PCFF/01

PERRY COURT FARM, FAVERSHAM, KENT

GEOPHYSICAL SURVEY

commissioned by Orion Heritage Ltd

15/504264/OUT

August 2016

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

PERRY COURT FARM, FAVERSHAM, KENT

GEOPHYSICAL SURVEY

commissioned by Orion Heritage Ltd

15/504264/OUT

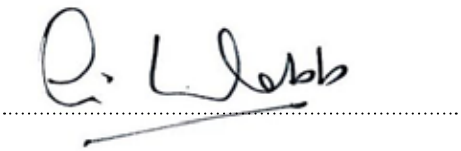
August 2016

project info

HA JOB NO.	PCFF/01
NGR	TR 0106 6009
PARISH	Faversham / Ospringe
LOCAL AUTHORITY	Swale Borough
OASIS REF.	headland5-260256

project team

PROJECT MANAGER	Alistair Webb
AUTHOR	David Harrison
FIELDWORK	Alex Schmidt, Joe Turner
GRAPHICS	David Harrison, Mano Kapazoglou, Rafael Maya-Torcelly
APPROVED BY	Alistair Webb – Project Manager



HEADLAND ARCHAEOLOGY

NORTH
Headland Archaeology
Unit 16, Hillside, Beeston Road, Leeds, LS11 8ND

0113 387 6430
north@headlandarchaeology.com

www.headlandarchaeology.com

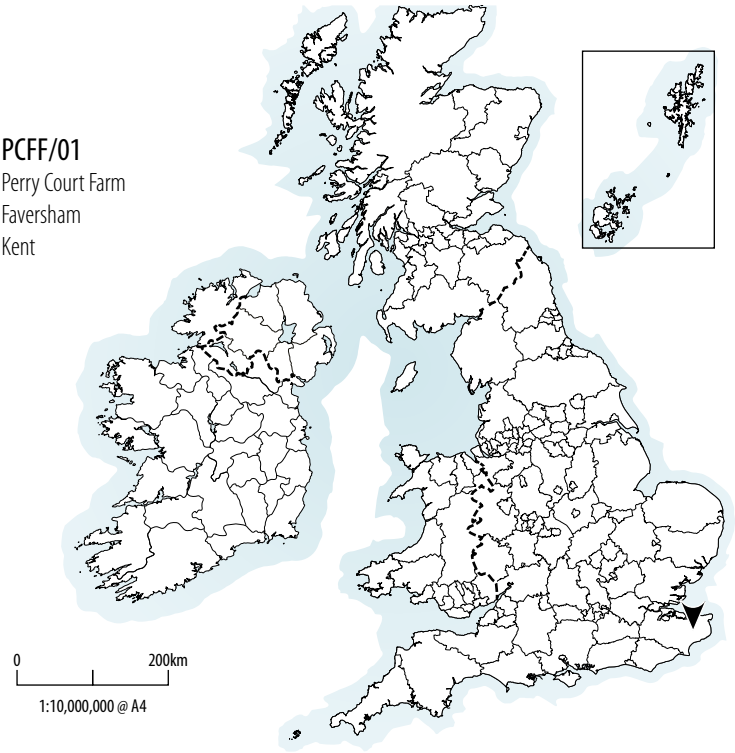
PROJECT SUMMARY

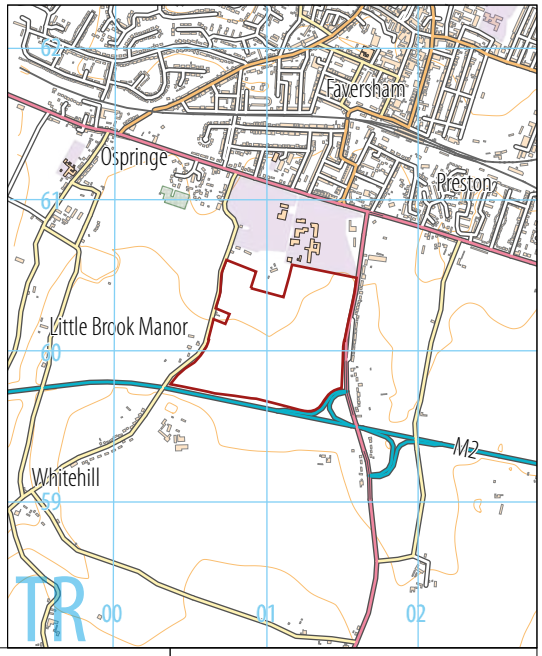
Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey covering 26 hectares on land south of Perry Court Farm, Faversham, to support an outline planning permission for a mixed residential and commercial development and inform forthcoming archaeological strategy. Well-defined rectilinear anomalies covering 0.5 hectares and forming at least two conjoined rectangular enclosures have been identified close to the south-western boundary of the site. The enclosures are oblique to the existing and historical pattern of land division and therefore an archaeological origin is considered likely. High magnitude pit-type anomalies within the south of the site may be of interest, perhaps being due to localised chalk extraction. A possible dene-hole which was observed during the course of the fieldwork and a back-filled chalk pit to the south-west of Perry Court Farm, and in the surrounding landscape, are testament to this type of activity in the locality. Elsewhere, anomalies have been identified which are due to the former and existing agricultural use of the land, modern services and near-surface geological variation. On the basis of the geophysical survey, the archaeological potential across the majority of the site is considered to be low with a moderate to high potential ascribed to the conjoined enclosures.

