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# **LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX**

## **DETAILED MAGNETOMETER SURVEY**



Report Number: 1115

November 2015

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**LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD,  
BRADWELL-ON-SEA, ESSEX**

**DETAILED MAGNETOMETER SURVEY**

Prepared for:  
Mr Arthur Thurtle  
Port Flair Ltd  
Waterside  
Bradwell on Sea  
Essex  
CM0 7RB

By:  
Martin Brook BA PCIfA

Britannia Archaeology Ltd  
**Unit The Old Wool Warehouse**  
**St Andrews Street South**  
**Bury St Edmunds**  
**Suffolk**  
**IP33 3PA**


T: 01449 763034

[info@britannia-archaeology.com](mailto:info@britannia-archaeology.com)

[www.britannia-archaeology.com](http://www.britannia-archaeology.com)

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November 2015

<b>Site Code</b>	BRBM15	<b>NGR</b>	TL 99527 07542
<b>Planning Ref.</b>	FUL/MAL/15/00142	<b>OASIS</b>	britanni1-228521
<b>Approved By</b>	Dan McConnell	<b>DATE</b>	November 2015
			



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## **ABSTRACT**

*In November 2015 Britannia Archaeology Ltd (BA) undertook a detailed magnetometer survey on Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex (NGR TL 99527 07542). The survey was conducted over the area of a proposed static holiday caravan park and will inform the Environmental Impact Assessment (EIA) to be submitted in support of the proposed planning application (ref. FUL/MAL/15/00142).*

*An abundance of 'iron spike' responses were recorded through the dataset. It is possible that some of these responses may have archaeological derivation however it is extremely likely that these represent nothing more than ferrous debris introduced into the topsoil during episodes of manuring.*

*Five positive linear trends were recorded in the dataset. These have been interpreted as buried agricultural ceramic land drains.*

*One large and two small areas of magnetic disturbance were recorded. The large area of disturbance was located along the western boundary of the site. This area of the site is known to have been subject to a series of reclamation and consolidation events from the mid-20<sup>th</sup> century onwards. The two smaller areas of magnetic disturbance present in the data represent the former location of known modern structures.*

*One dipolar linear trend marks the location of a probable buried modern pipe. The route of the pipe runs from the eastern boundary and is orientated east to west across the site.*



## 1.0 INTRODUCTION

In November 2015 Britannia Archaeology Ltd (BA) undertook a detailed magnetometer survey on behalf of Mr Arthur Thurtle, Port Flair Ltd, Waterside, Bradwell on Sea, Essex, CM0 7RB. The survey was conducted over the area of a proposed static holiday caravan park (6 .0 ha) on Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex (NGR TL 99527 07542). This survey will inform the Environmental Impact Assessment (EIA) to be submitted in support of the proposed planning application (ref. FUL/MAL/15/00142).

## 2.0 SITE DESCRIPTION

The site is situated in two fields currently utilised as pasture and is located in Bradwell-on-Sea, Essex. It is bound to the north, east and south by the B1021 (Waterside Road), and to the west by land set aside for car parking, boat yards and the Bradwell marina complex itself. (Fig. 1)

The bedrock geology is Thames Group - Clay, Silty. This sedimentary bedrock formed approximately 34 to 56 million years ago in the Palaeogene period when the local environment was dominated by deep seas. (BGS, 2015).

Superficial deposits are described as River Terrace Deposits 2 - Sand and Gravel. These superficial deposits formed up to 3 million years ago in the Quaternary period. The local environment would have previously been dominated by rivers. (BGS, 2015).

## 3.0 PLANNING POLICIES

The archaeological investigation was to be carried out on the recommendation of the local planning authority, following guidance laid down by the National Planning and Policy Framework (NPPF, DCLD 2012) which replaces Planning Policy Statement 5: Planning for the Historic Environment (PPS5, DCLG 2010). The relevant local planning policy is the *Mid Suffolk Local Plan; (1998)*.

