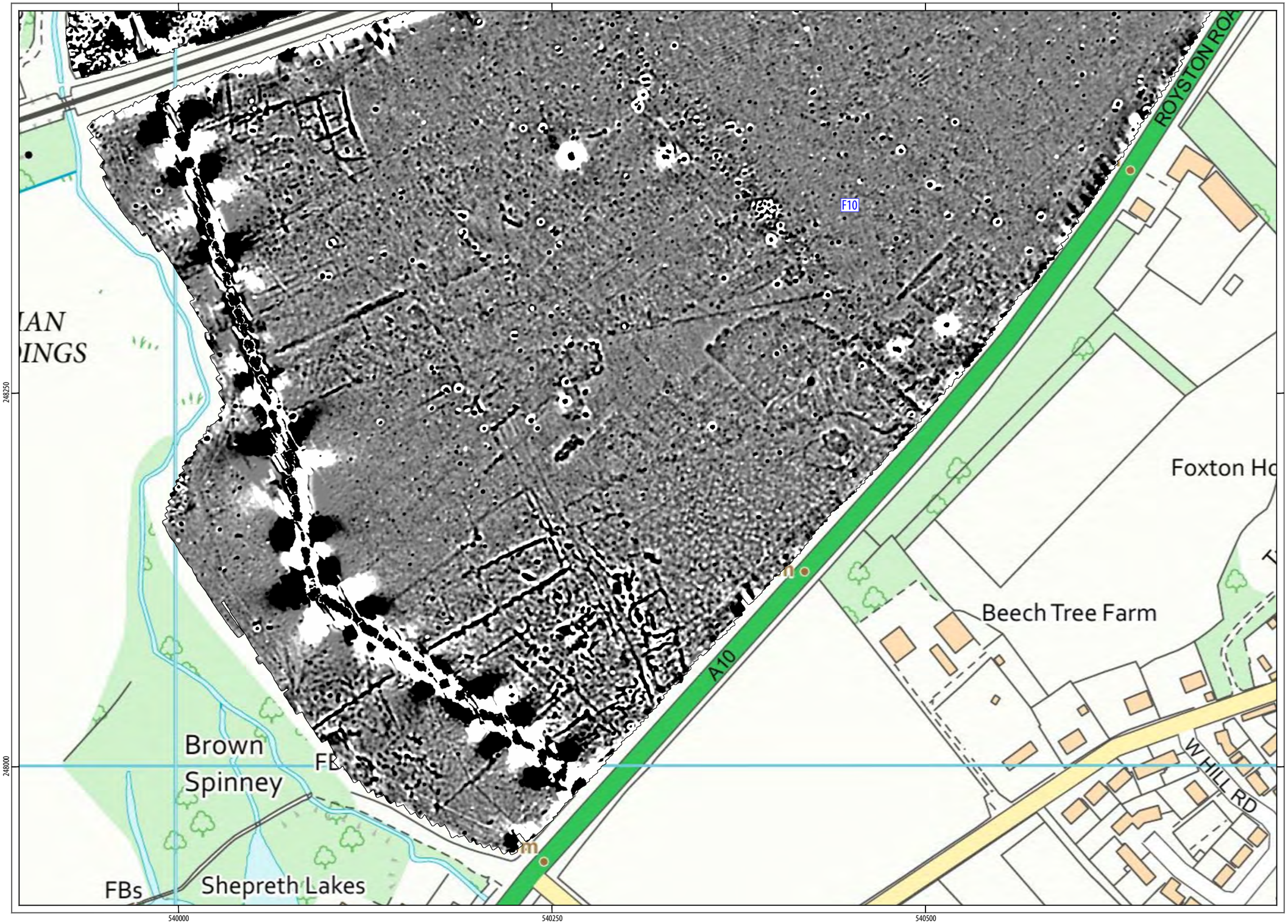

nT
-1.0 1.0

0 50m
1:2,500 @ A3

PROJECT SFFC19
Station Fields
Foxton
South Cambridgeshire

CLIENT Axis Land Partnerships