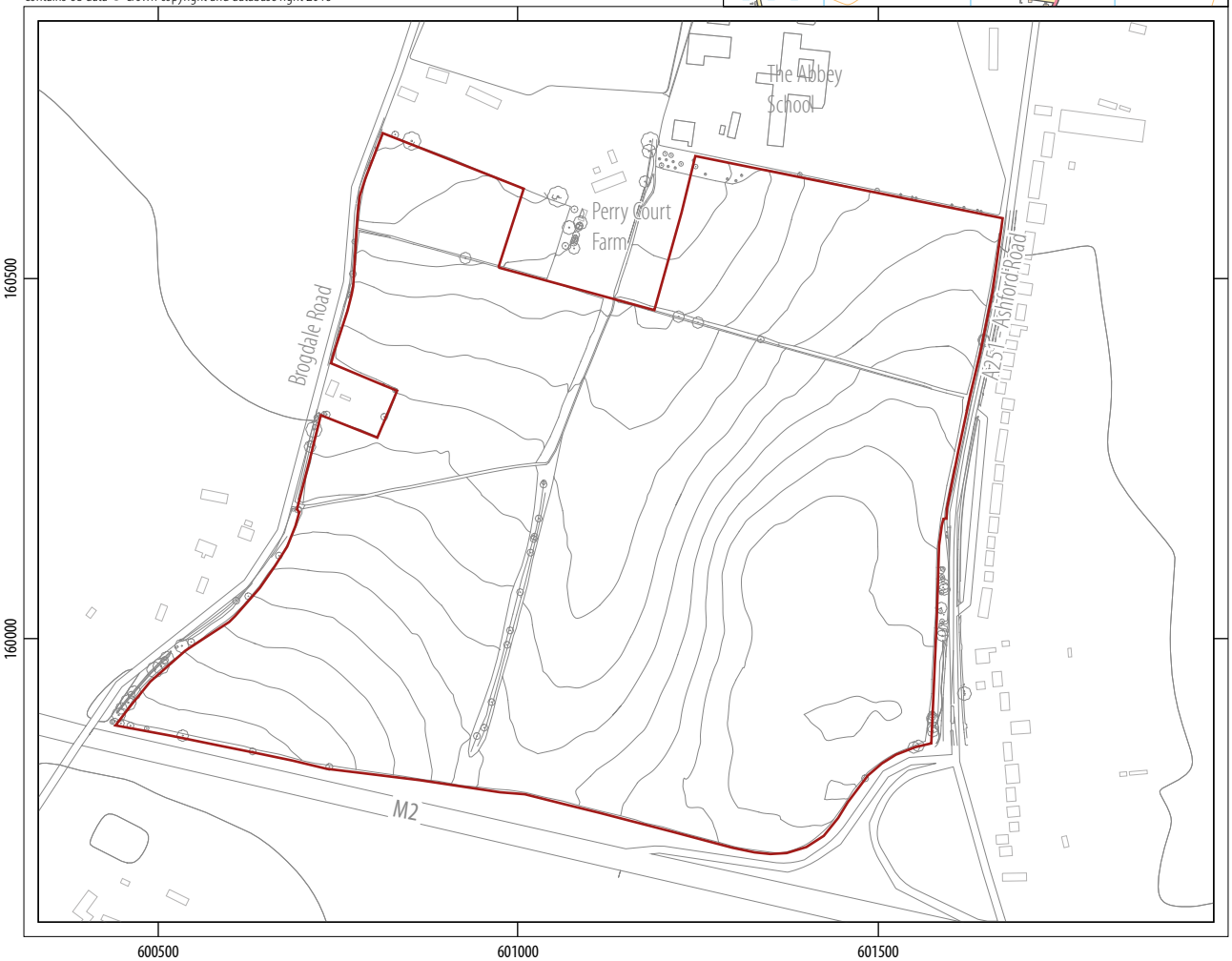
CONTENTS

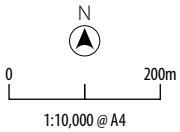
LIST OF ILLUSTRATIONS

PCFF/01
Perry Court Farm
Faversham
Kent









KEY
proposed development area

HEADLAND ARCHAEOLOGY
NORTH
Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 1 Site location

PERRY COURT FARM, FAVERSHAM, KENT

GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by Orion Heritage Ltd (the Consultant) on behalf of Hallam Land Management (the Developer) to undertake a geophysical (magnetometer) survey at Perry Court Farm, Faversham. The survey will support an outline planning permission (ref 15/504264/OUT) for a mixed residential and commercial development and inform forthcoming archaeological strategy in advance of the proposed development of the site.

The work was undertaken in accordance with a Written Scheme of Investigation (Headland Archaeology 2016), provided to the Client, with guidance contained within the National Planning Policy Framework (DCLG 2012) and in line with current best practice (English Heritage 2008).

The survey was carried out between August 1st and August 3rd 2016 in order to provide information on the archaeological potential of the proposed development area (PDA).

1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The PDA comprises four fields (F1–F4) within a single parcel of land south of Perry Court Farm and north of the M2 motorway, centred at NGR TR 0106 6009 (see **ILLUS 1**). It is bound by the M2 to the south, by Brogdale Road to the west, Ashford Road to the east and by The Abbey School and Perry Court Farm to the north. At the time of the survey F1 had been recently cleared of overgrown vegetation, F2 was overgrown and unsuitable for geophysical survey, and F3 and F4 had recently been harvested of an oil seed rape crop (see **ILLUS 2** to **ILLUS 5** inclusive). During the course of the survey a circular void, approximately one metre in diameter, was observed within the south of F4 (see **ILLUS 6** to **ILLUS 8** inclusive). The void may be due to a dene-hole, an underground structure used for the extraction of chalk which is entered by a vertical shaft.

The topography undulates between 25m above Ordnance Datum (aOD) in the north-west and 38m aOD within the south (see **ILLUS 8**).

1.2 GEOLOGY AND SOILS

The underlying bedrock mainly consists of Seaford Chalk Formation with Thanet Formation (sand, silt and clay) being recorded in the east. Superficial deposits of Head (clay and silt) are recorded across much of the PDA (see **ILLUS 6**; NERC 2016).

The soils across the majority of the PDA are classified in the Soilscape 6 association, characterised as freely draining loams, whilst freely-draining lime-rich loams (Soilscape 5 association) are recorded in the south-west (Cranfield University 2016).