## 4.0 ARCHAEOLOGICAL BACKGROUND

There are extensive cropmarks of probable prehistoric-Roman date to the east of the proposed development. The site itself was part of the manorial holdings of Bradwell Hall. To the north-west were former oyster-pits, while in the estuary itself, is a set of scheduled Saxon fish-traps. The location of the site on the edge of the former salt-marsh/dry-land boundary is one favoured by the Roman salt-making industry for which there is extensive evidence around the Essex coast. The area has been assessed as part of the Historic Environment Characterisation projects undertaken for Maldon District Council which have highlighted the diversity of the historic environment assets present and their sensitivity to change.



## 5.0 PROJECT AIMS

A non-intrusive geophysical survey is to be undertaken ahead of the development to inform the Environmental Impact Assessment (EIA). Any decision about the need for, and extent of, further archaeological mitigation will be taken following the geophysical survey and submission of a desk based assessment.

## 6.0 METHODOLOGY

The survey grid was set out to the Ordnance Survey OSGB36 datum to an accuracy of  $\pm 0.01\text{m}$  using a Leica Viva Glonass Smart Rover GS08.

A Bartington Dual Grad 601-2 fluxgate gradiometer was used to undertake the survey, because of its high sensitivity and rapid ground coverage. The soils and underlying geology are receptive to magnetometer survey, but good results are heavily dependent on the contrast between the fills of a feature (with humic and charcoal rich deposits providing the best results) and the relative weakness of the local magnetic background field.

Only minimal processing of the datasets has been undertaken, typically de-spike and zero mean traverse. The raw and processed greyscale plots have been produced for comparison. An XY trace plot consisting of the processed data will be used in combination with raw and processed greyscale data. An interpretation plan characterising the anomalies has been produced based on the evidence collated from the greyscale and XY trace plots.

## 7.0 RESULTS (Figs. 2-6)

The site proved well suited to magnetometry and the field conditions were not prohibitive. The location of the existing boat yard on the western boundary required some proposed grids be avoided in order to cut down on interference. In total 155 grids proved suitable for survey (Fig. 2).

### 7.1 Gradiometer Results and Interpretation

An abundance of 'iron spike' responses were recorded through the dataset. It is possible that some of these responses may have archaeological derivation however it is extremely likely that these represent nothing more than ferrous debris introduced into the topsoil during episodes of manuring. A slightly higher concentration was recorded near the eastern boundary of the site in grids 145, 146, 151 and 152. This is located near a known entrance to the southern half of the field and the higher concentration can be explained simply by the increased utilization of this area as an access point.

Five positive linear trends were recorded in the dataset. These have been interpreted as buried agricultural ceramic land drains.



One large and two small areas of magnetic disturbance were recorded. The large area of disturbance was located along the western boundary of the site. This area of the site is known to have been subject to a series of reclamation and consolidation events from the mid-20<sup>th</sup> century onwards. The reclamation of the salt-marsh to dry-land boundary was key in the construction of the current boat yard and marina complex. The resulting spread of material is likely to have been sourced from dredging events within the marina itself and likely contains building demolition and metallic debris. It was noted by the surveyors that the area contained debris protruding from the ground including pieces of metal and rope. The two smaller areas of magnetic disturbance present in the data (grids 32 and 82) represent the former location of known structures, the foundations of which were still visible at the time of survey.

## **7.2 Gradiometer Results and Interpretation - Modern Services / Installations**

Two dipolar responses mark the location of current standing telegraph poles on the site and the associated earthing wires located next to them.

A large dipolar response on the eastern boundary (Grids 151 and 152) marks the location of a large ferrous pipe that has been placed across a gap in the boundary hedge, to prevent illegal access to the site. This access was previously open at points.

One dipolar linear trend marks the location of a probable buried modern pipe. The route of the pipe runs from the eastern boundary and is orientated east to west across the site for approximately 95.00m. It is likely that the function of this pipe would have been to drain into the salt-marsh before the area was reclaimed. It is worth noting that two of the positive linear trends appear to terminate either in or next to this anomaly. These trends have been interpreted as buried agricultural ceramic land drains which give credence to the interpretation of the anomaly as a metal drain pipe. The land opposite the eastern boundary once contained a row of (now demolished) cottages, it is possible that this drain once serviced them.