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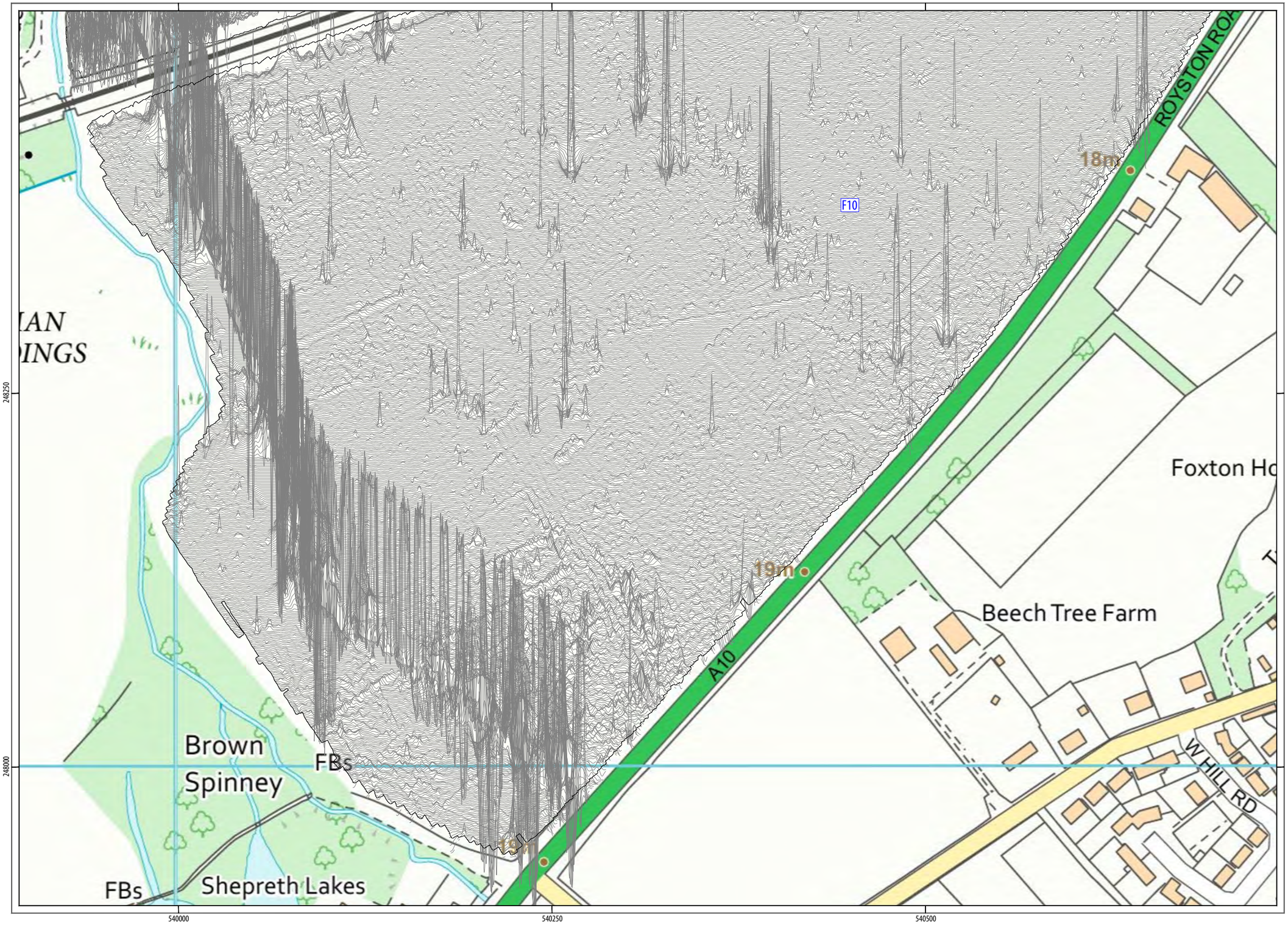
ILLUS 16 Processed greyscale magnetometer data; Sector 3



