



**Geophysical Survey of land at the proposed  
site of East Midlands Intermodal Park  
Etwell, Derbyshire  
(September - December 2013)**

Report No. 14/32

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Illustrators: Ian Fisher  
Amir Bassir





**Geophysical Survey of land at the proposed  
site of East Midlands Intermodal Park  
Etwall, Derbyshire  
September - December 2013**

DBYMU.2013.105

Report No. 14/32

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**OASIS REPORT FORM**

<b>PROJECT DETAILS</b>		OASIS No: molanort1_170814	
Project name	Geophysical survey of land at the proposed site of East Midlands Intermodal Park, Etwall, Derbyshire, September to December 2013		
Short description	Northamptonshire Archaeology (now trading as MOLA) was commissioned to carry out an archaeological geophysical survey on c109ha of land at the proposed site of East Midlands Intermodal Park (EMIP), south of Etwall, Derbyshire. The survey identified features relating to modern land use.		
Project type	Geophysical survey		
Site status	None		
Previous work	Desk-based assessment (Stephenson 2014)		
Current Land use	Arable		
Future work	Unknown		
Monument type/ period	Prehistoric ring ditch and enclosure cropmarks		
Significant finds	None		
<b>PROJECT LOCATION</b>			
County	Derbyshire		
Site address	Boundary Lane, Etwall		
Study area	c260 ha (109ha surveyed)		
OS Easting & Northing	SK 27840 29530		
Height aOD	c52 - 63m aOD		
<b>PROJECT CREATORS</b>			
Organisation	Northamptonshire Archaeology (now trading as MOLA)		
Project brief originator			
Project Design originator			
Director/Supervisor	Ian Fisher		
Project Manager	Mark Holmes		
Sponsor or funding body	MOLA		
<b>PROJECT DATE</b>			
Start date	September 2013		
End date	December 2013		
<b>ARCHIVES</b>	Location	Content	
Physical			
Paper	DBYMU2013.105	Site survey records	
Digital		Geophysical survey & GIS data	
<b>BIBLIOGRAPHY</b>			
Title	Geophysical survey of land at the proposed site of East Midlands Intermodal Park, Etwall, Derbyshire, September to December 2013		
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# **GEOPHYSICAL SURVEY OF LAND AT THE PROPOSED SITE OF EAST MIDLANDS INTERMODAL PARK, ETWALL, DERBYSHIRE SEPTEMBER TO DECEMBER 2013**

## ***Abstract***

*Northamptonshire Archaeology (now trading as MOLA) was commissioned to carry out an archaeological geophysical survey on c109ha of land at the proposed site of East Midlands Intermodal Park (EMIP), south of Etwall, Derbyshire. The survey identified features relating to modern land use.*

## **1 INTRODUCTION**

Northamptonshire Archaeology (now trading as MOLA) was commissioned to carry out an archaeological geophysical survey on c109ha of land at the proposed site of East Midlands Intermodal Park (EMIP), Etwall, Derbyshire (Fig 1). The fieldwork was conducted from September to December 2013 and comprised the detailed magnetometer survey of c109ha of arable land.

## **2 TOPOGRAPHY AND GEOLOGY**

The survey area is located south of Etwall, c4km south-west of Derby, centred on NGR SK 27840 29530. It comprises a block of predominantly arable farmland bounded by the A5132, Carriers Road, in the south, the A50 in the north, the A38 in the east and Etwall Road in the west (Fig 1). The site is relatively flat with a gentle southwards slope. It lies at 63m aOD in the north and slopes down to 52m aOD in the south. A 19th-century railway line bisects the survey area from east to west.

The underlying solid geology is mapped as Triassic mudstones, siltstones and sandstones of the mid-late Triassic Mercia Mudstone Group. Superficial deposits of Eggington Common Sand and Gravel Member are mapped in the southern and north-western parts, whilst Etwall Sand and Gravel Member are to be found in the northern and north-eastern parts. Finder Clay deposits are also mapped in patches in the north-east (Stephenson 2014).



Within the survey area there are extensive areas of worked (unfilled, disused sand and gravel pits and sandstone and mudstone quarries) and made ground (wholly or partly backfilled with quarry spoil and other waste material) (Stephenson 2014).

### **3 ARCHAEOLOGICAL BACKGROUND**

A desk-based assessment of the survey area has been undertaken and provides the main source for this summary (Stephenson 2014).

The earliest known remains from the survey area are prehistoric. Cropmarks have been identified from aerial photographs of the site. These indicate a ring ditch on Eggington Common (19601-MDR2585, SK 284291) and a rectangular enclosure with two linear features, south of Boundary Road, Etwall (19621-MDR2589) (Fig 1).

Within the survey area, no evidence for the Roman period has been recorded. However, the A38, which forms the eastern boundary of the site, follows the line of Rykniel Street, a former Roman Road.

No evidence for early medieval to post-medieval remains has been recorded within the survey area. However, quarrying (post-medieval and modern) and sewage farm work installations over approximately a third of the site may have removed deposits containing archaeological remains (Fig 2).

### **4 METHODOLOGY**

The magnetometer survey was conducted with Bartington Grad 601-2, twin sensor array, vertical component fluxgate gradiometers (Bartington and Chapman 2003). These are standard instruments for archaeological survey and can resolve magnetic variations as slight as 0.1 nanoTesla (nT).

An independent network of 30m grid squares was established within each of the fields to be surveyed. The grids were set out with a tape measure and optical square and were tied in to the Ordnance Survey National Grid by means of a Leica 1200 dGPS. The gradiometers were carried at a brisk but steady pace through each grid square,

collecting data along 1m spaced traverse lines. Measurements were automatically triggered every 0.25m along the traverses, giving a total of 3600 measurements per square.

All fieldwork methods complied with the guidelines issued by English Heritage and by the Institute for Archaeologists (EH 2008; IfA 2011).

The survey data were processed using Geoplot 3.00v software. The striping was removed using the 'Zero Mean Traverse' function and destaggering of the data was performed where necessary.

The processed data is presented in this report in the form of greyscale plots at a range of +4nT (black) to -4nT (white). These have been scaled, rotated and resampled (georectified) for display against the Ordnance Survey base mapping in Figures 3, 5, 7, 9, 11 and 13. Interpretative overlays are presented in Figures 4, 6, 8, 10, 12 and 14.

## **5 SURVEY RESULTS**

### **5.1 Summary (Figs 3 & 4)**

Anomalies relating to modern land uses dominate the survey results and although cropmarks suggest the presence of archaeologically significant remains none have been detected. Areas of made and worked ground were not targeted to be surveyed. However, the results do indicate small areas of made and/or worked ground within the survey area.

### **5.3 Ridge and furrow (Figs 11 & 12)**

In Field 8, parallel sinuous linear anomalies indicate the remains of remnant furrows of medieval ridge and furrow cultivation. These anomalies are magnetically weak and are not visible across the whole field.

### **5.3 Field boundaries (Figs 7-10 & 13-14)**

Former field boundaries have been recorded in Fields 3, 4, 6 and 9-11. These are weak positive linear anomalies and have been identified from Ordnance Survey maps. The north-west to south-east boundary in Field 3 is partially surviving.

**5.4 Pipelines and trackways** (Figs 5-14)

The survey results indicate a network of pipelines and former trackways throughout the survey area. The pipelines mainly run along existing field boundaries and tracks. However, a herringbone pattern of pipelines and tracks has been identified in Field 8 (Figs 11-12). The pipelines served the sewage farm works and the trackways provided access to the pipelines. The trackways in Field 8 have been since removed. The pipelines identified in Field 3, are most likely to be modern services not related to the sewage farm works.

**5.5 Land drains** (Figs 5-12)

Sets of parallel linear anomalies have been identified as land drains in Fields 2, 3, 6 and 8. The anomalies are characteristic of land drains.

**5.6 Ferrous noise/disturbance** (Figs 5-14)

Several areas of ferrous noise/disturbance have been identified by the survey. A rectangular area of magnetic disturbance in Field 2 indicates a former landfill site (Figs 2, 5 & 6). This area was occupied by woodland, Fox Covert, prior to the landfill.