## **8.0 CONCLUSIONS**

The detailed gradiometer survey has been successful in detecting anomalies of possible archaeological interest within the site, however these are all 'iron spike' anomalies and while they may have an archaeological origin, it is also quite likely that they are nothing more than ferrous material that has been introduced into the topsoil. Additional areas of increased magnetic response and at least one modern pipe were also identified.

Numerous anomalies can be identified within the greyscale plot. It is difficult to discriminate between anomalies of geological and possibly archaeological origins. Whilst it is considered likely that significant archaeological remains would have produced identifiable anomalies, the confidence with which these anomalies can be interpreted is somewhat reduced given the site's known history.

The existing boatyard adjacent to the site was constructed in the last 25 years and the level of the western half of the site raised from a low lying salt-marsh to its current level.





The material used in the reclamation process to raise the level of the land was sourced from the marina itself. This process is likely to have contained material which would cause readings on the magnetometer that could be potentially interpreted as archaeological anomalies.

## **9.0 PROJECT ARCHIVE AND DEPOSITION**

A full archive will be prepared for all the work undertaken in accordance with the *Selection, Retention and Dispersion of Archaeological Collections*, Archaeological Society for Museum Archaeologists 1993. Arrangements will be made for the archive to be deposited with the relevant museum/HER office.

## **10.0 ACKNOWLEDGEMENTS**

Britannia Archaeology Ltd would like to thank Mr Arthur Thurtle for commissioning and funding the project. Our thanks also to Maria Medlycott and Helen Saunders at Essex County Council for their input and advice.



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## APPENDIX 1 OASIS FORM

OASIS FORM - Print view

# 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: britanni1-228521

### Project details

Project name	Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex
Short description of the project	In November 2015 Britannia Archaeology Ltd (BA) undertook a detailed magnetometer survey on Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex (NGR TL 99527 07542). The survey was conducted over the area of a proposed static holiday caravan park and will inform the Environmental Impact Assessment (EIA) to be submitted in support of the proposed planning application (ref. FUL/MAL/15/00142). An abundance of 'iron spike' responses were recorded through the dataset. It is possible that some of these responses may have archaeological derivation however it is extremely likely that these represent nothing more than ferrous debris introduced into the topsoil during episodes of manuring. Five positive linear trends were recorded in the dataset. These have been interpreted as buried agricultural ceramic land drains. One large and two small areas of magnetic disturbance were recorded. The large area of disturbance was located along the western boundary of the site. This area of the site is known to have been subject to a series of reclamation and consolidation events from the mid-20th century onwards. The two smaller areas of magnetic disturbance present in the data represent the former location of known modern structures. One dipolar linear trend marks the location of a probable buried modern pipe. The route of the pipe runs from the eastern boundary and is orientated east to west across the site.
Project dates	Start: 02-11-2015 End: 04-11-2015
Previous/future work	No / Not known
Any associated project reference codes	BRBM15 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Other 15 - Other
Monument type	RECLAMATION Modern
Significant Finds	NONE None
Investigation type	"Geophysical Survey"
Prompt	Planning condition
Solid geology	LONDON CLAY
Drift geology	RIVER TERRACE DEPOSITS
Techniques	Magnetometry

OASIS FORM - Print view.htm[25/11/2015 08:20:45]



OASIS FORM - Print view

#### Project location

Country England  
Site location ESSEX MALDON BRADWELL ON SEA Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex  
Postcode CM0 7RB  
Study area 6 Hectares  
Site coordinates TL 99527 07542 51.730486362826 0.889666827319 51 43 49 N 000 53 22 E Point

#### Project creators

Name of Organisation Britannia Archaeology Ltd  
Project brief originator Local Authority Archaeologist and/or Planning Authority/advisory body  
Project design originator Martin Brook  
Project director/manager Martin Brook  
Project supervisor Martin Brook  
Type of sponsor/funding body Landowner  
Name of sponsor/funding body Port Flair Ltd