32.0nT/cm

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1:2,500 @ A3

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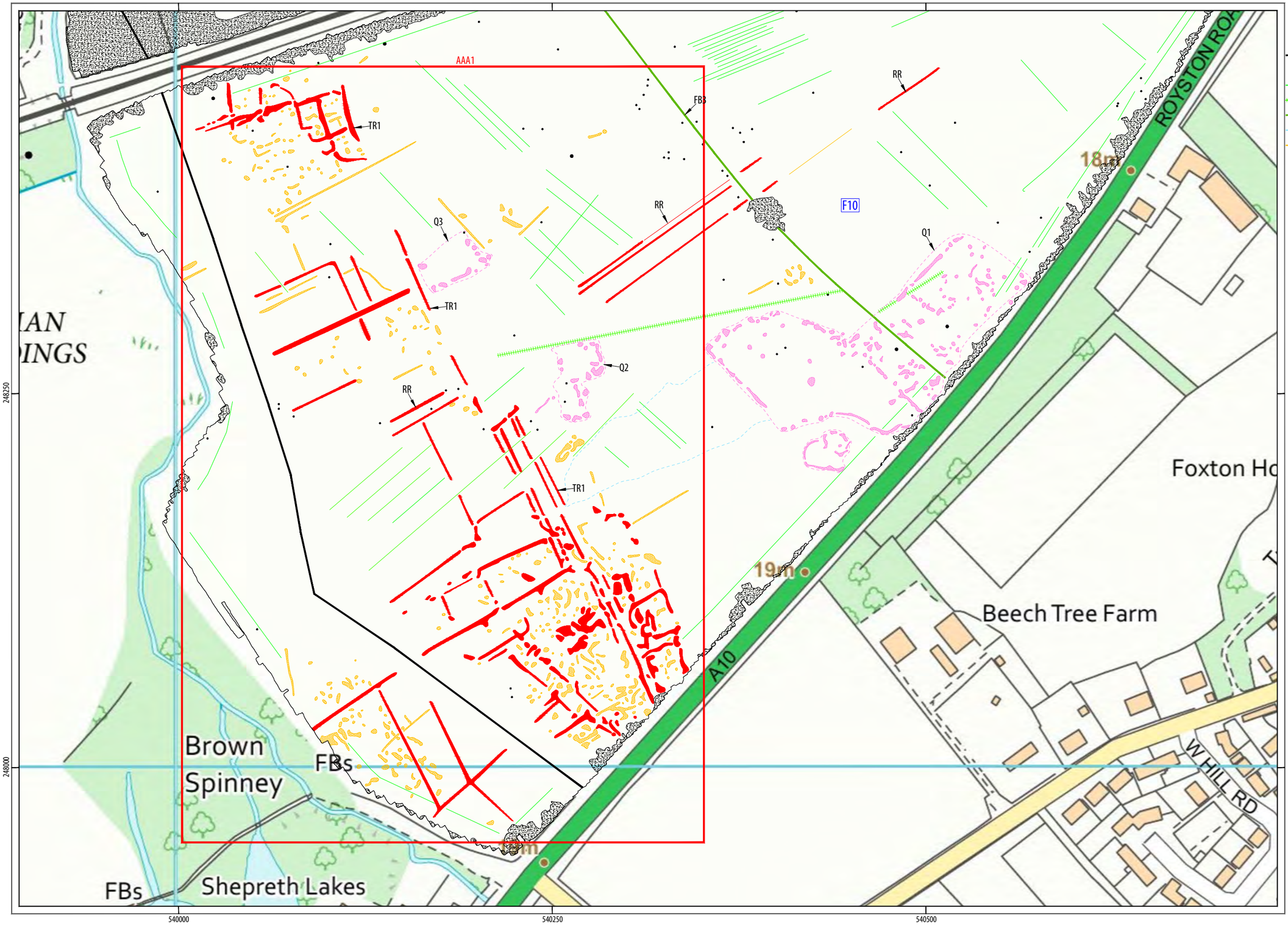
ILLUS 17 XY trace plot of minimally processed magnetometer data; Sector 3



TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
dipolar linear	service pipe
magnetic enhancement	quarrying
linear trend	agricultural
linear trend	field drain
linear	former field boundary
linear trend	geological variation
linear trend	archaeology?
magnetic enhancement	archaeology?
magnetic enhancement	archaeology

ABBREVIATIONS

FB	field boundary
Q	quarry
RR	roman road
TR	trackway

0 50m
1:2,500 @ A3

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ILLUS 18 Interpretation of magnetometer data; Sector 3

7 APPENDICES

7.1 Appendix 1 Magnetometer survey

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However, some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Lightning-induced remnant magnetisation (LIRM)

LIRM anomalies are thought to be caused in the near surface soil horizons by the flow of an electrical currents associated with lightning strikes. These observed anomalies have a strong bipolar signal which decreases with distance from the spike point and often appear as linear or radial in shape.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an

anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

7.2 Appendix 2 Survey location information

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

7.3 Appendix 3 Geophysical survey archive

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_3). The data will be stored in an indexed archive and migrated to new formats when necessary.

7.4 Appendix 4 Data processing

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

7.5 Appendix 5 Oasis Data Collection Form: England

Plans

Plan EDP 1	Designated Archaeological Assets (edp5958_d001 06 December 2019 GY/MM)
Plan EDP 2	Known Non-designated Archaeological Assets (edp5958_d002 06 December 2019 GY/MM)
Plan EDP 3	Cropmarks within Site (edp5958_d003 06 December 2019 GY/MM)
Plan EDP 4	Extract from (a) Foxton Tithe Map (1839) and (b) 1938 Edition Ordnance Survey Map (edp5958_d004 06 December 2019 GY/MM)