A linear band and an amorphous area of magnetic noise/disturbance in Field 3 may indicate the former groundworks for a pipeline installation (Google Earth) (Figs 7 & 8). A small circular area of disturbance in the data corresponds to a standing tree in the north-east corner of the field. On the northern edge of Field 3, a circular area of noise indicates debris surrounding a surviving World War II pillbox (MDR7874 DOBS10000138) (Fig 1).

The majority of Field 4 has been subjected to groundworks and consists of made ground (Figs 7 & 8). This is evident in the data. An area of noise on the eastern edge of the field correlates with a concentration of rubbish and indicates a mapped area of worked and made ground. An area was unsurveyable due to raised and overgrown ground that supports a pylon base. Cropmarks have been recorded on the south-western edge of the unsurveyable area (MDR2589) but the subsequent groundworks have removed them.

Two areas of modern litter and rutted ground on the eastern edge of Field 6 account for two small areas of noise in the data here (Figs 9 & 10).

On the eastern edge of Field 8, an area of worked ground has been mapped (Figs 2, 11 & 12). The survey data has recorded several small areas of magnetic/noise and disturbance on the eastern edge of the survey area. The eastern edge of the field was not surveyed as it was overgrown. Air photographs record a ring ditch (MDR2585) in this area close to the junction of natural and worked ground (Fig 1). The survey did not survey the entire area of the cropmarks but the groundworks may have removed them.

#### **5.7 Ferrous objects (Figs 5-14)**

The small magnetic dipoles which are scattered across the survey area will mostly have been caused by small pieces of ferrous debris within the topsoil.

### **6 CONCLUSION**

The geophysical survey did not identify any significant archaeological features. Cropmarks have been recorded within the survey area in areas that are mapped as worked and/or made ground but are not surveyable. However, the ground works have probably since removed them. The survey was successful in recording features of modern origin.

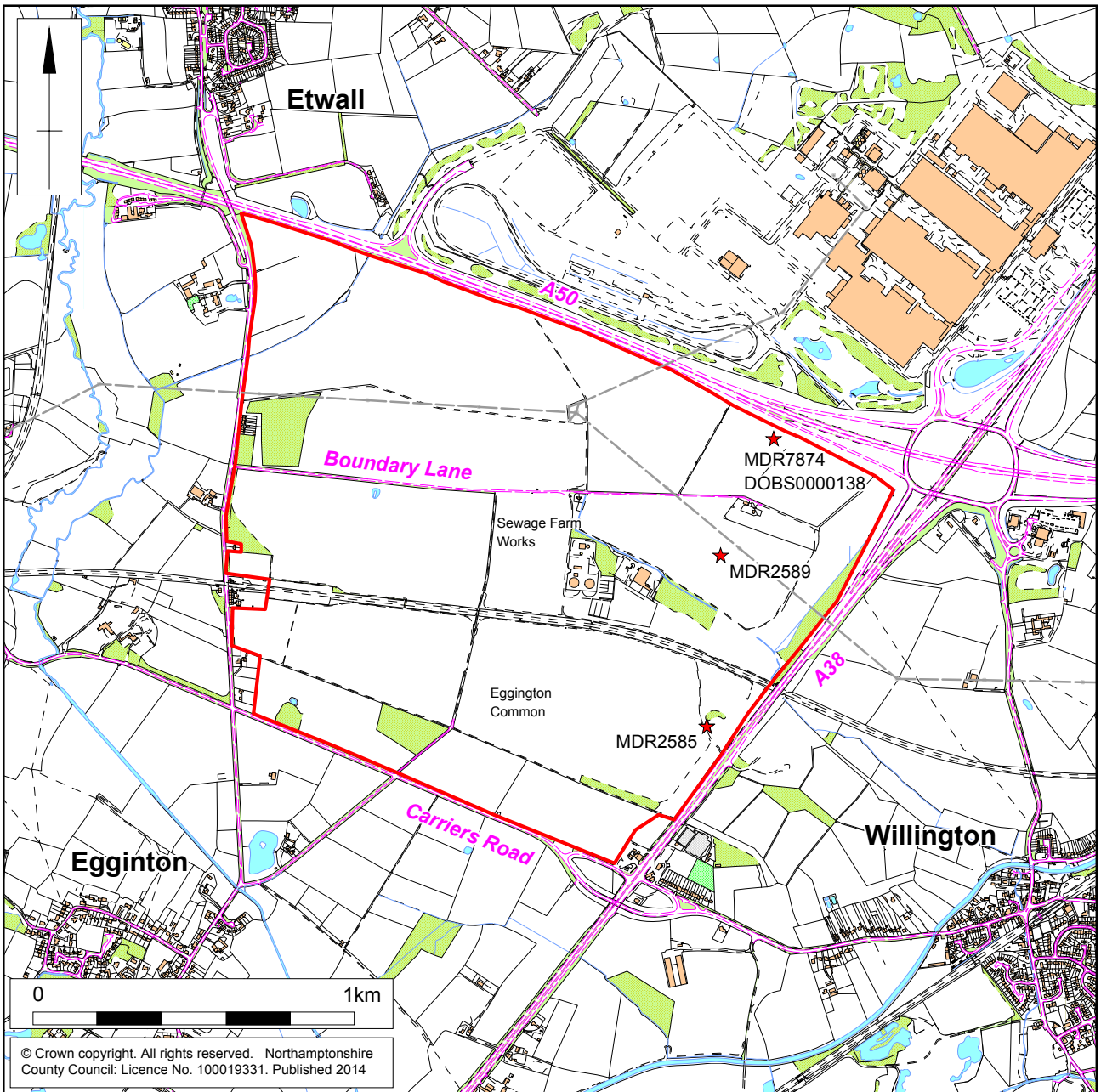
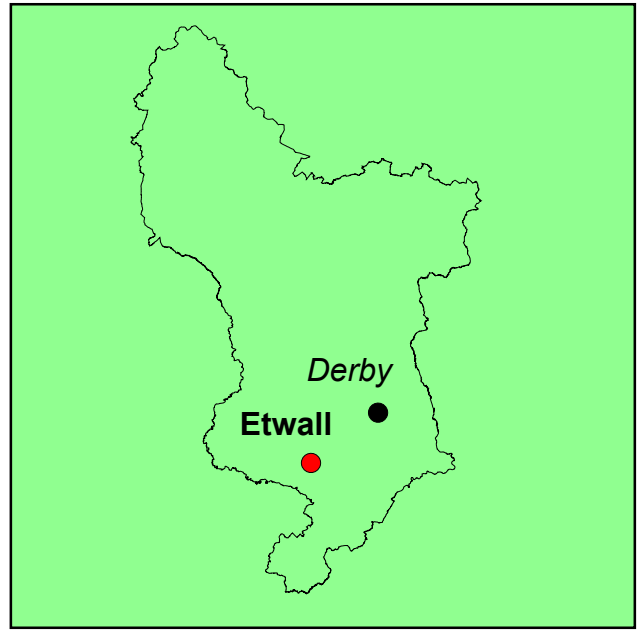
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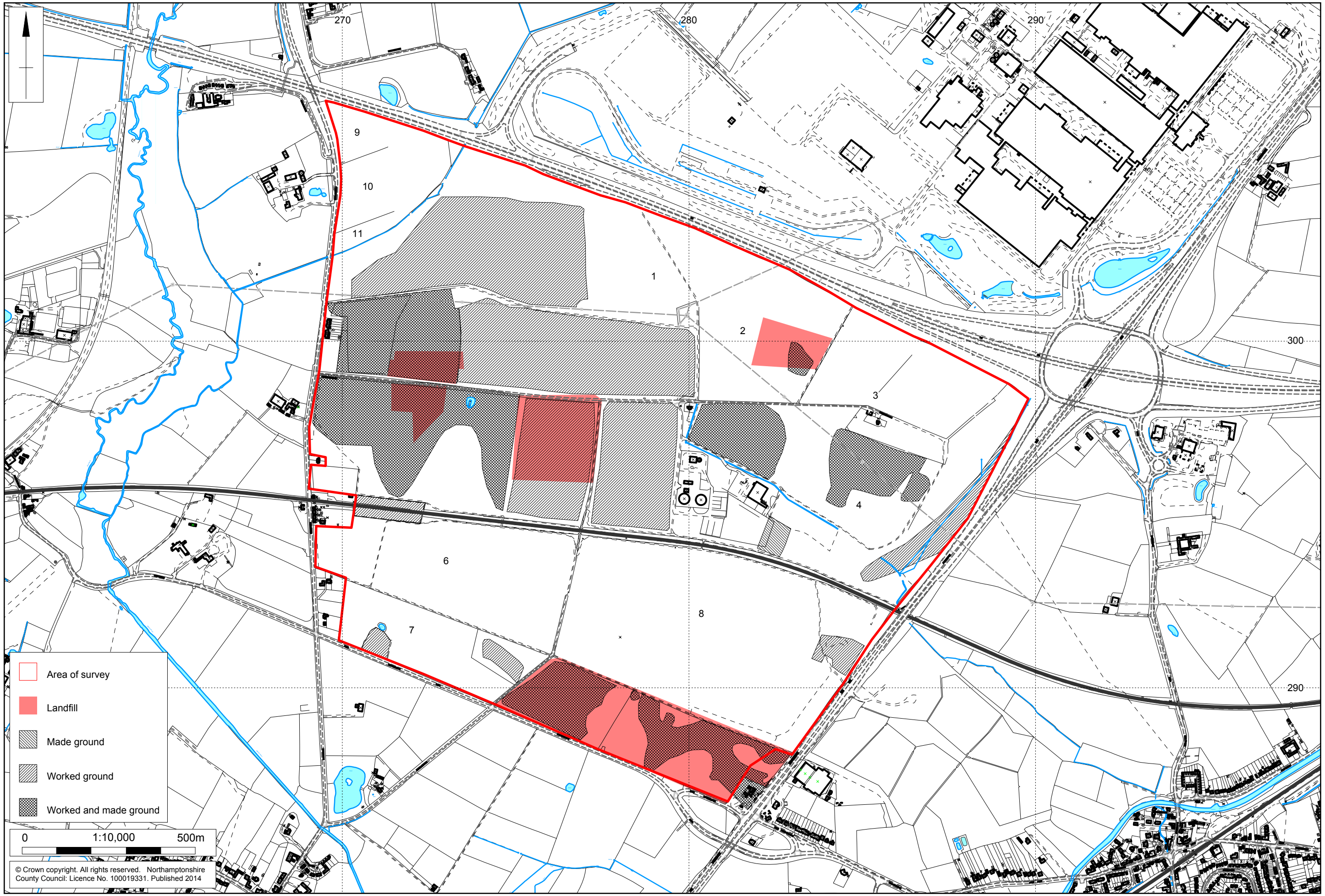
IfA 2011 *The Use of Geophysical Techniques in Archaeological Evaluations*, Institute for Archaeologists