2 ARCHAEOLOGICAL BACKGROUND

A Heritage Desk Based Assessment (CgMs 2015) concluded that there is little evidence for unrecorded archaeological remains within the PDA. However,

> '…there is evidence of significant settlement alongside Faversham Creek to the north of the study site from the Iron Age onwards. Therefore, it is reasonable to assume that the wider landscape was also occupied/exploited. Therefore, the presence of later prehistoric and Roman remains cannot be ruled out entirely.'

The PDA is located 290m south of the postulated route of Watling Street Roman Road (Kent HER TQ06SW132) which is thought to follow the route of the modern A2 (see **ILLUS 8**).

Analysis of historical mapping has shown that most of the western half of the PDA has been under mixed orchards for over 200 years. The orchards had largely been removed by the publication of the 1972 Ordnance Survey (OS) map. A former chalk extraction pit is shown on the 1898 OS map to the immediate south-west of Perry Court Farm. Further chalk pits are recorded in the surrounding landscape and an undated dene-hole is recorded 500m north-east of the PDA (see **ILLUS 8**).

3 AIMS, METHODOLOGY AND PRESENTATION

The main aim of the geophysical survey was to provide sufficient information to enable an assessment to be made of the impact of any proposed development on any potential sub-surface archaeological remains.

ILLUS 2 General view of Field 1, looking north-west **ILLUS 3** General view of Field 2 (east), looking north-east **ILLUS 4** General view of Field 3, looking south
ILLUS 5 General view of Field 4, looking south **ILLUS 6** Overview of possible dene-hole, looking south-east **ILLUS 7** Possible dene-hole, looking east

The general archaeological objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore model the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the Earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system is programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses 4m apart. These readings are stored on an external weatherproof

laptop and later downloaded for processing and interpretation. The system is linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software has been used to collect and export the data. Terrasurveyor V3.0.29.3 (DWConsulting) software has been used to process and present the data.

Marker canes were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model).

3.2 REPORTING

A general site location plan is shown in **ILLUS 1** at a scale of 1:10,000. **ILLUS 2–7** are general site condition photographs. **ILLUS 8** shows the survey location, the contour and geology detail and the location and direction of the site condition photographs at a scale of 1:5,000. A plan showing the overall processed greyscale magnetometer data is presented in **ILLUS 9**, at 1:3,000. **ILLUS 10** is an overall interpretation of the data at the same scale.

Detailed data plots (greyscale and XY trace) and interpretative illustrations are presented at a scale of 1:2,000 in **ILLUS 11** to **ILLUS 16** inclusive with 1:1,000 plots and interpretations of areas of archaeological potential displayed in **ILLUS 17–19** inclusive.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the composition and location of the site archive. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 4.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Headland Archaeology 2016) and guidelines outlined by English Heritage (English Heritage 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All illustrations reproduced from Ordnance Survey (OS) mapping are with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.

4 RESULTS AND DISCUSSION

Magnetic background

The background magnetic response varies between moderate levels of variation in the west and low levels of variation in the east. This disparity is thought to be due to a combination of near-surface geological variation in the west of the PDA as well as differing modern agricultural practices – much of F2 being under orchards for most of the 20th century. Against this background, numerous anomalies can be identified which are discussed below, and cross-referenced to specific anomalies on the interpretative illustrations, where appropriate.

4.1 FERROUS ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on most sites, often being present as a consequence of manuring or tipping/infilling.

Two high magnitude linear dipolar anomalies (SP1 and SP2 see **ILLUS 11–16** inclusive) are identified crossing the centre of the PDA from east to west. These locate buried service pipes. A third service pipe (SP3 see **ILLUS 11–13**) is identified close to the western site boundary aligned north/south.

Two ferrous spikes within the south of F4 (TP1 and TP2 see **ILLUS 14–16**) locate wooden telegraph poles carrying overhead cables.

Within the north-west of F1 a broad area of magnetic disturbance (M1 see **ILLUS 11–13**) is caused by a spread of modern ferrous material (eg bricks, concrete, etc). Other areas of magnetic disturbance around the perimeter of the survey area and field edges can be attributed to the proximity of post and wire fencing and/or other ferrous material within or close to the boundaries.

4.2 QUARRYING ANOMALIES

Within the north-east corner of F1 a clear area of high-magnitude magnetic disturbance (Q1 see **ILLUS 11–13**) corresponds closely to a former chalk pit which is depicted on OS maps between 1877 and 1972. The anomaly is caused by ferrous material used to back-fill the quarry.

4.3 AGRICULTURAL ANOMALIES

Analysis of historical OS mapping indicates that the division and layout of fields within the PDA has changed little since the publication of the first edition OS map in 1877, albeit with the plantation and subsequent removal of orchards from within F3.

A faint negative linear trend (B1 see **ILLUS 14–16**), aligned north/south within F4, corresponds to an undefined boundary which is depicted on the first edition OS map. B2 locates the former boundary which divided F3 and F4. Elsewhere, numerous parallel trends are visible across the PDA, mostly within F3 and all being parallel with the existing field boundaries. These are caused by modern ploughing.

4.4 GEOLOGICAL ANOMALIES

Discrete anomalies are identified throughout the PDA and are due to variations in the depth and composition of the soils. The anomalies appear in greater frequency throughout F3 (see **ILLUS 7–9**) with a particularly variable background in the south-west corner. This is

mainly thought to be due to the recent agricultural use of the land – most of F2 being under orchards for most of the 20th century – with the increased variation on the south-west probably being caused by soil-filled solution hollows and fissures within the chalk bedrock.

4.5 ARCHAEOLOGICAL & POSSIBLE ARCHAEOLOGICAL ANOMALIES

Clear linear and rectilinear anomalies have been identified at the southern boundary of F2 forming at least two conjoined rectangular enclosures (E1 and E2 see **ILLUS 11–13** and **ILLUS 17–19**). The anomalies are due to soil-filled ditches and cover approximately half a hectare, measuring 82m from east to west and 50m from north to south. Faint linear trends (D1 and D2) which appear on the same alignment suggest that the anomalies may extend northwards, although this is not clear. It is thought likely that the anomalies extend southwards, beyond the limit of the PDA. The north/south orientation of the anomalies is oblique to the extant and historical pattern of land division and therefore an archaeological origin is likely.