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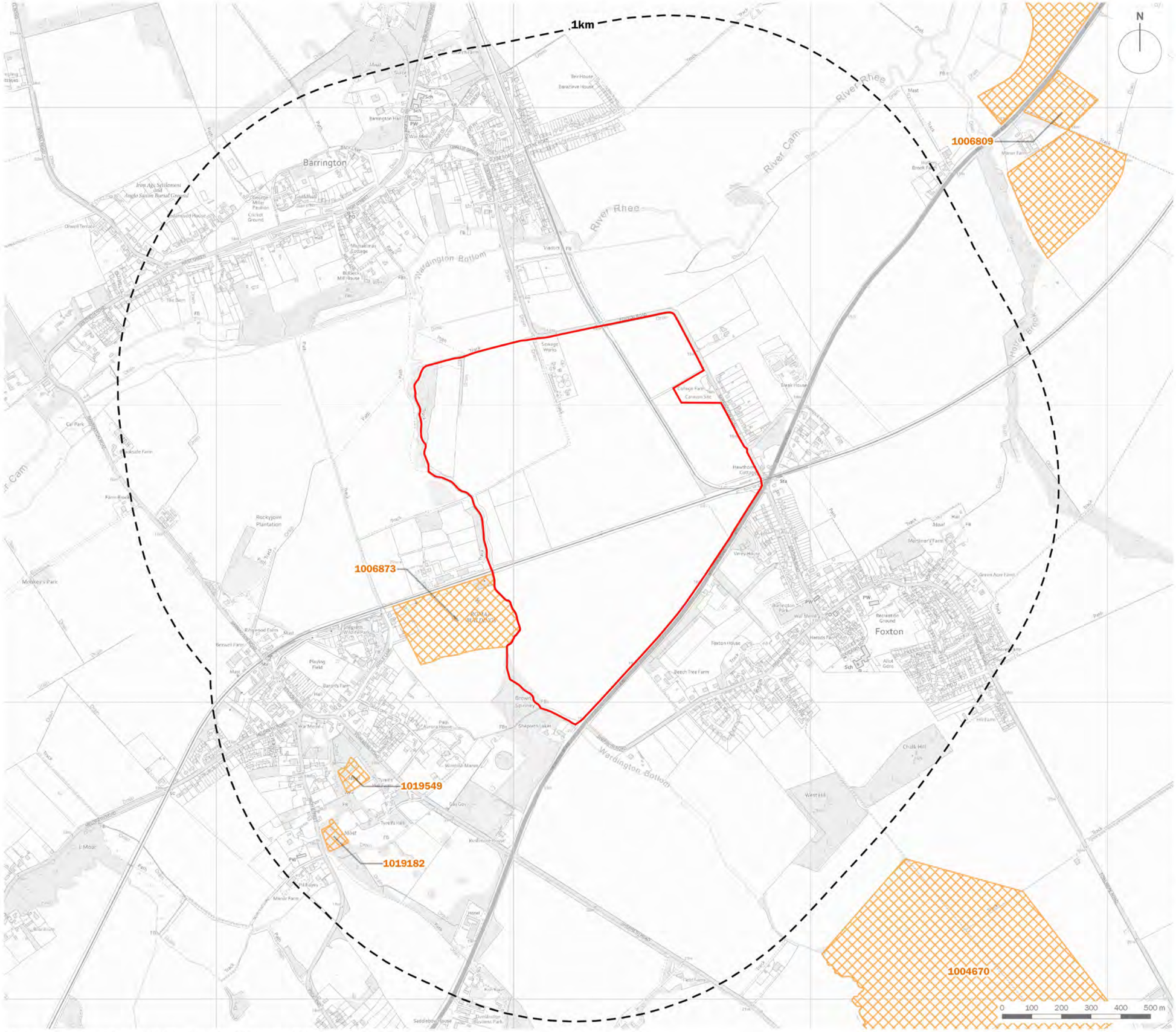

Site Boundary

1km Study Area

Scheduled Monument

DRAFT

client

Axis Land Partnerships

project title

Land at Station Road, Foxton

drawing title

Plan EDP 1: Designated Archaeological Assets

date	06 DECEMBER 2019	drawn by	GY
drawing number	edp5958_d001	checked	MM
scale	1:12,500 @ A3	QA	

the environmental dimension partnership

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DRAFT

Site Boundary

1km Study Area

HER Monument

HER Event

Ridge and Furrow

Pastscape Record

client

Axis Land Partnerships

project title

Land at Station Road, Foxton

drawing title

Plan EDP 2: Known Non-designated Archaeological Assets

date	06 DECEMBER 2019	drawn by	GY
drawing number	edp5958_d002	checked	MM
scale	1:12,500 @ A3	QA	