Stephenson, A, 2014 *East Midlands Intermodal Park, Etwall, Derbyshire An Historic Environment Assessment January 2014*, Museum of London Archaeology



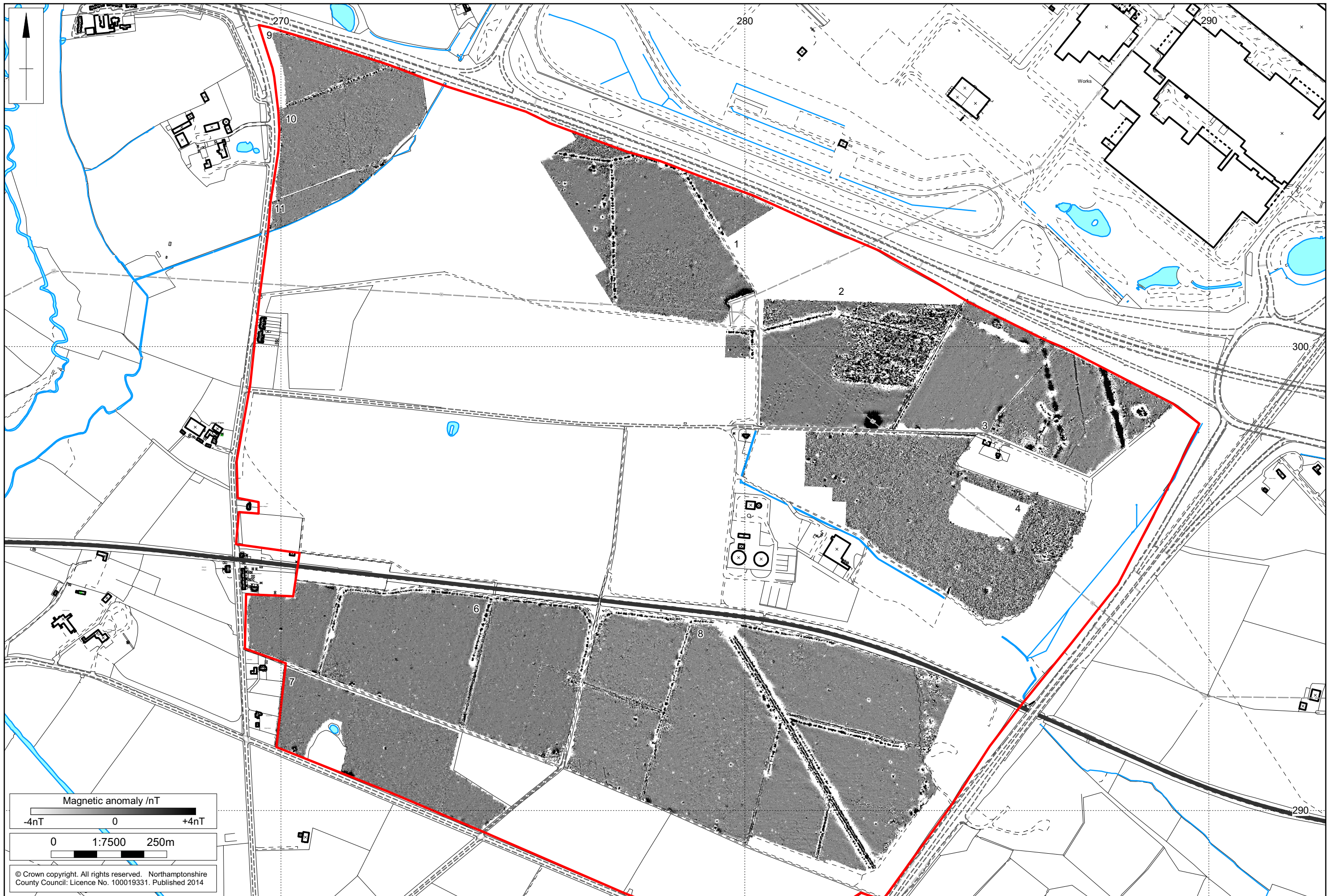
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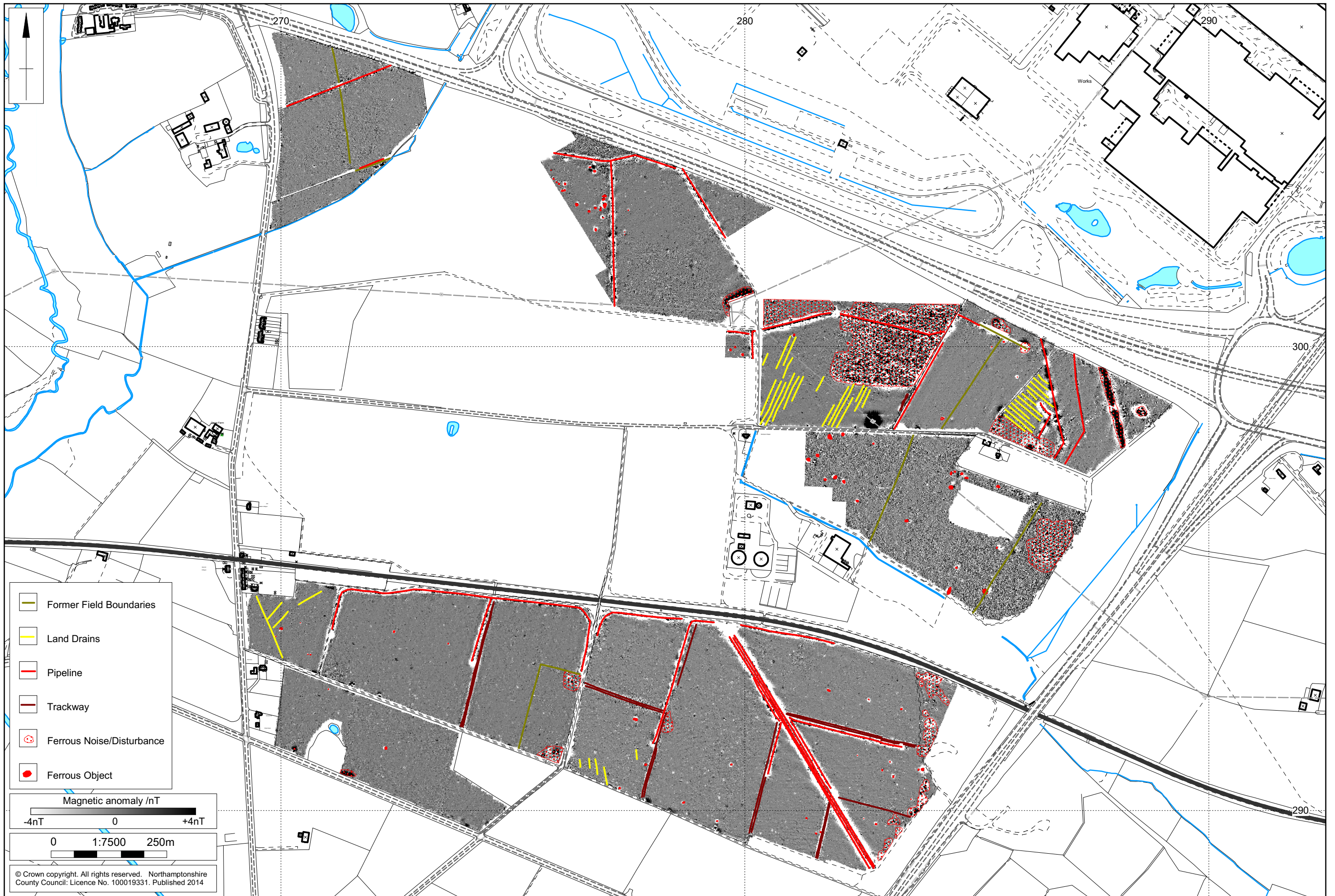
Site Location Fig 1