No anomalies of definite archaeological potential have been identified within the interior of the enclosures although four high magnitude discrete anomalies (P1 – P4 see **ILLUS 13–15** and **ILLUS 17–19**) within the east of E1 may be due to pits.

Isolated high magnitude anomalies are identified to the north and east of the enclosures including five pit-type anomalies and a broad irregular-shaped anomaly (P5 – P10 see **ILLUS 7–9**). All are caused by soil-filled features of unknown origin. It is possible that they are caused by isolated archaeological pits or perhaps by modern ground disturbance (eg soil-filled root-boles). Alternatively these anomalies may be caused by localised chalk extraction. Chalk pits are recorded in the immediate landscape and anomalies P8 and P9 are identified within 40m of a possible dene-hole and may have similar origins.

5 CONCLUSION

The geophysical survey has identified rectilinear anomalies within the south-west of the site which are caused by soil-filled ditches forming two conjoined rectangular enclosures. No anomalies of definite archaeological potential have been identified beyond the well-defined limit of the enclosures although occasional high-magnitude anomalies have been ascribed a possible archaeological origin, perhaps being due to areas of localised chalk extraction.

Within the north of the site, south-west of Perry Court Farm, magnetic disturbance is thought to be caused by magnetic material within a back-filled chalk pit.

The archaeological potential across the majority of the PDA is assessed as low based on the results and interpretation of the geophysical data. The only exception is to the south-west where two conjoined enclosures are clearly defined. The archaeological potential here is assessed as moderate to high.

6 REFERENCES

CgMs 2015 ***Heritage Desk Based Assessment: Perry Court Faversham Kent*** Unpublished CgMs Doc Ref RB/14069

Chartered Institute for Archaeologists (ClfA) 2014 ***Standard and guidance for archaeological geophysical survey*** [online document] Accessed 3 August 2016 from http://www.archaeologists.net/sites/default/files/ClfAS&GGeophysics_1.pdf

Cranfield University 2016 ***Cranfield Soil and Agrifood Institute Soilscapes*** [online] Accessed 3 August 2016 from www.landis.org.uk/soilscapes/

Department of Communities and Local Government (DCLG) 2012 ***National Planning Policy Framework*** [online document] Accessed 3 August 2016 from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

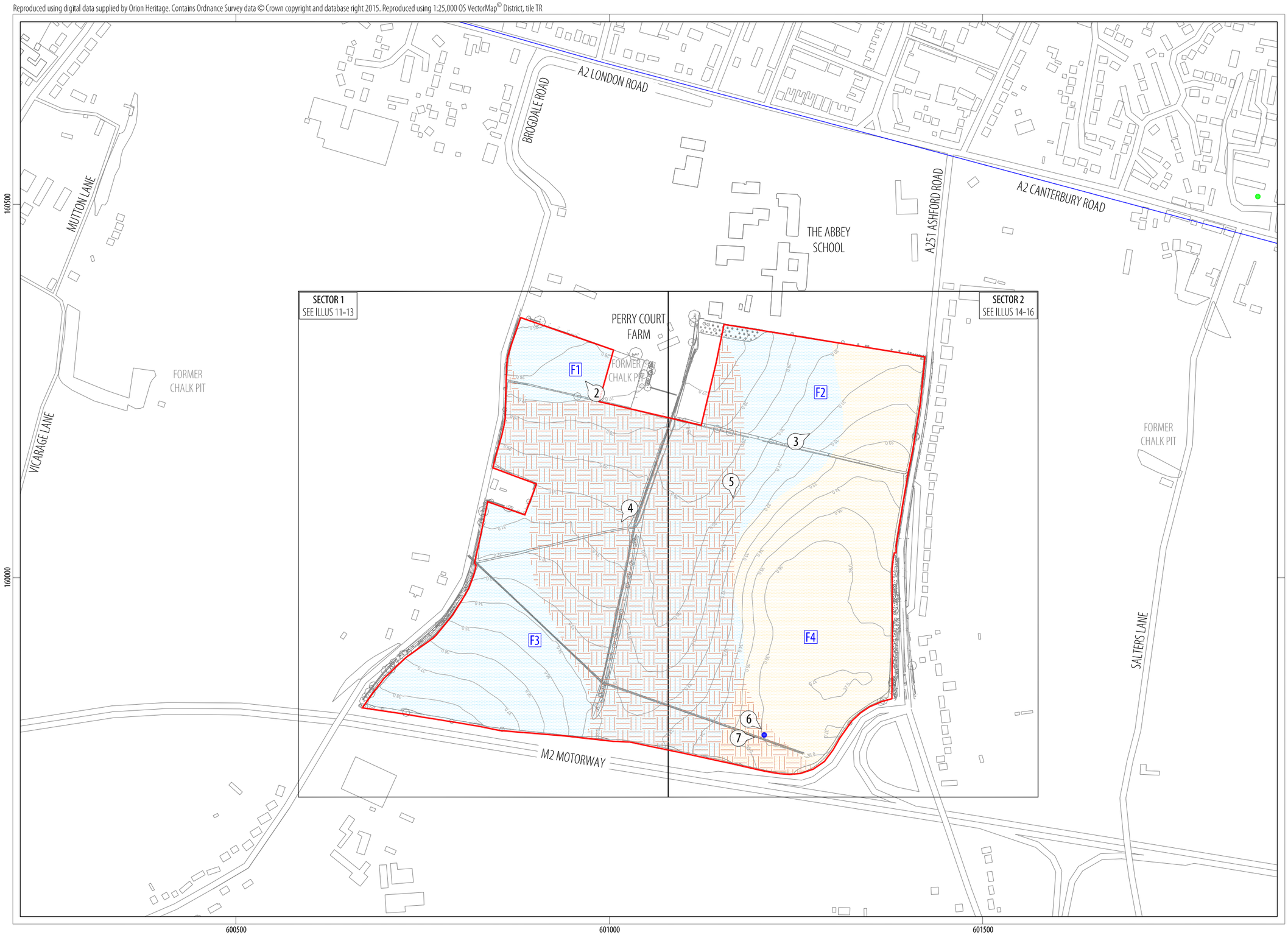
EDP 2008 ***Land at South East Milton Keynes: Archaeological Desk-Based Assessment*** Unpublished client document ref. H_EDP101_10_ Archaeological Desk-Based Assessment