#### Project archives

Physical Archive Exists? No  
Digital Archive recipient Essex HER  
Digital Archive ID BRBM15  
Digital Contents "none"  
Digital Media available "GIS", "Geophysics", "Images raster / digital photography", "Survey", "Text"  
Paper Archive recipient Essex HER  
Paper Archive ID BRBM15  
Paper Contents "none"  
Paper Media available "Map", "Miscellaneous Material", "Plan", "Report"

#### Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)

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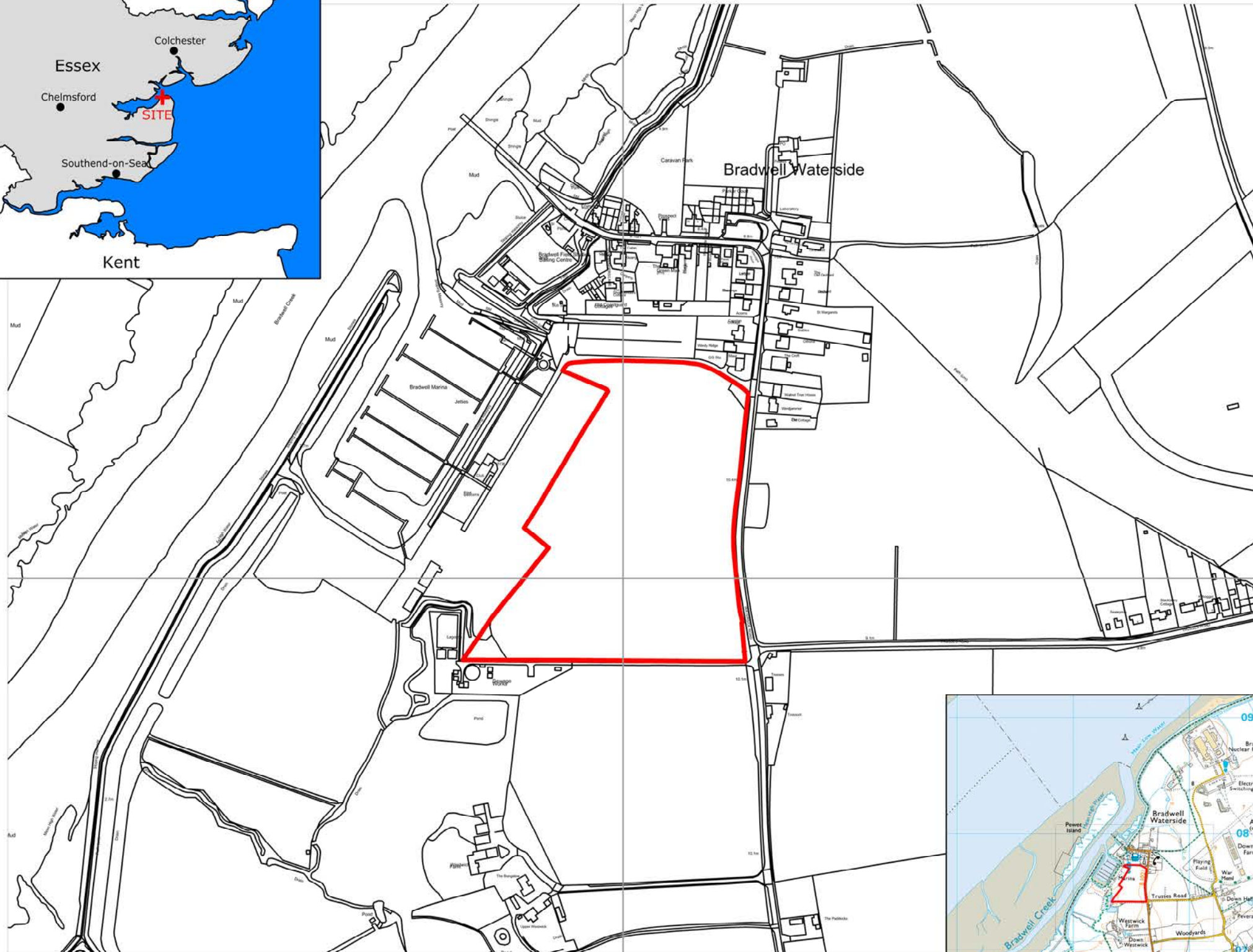
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Title Land Adjacent to Bradwell Marina, Waterside Road, Bradwell-on-Sea, Essex  
Author(s)/Editor(s) Brook, M.  
Other bibliographic details R1115  
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Issuer or publisher Britannia Archaeology Ltd  
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URL [www.britannia-archaeology.com](http://www.britannia-archaeology.com)