Scale 1:10,000 (A3)

Extent of Previous Impacts Fig 2

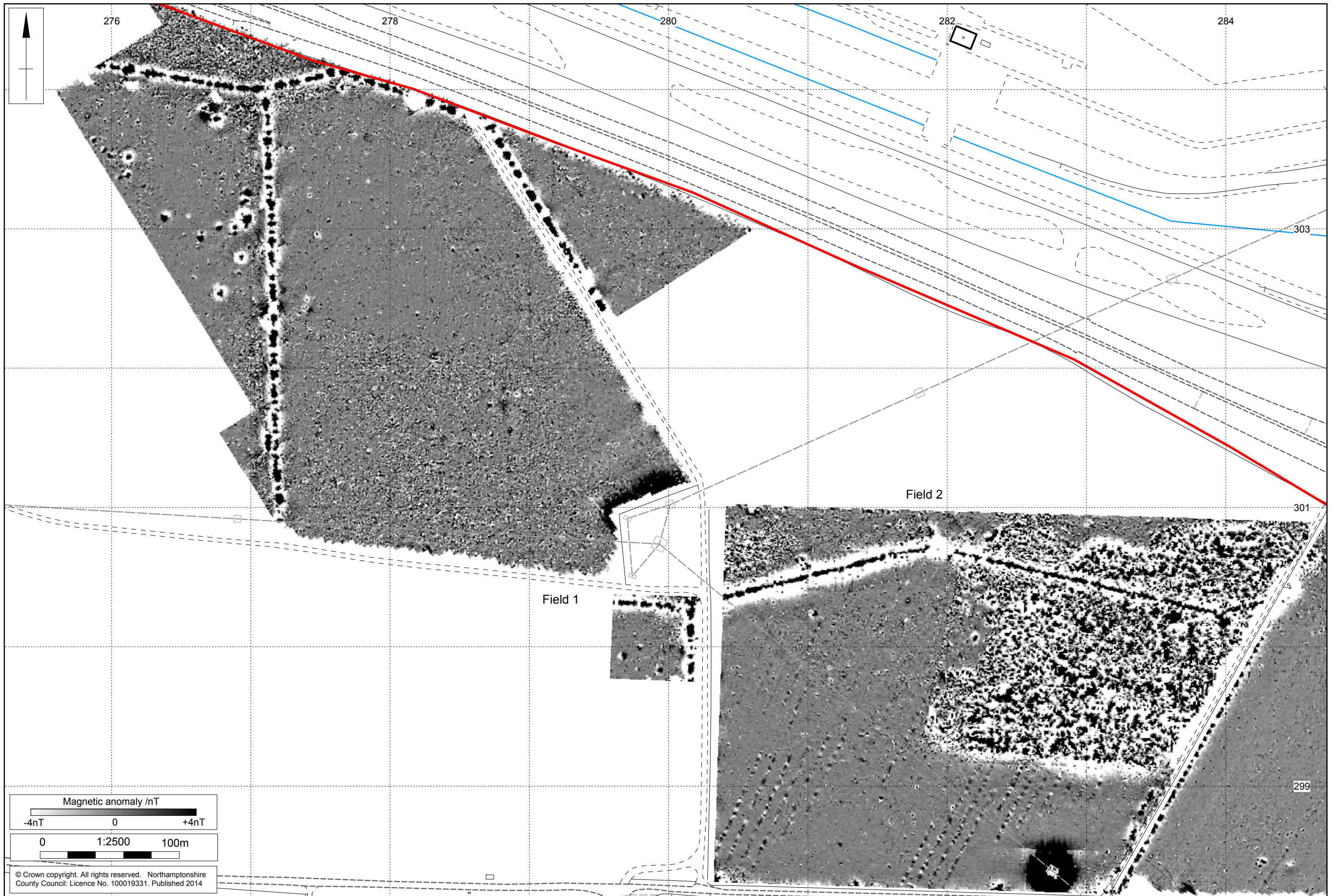


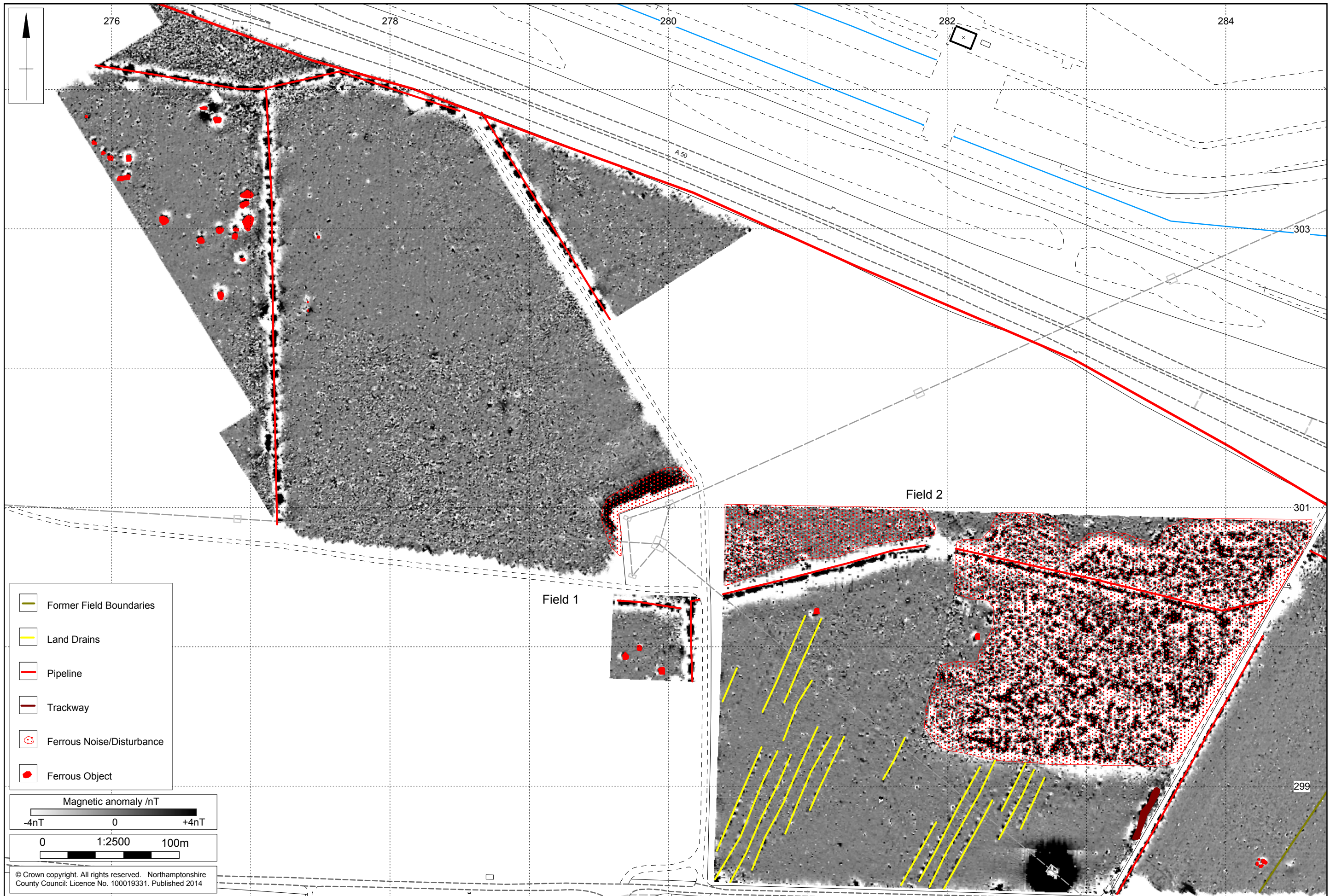


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Etwall, Overall Geophysical Survey Interpretation Fig 4