English Heritage 2008 ***Geophysical Survey in Archaeological Field Evaluation: Research and Professional Services Guidelines*** (2nd edition) [online document] Accessed 3 August 2016 from http://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf

Gaffney, C & Gater, J 2003 ***Revealing the Buried Past: Geophysics for Archaeologists*** The History Press: Stroud

Headland Archaeology 2016 ***Land south-east of Milton Keynes, Central Bedfordshire: Written Scheme of Investigation for Geophysical Survey*** Unpublished Headland document ref SEMK/01

Natural Environment Research Council (NERC) 2016 ***British Geological Survey*** [online] Accessed 3 August 2016 from http://www.bgs.ac.uk/



proposed development area
location and direction of ILLUS 2-5
TQ06SW132 Watling Street Roman Road
TR06SW255 undated dene-hole
approximate location of possible dene-hole

BEDROCK
Seaford Chalk Formation - chalk
Thanet Formation - sand, silt and clay

SUPERFICIAL DEPOSITS
Head - clay and silt

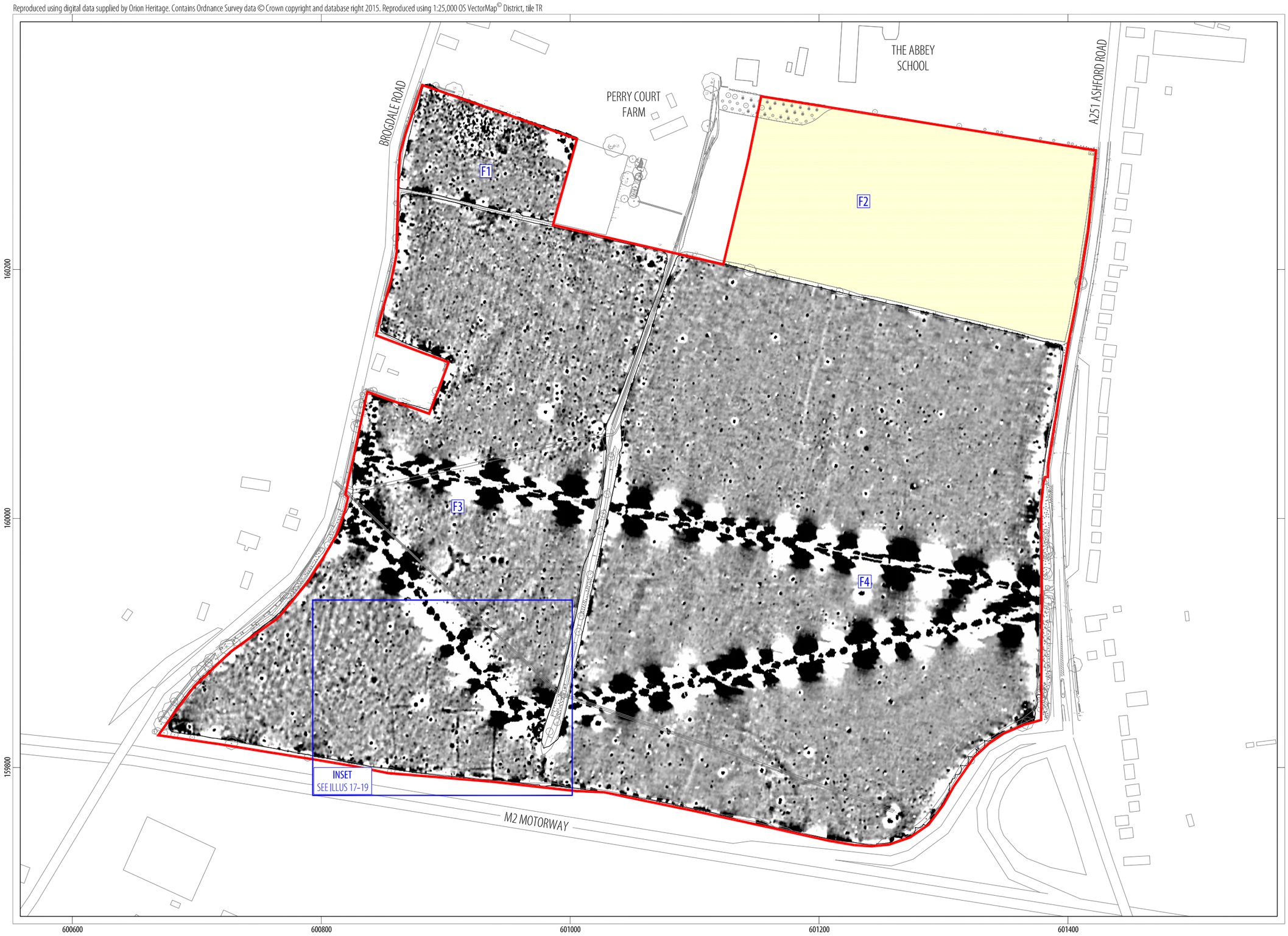
N
0 100m
scale 1:5,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 8 Survey location showing contour and geology detail and location and direction of ILLUS 2-5



proposed development area
area unsuitable for survey

nT
-1.0 2.0

N

0 50m
scale 1:3,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 9 Overall processed greyscale magnetometer data

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
dipolar linear	service pipe
linear trend	agricultural
linear	former field boundary
magnetic enhancement	geology
magnetic disturbance	former chalk pit
magnetic enhancement	archaeology?
magnetic enhancement	archaeology