Entered by Martin Brook ([martin@britannia-archaeology.com](mailto:martin@britannia-archaeology.com))  
Entered on 25 November 2015

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



 Site Boundary

NGR: 599500 207500 REFERENCE: R1115

PROJECT:  
LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**


DESCRIPTION:  
GENERAL LOCATION PLAN

**BRITANNIA ARCHAEOLOGY LTD**

UNIT 2  
THE OLD WOOL WAREHOUSE,  
ST ANDREWS STREET SOUTH,  
BURY ST EDMUNDS,  
SUFFOLK, IP33 3PH

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SCALE:  
1:5000 

PLOT: A3 APPROVED: MB VERSION: 02

DATE: OCT 2015 AUTHOR: MCA FIGURE: 01

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 Site Boundary

NGR: 599500 207500 REFERENCE: R1115


PROJECT:  
LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**

DESCRIPTION:  
SURVEY GRID & GEOREFERENCING PLAN

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 ST ANDREWS STREET SOUTH,  
 BURY ST EDMUNDS,  
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SCALE:  
1:1250  Plans 50m

PLOT: A3 APPROVED: MB VERSION: 01

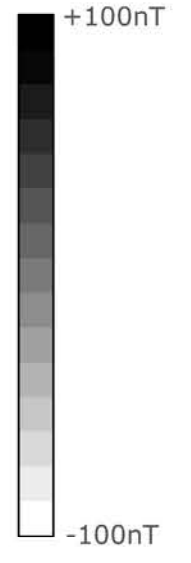
DATE: OCT 2015 AUTHOR: DPM FIGURE: 02

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Trusses





 Site Boundary

NGR: 599500 207500 REFERENCE: R1115

PROJECT:  
LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**

DESCRIPTION:  
RAW MAGNETOMETER GREYSCALE PLOT

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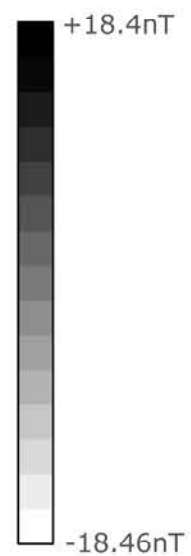
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SCALE:  
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PLOT: A3 APPROVED: MB VERSION: 01

DATE: OCT 2015 AUTHOR: DPM FIGURE: 03

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 Site Boundary

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PROJECT:  
LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**

DESCRIPTION:  
PROCESSED MAGNETOMETER GREYSCALE PLOT

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PLOT: A3 APPROVED: MB VERSION: 01

DATE: OCT 2015 AUTHOR: DPM FIGURE: 04

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PROJECT:  
LAND ADJACENT TO BRADWELL  
MARINA, WATERSIDE ROAD,  
BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**