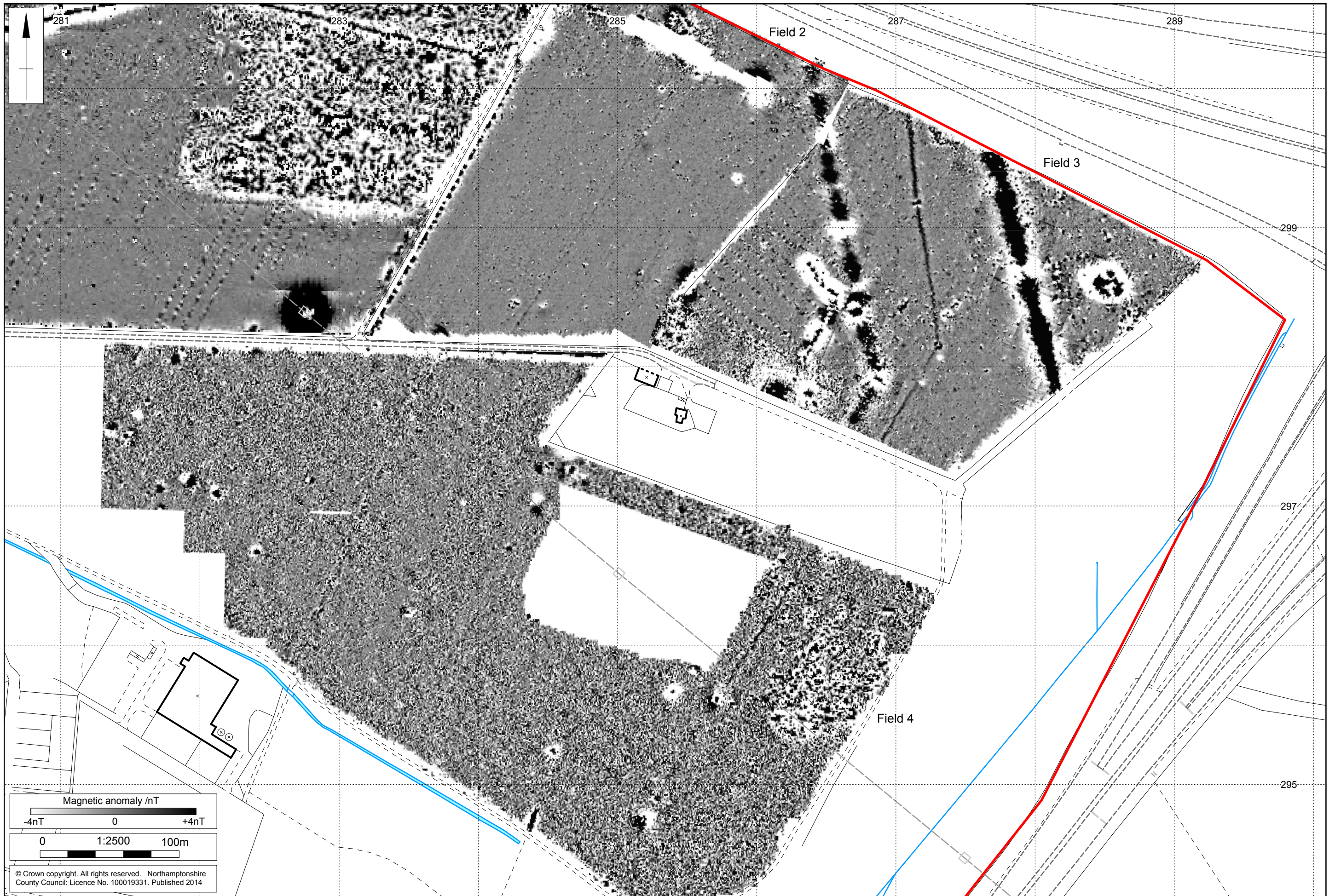


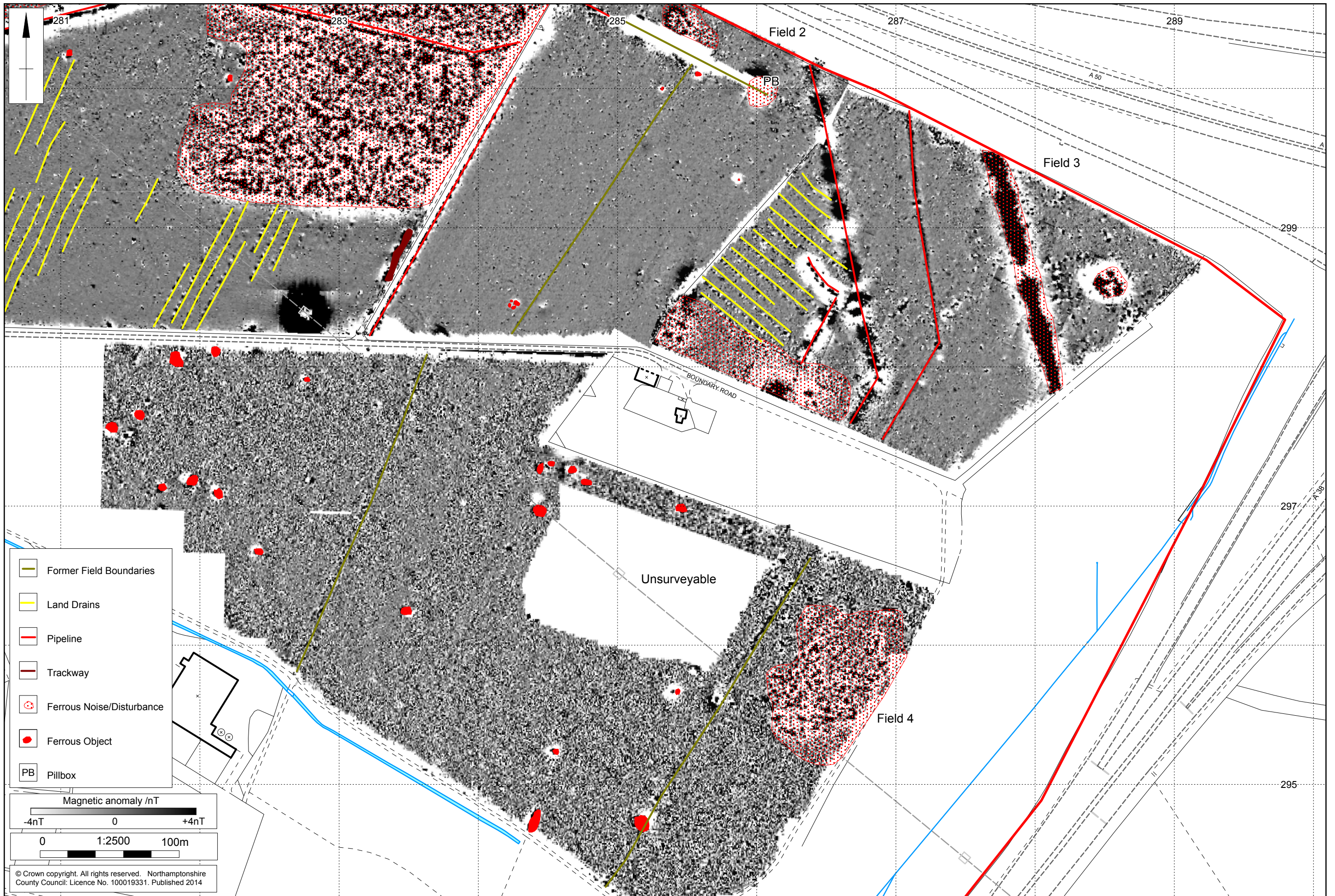




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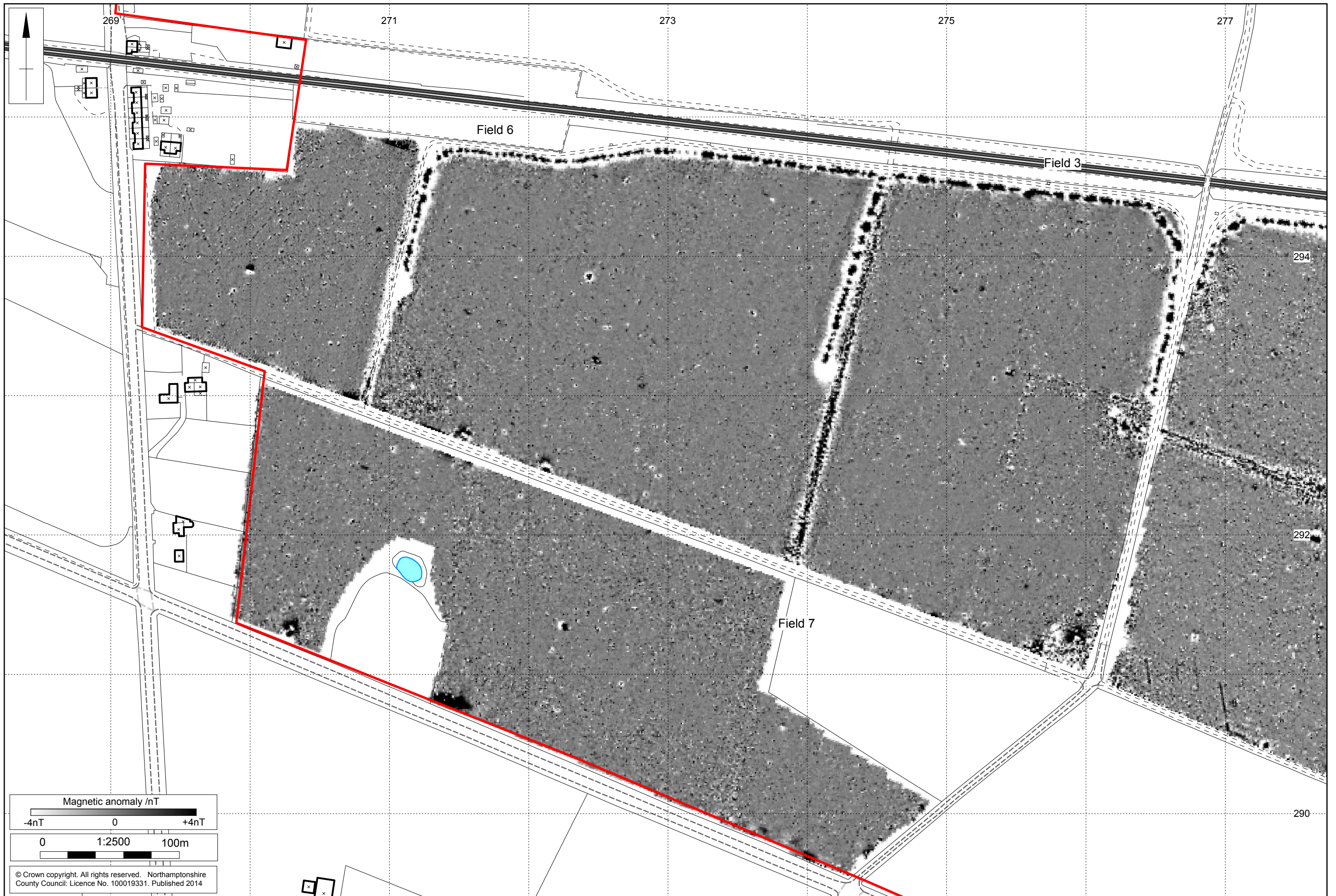