ABBREVIATIONS

B	boundary	G	geology
D	ditch	P	pit
E	enclosure	Q	quarry
F	field	SP	service pipe
		TP	telegraph pole

● approximate location of possible dene-hole

N

0 50m

scale 1:3,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 10 Overall interpretation of magnetometer data

PERRY COURT FARM

BROGDALE ROAD

M2 MOTORWAY

F1

F3

F4

INSET
SEE ILLUS 17-19

160200

160000

159800

600600

600800

601000

nT
-1.0
2.0

N

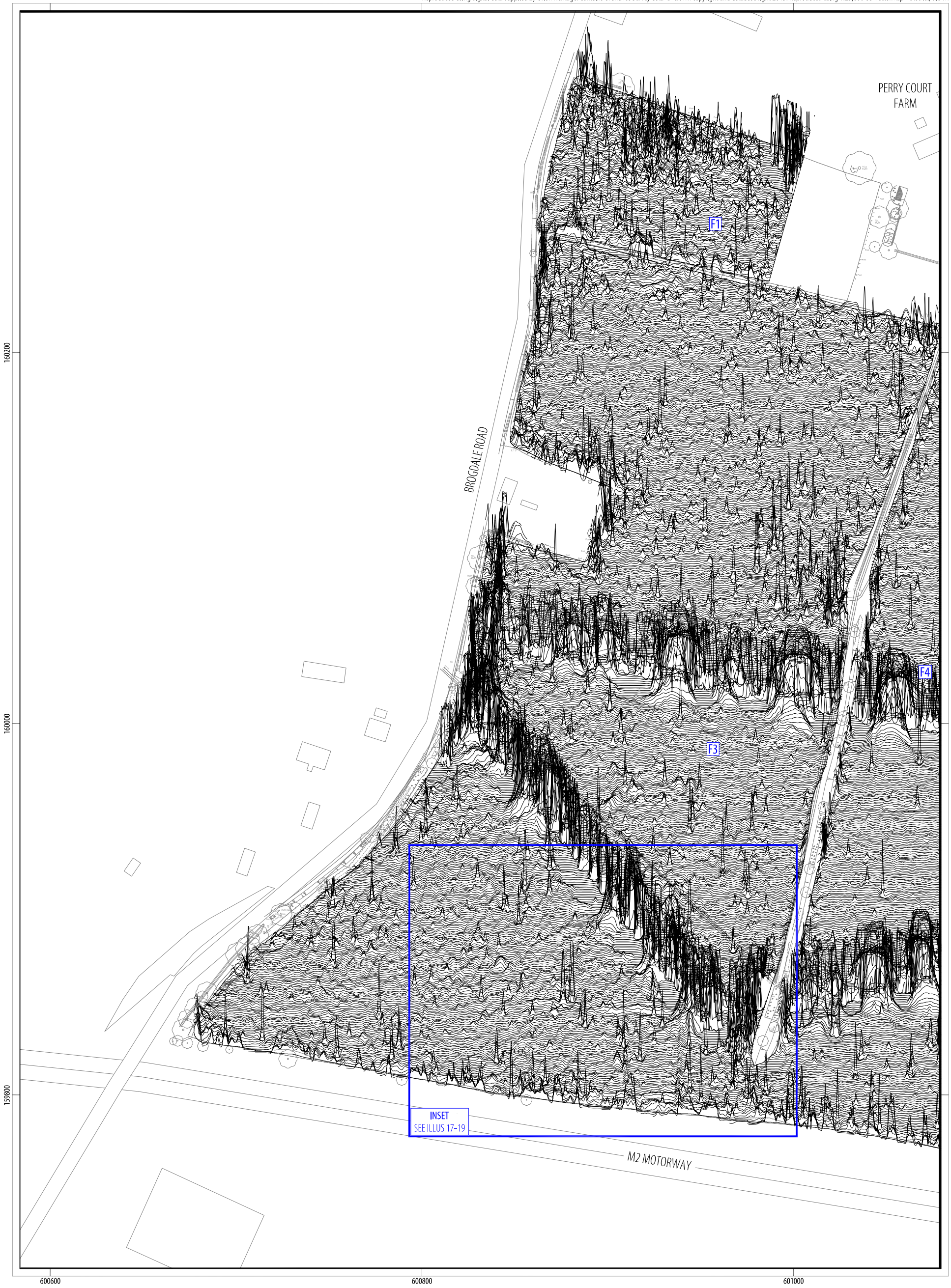
0
50m
scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 11 Processed greyscale magnetometer data; Sector 1



30.0nT/cm

[Data clipped to -2.0 to 50.0nT/cm]

N

0 50m

scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 12 XY trace plot of magnetometer data; Sector 1

PERRY COURT FARM

BROGDALE ROAD

M2 MOTORWAY

M1

Q1

F1

F2

F3

F4

SP1

SP2

SP3

P1

P2

P3

P4

P5

P6

P7

P10

D1

D2

E1

E2

B2

TP1

INSET
SEE ILLUS 17-19

160200

160000

159800

600600

600800

601000

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
dipolar linear	service pipe
linear trend	agricultural

TYPE OF ANOMALY	INTERPRETATION
linear	former field boundary
magnetic enhancement	geology
magnetic disturbance	former chalk pit
magnetic enhancement	archaeology?
magnetic enhancement	archaeology