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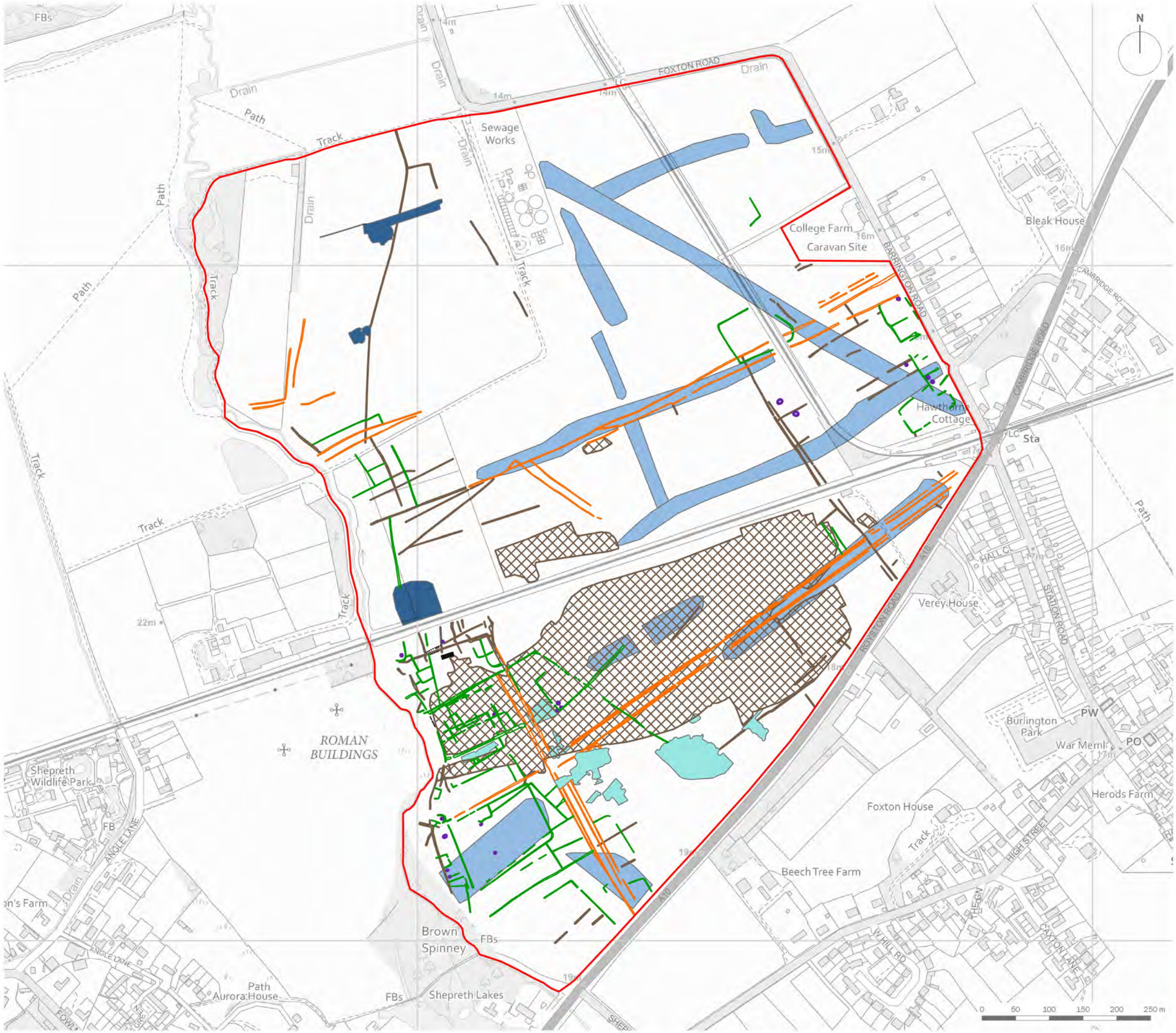

DRAFT

Site Boundary

Potential Prehistoric or Roman Archaeology

- Rectilinear Enclosures
- Trackways
- Buildings
- Pits
- Field Systems

Potential Medieval, Post-medieval or Undated Archaeology

- Extraction Pits of Unknown Date
- Post Medieval Quarrying
- Medieval and Post-medieval Cultivation

client

Axis Land Partnerships

project title

Land at Station Road, Foxton

drawing title

Plan EDP 3: Cropmarks within Site

date	**06 DECEMBER 2019**	drawn by	**GY**
drawing number	**edp5958_d003**	checked	**MM**
scale	**1:12,500 @ A3**	QA	