Geophysical Survey Interpretation Fields 1 & 2 Fig 6





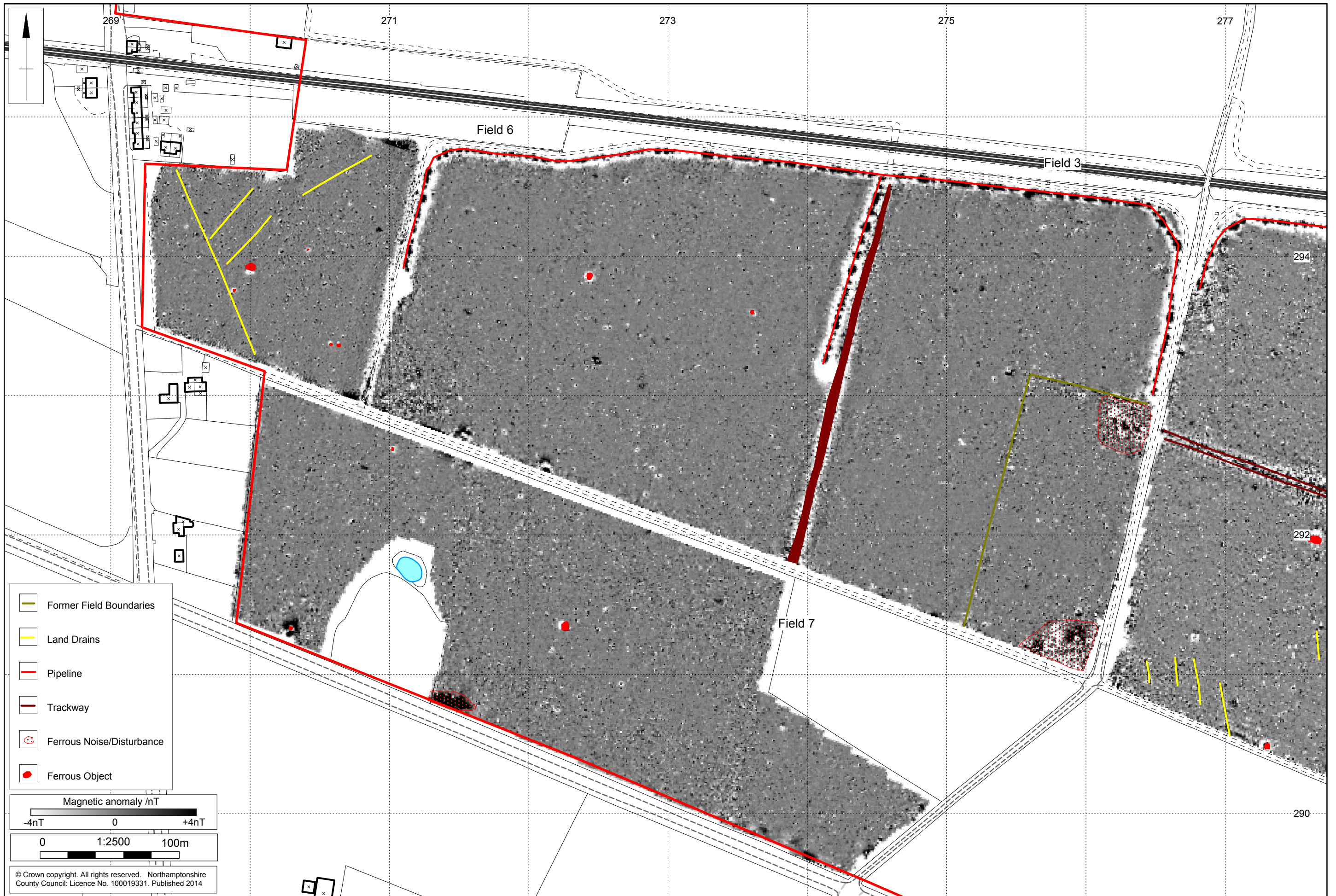
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Geophysical Survey Interpretation Fields 3 & 4 Fig 8