N

0 50m

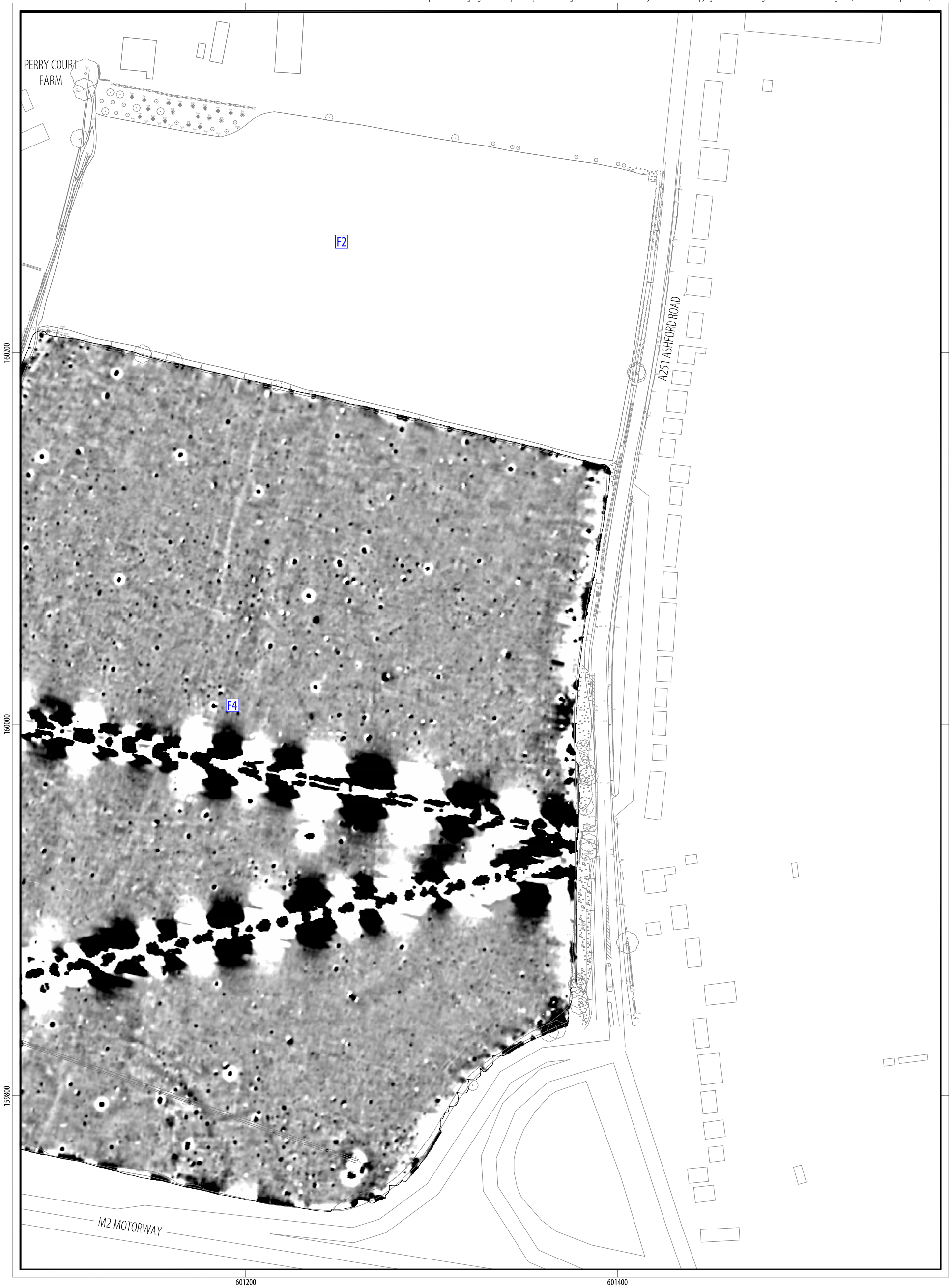
scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 13 Interpretation of magnetometer data; Sector 1



-1.0 nT 2.0

N

0 50m

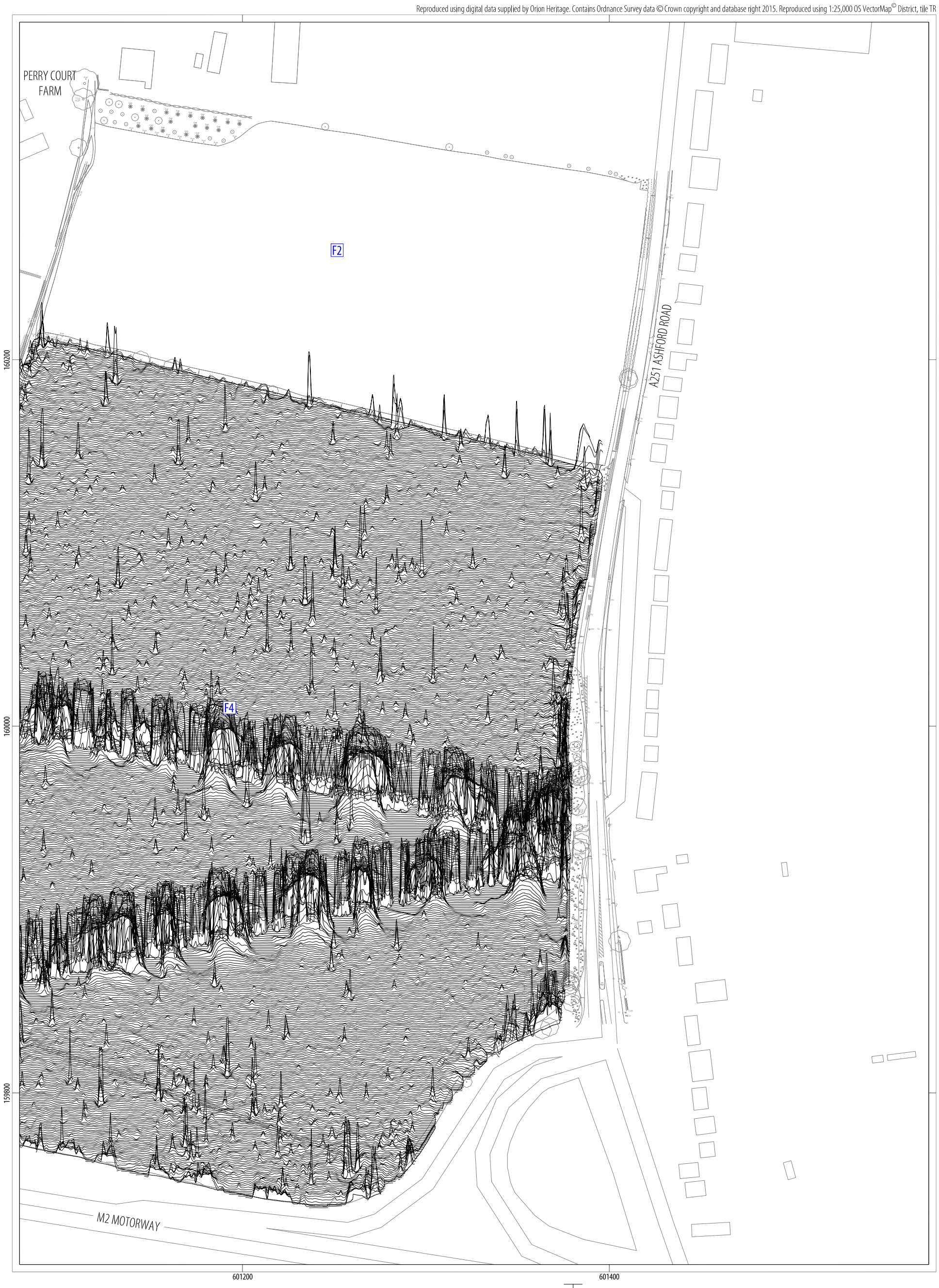
scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 14 Processed greyscale magnetometer data; Sector 2