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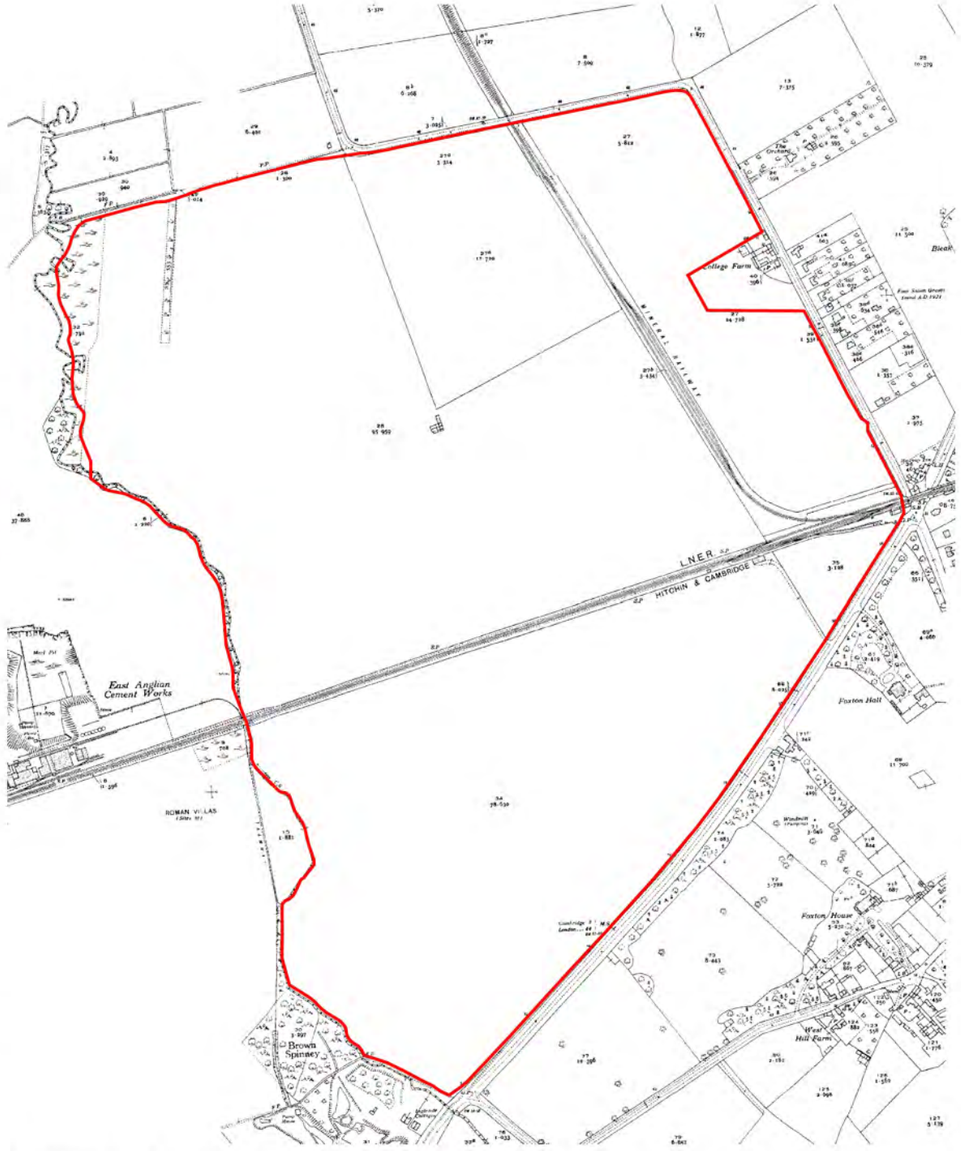
(a) Foxton Tithe Map (1839)



(b) 1938 Edition Ordnance Survey Map

Approximate Site Boundary

DRAFT

client

Axis Land Partnerships

project title

Land at Station Road, Foxton

drawing title

Plan EDP 4: Extract from (a) Foxton Tithe Map (1839) and (b) 1938 Edition Ordnance Survey Map

date	**06 DECEMBER 2019**	drawn by	**GY**
drawing number	**edp5958_d004**	checked	**MM**
scale	**Not to scale**	QA	

the environmental dimension partnership

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