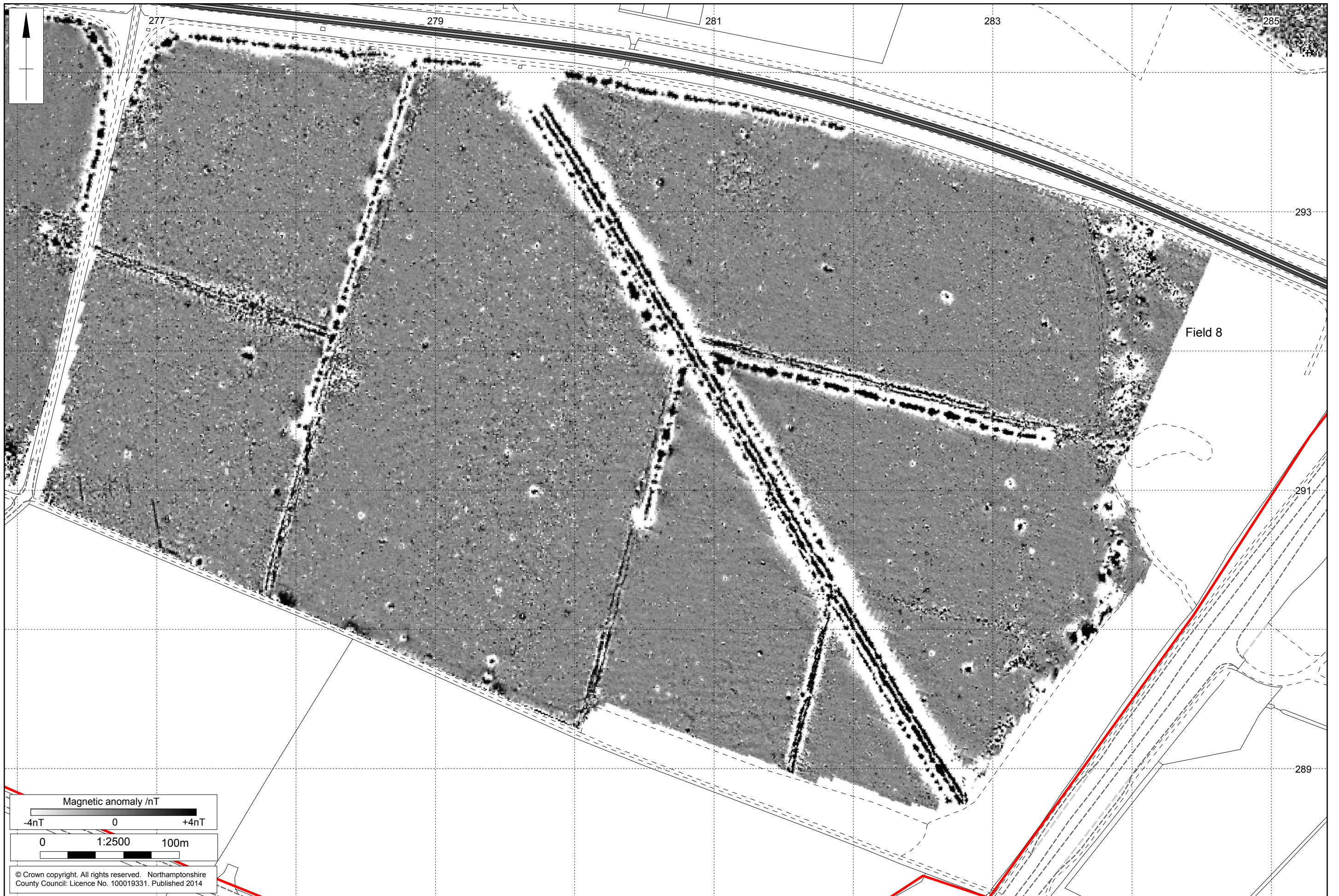
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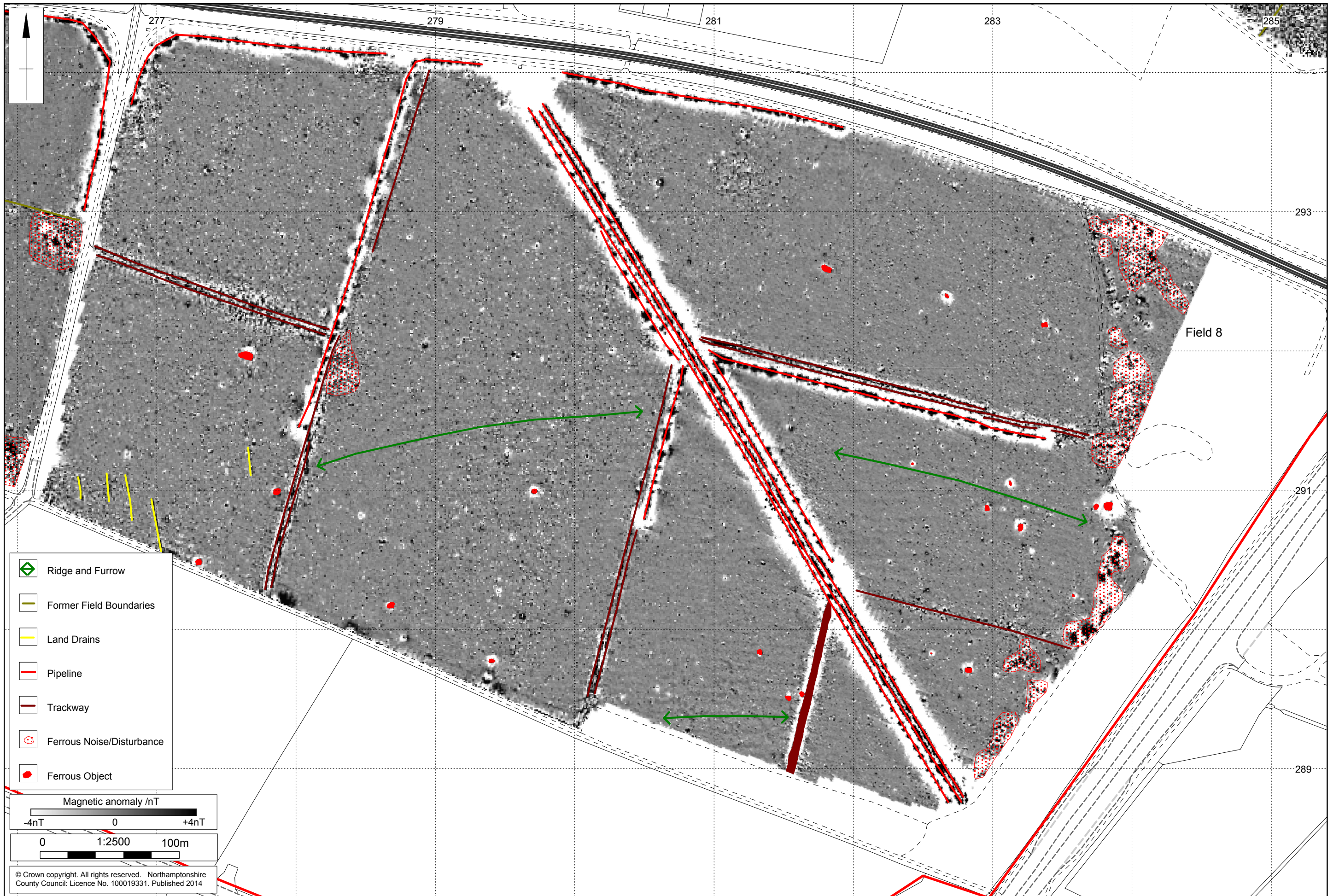
Geophysical Survey Results Fields 6 & 7 Fig 9