DESCRIPTION:  
PROCESSED MAGNETOMETER XY  
TRACE PLOT

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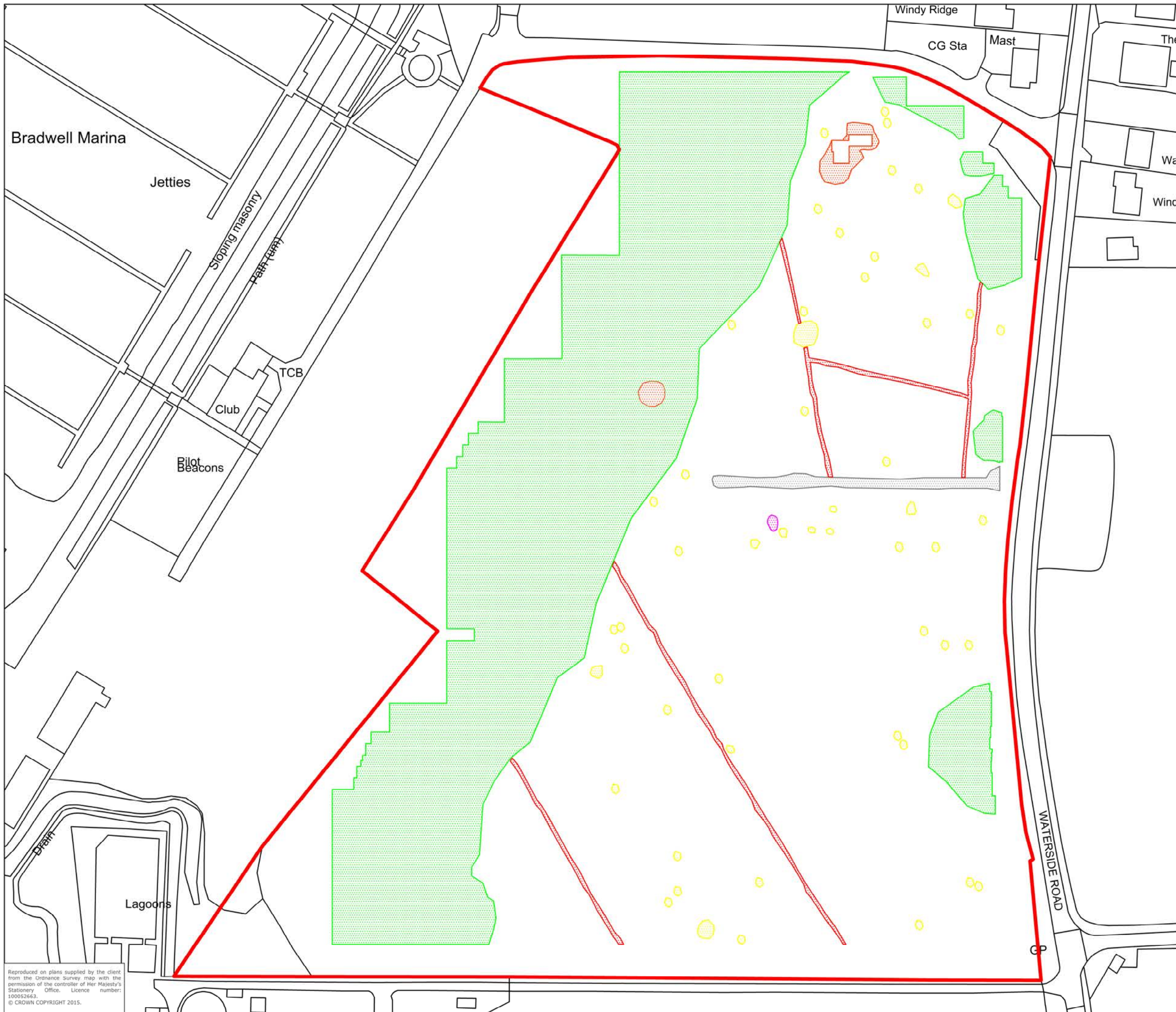
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	Area of Magnetic Disturbance
	Modern Dipolar Response
	Dipolar Linear Trend
	Positive Linear Trends
	Thermoremanent Response
	Isolated Dipolar Response
	Site Boundary

NGR: 599500 207500 REFERENCE: R1115

PROJECT:  
LAND ADJACENT TO BRADWELL MARINA, WATERSIDE ROAD, BRADWELL-ON-SEA, ESSEX

CLIENT:  
 **Bradwell Marina**

DESCRIPTION:  
INTERPRETATION PLAN OF MAGNETOMETER ANOMALIES

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