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Geophysical Survey Interpretation Fields 6 & 7 Fig 10

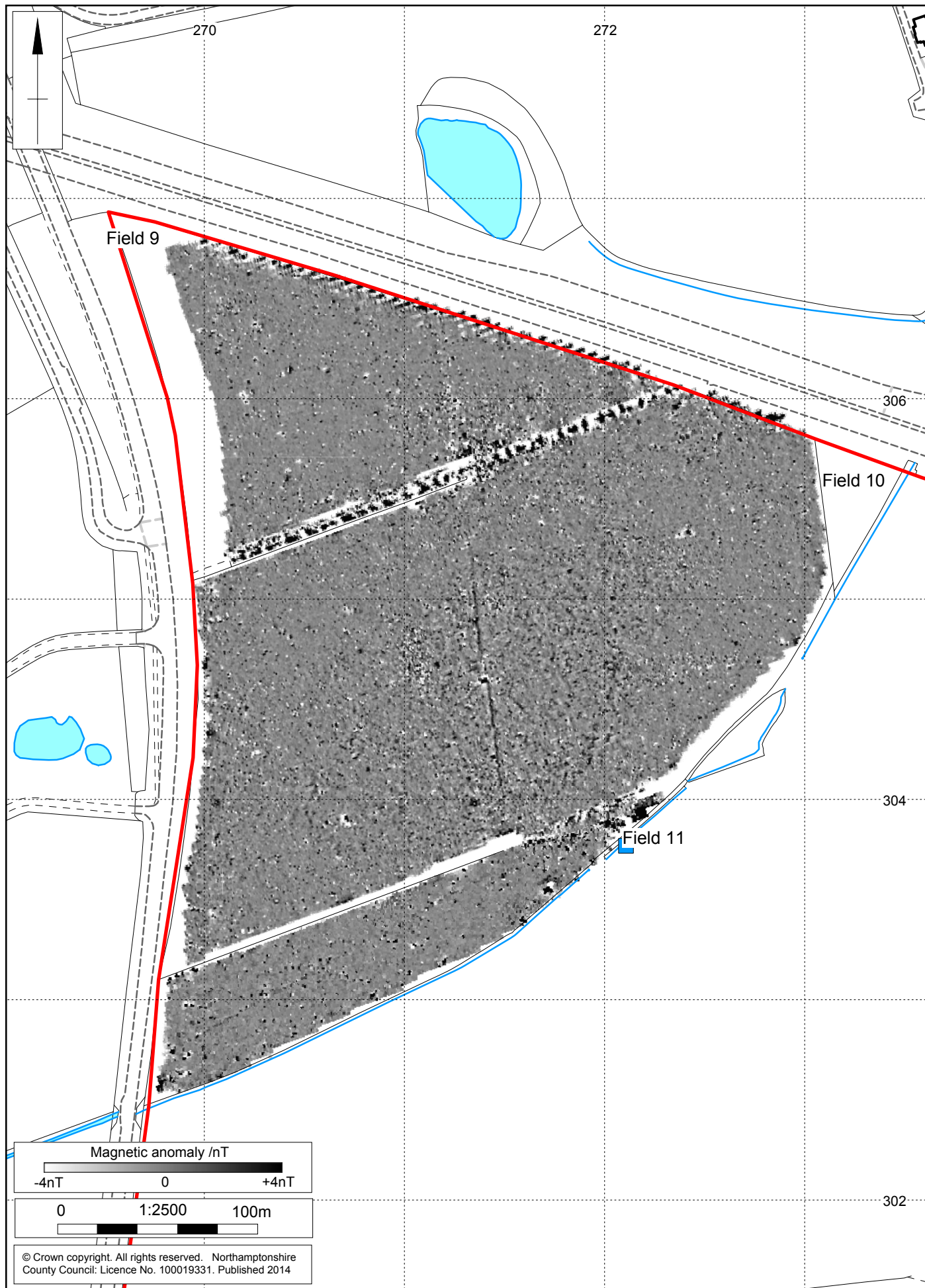




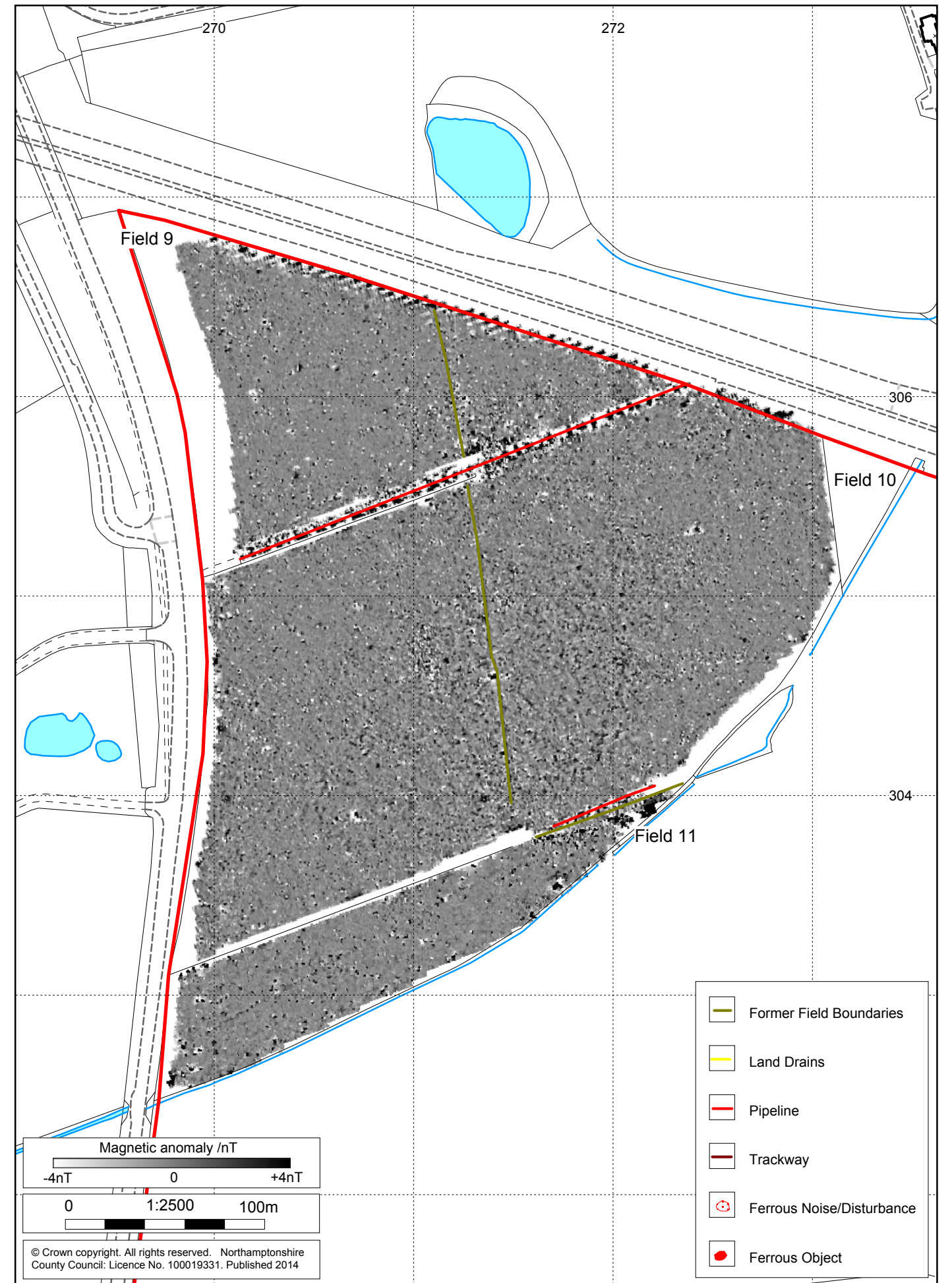
Scale 1:2500 (A3)

Geophysical Survey Interpretation Field 8 Fig 12





Scale 1:2500



Geophysical Survey Results & Interpretation Fields 9, 10 & 11 Fig 13 & 14



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