30.0nT/cm

[Data clipped to -2.0 to 50.0nT/cm]

N

0 50m

scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 15 XY trace plot of magnetometer data; Sector 2

PERRY COURT FARM

F2

A251 ASHFORD ROAD

B1

F4

SP1

B1

SP2

B1

TP1

P9

P10

TP2

M2 MOTORWAY

160200

160000

159800

601200

601400

approximate location of possible dene-hole

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
dipolar linear	service pipe

TYPE OF ANOMALY	INTERPRETATION
linear trend	agricultural
linear	former field boundary
magnetic enhancement	geology
magnetic enhancement	archaeology?

N

0 50m

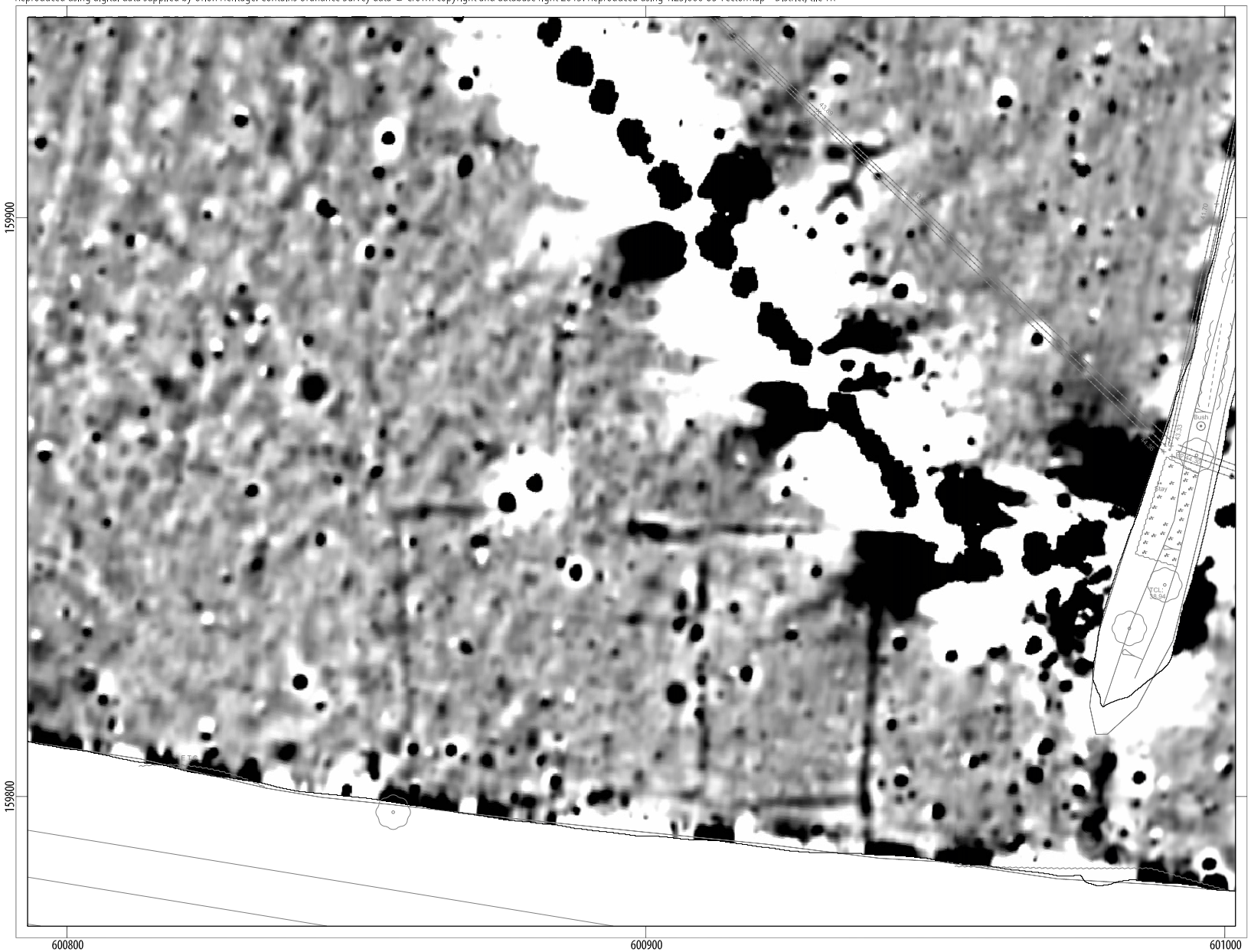
scale 1:2,000 @ A3

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY
NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 16 XY trace plot of magnetometer data; Sector 2



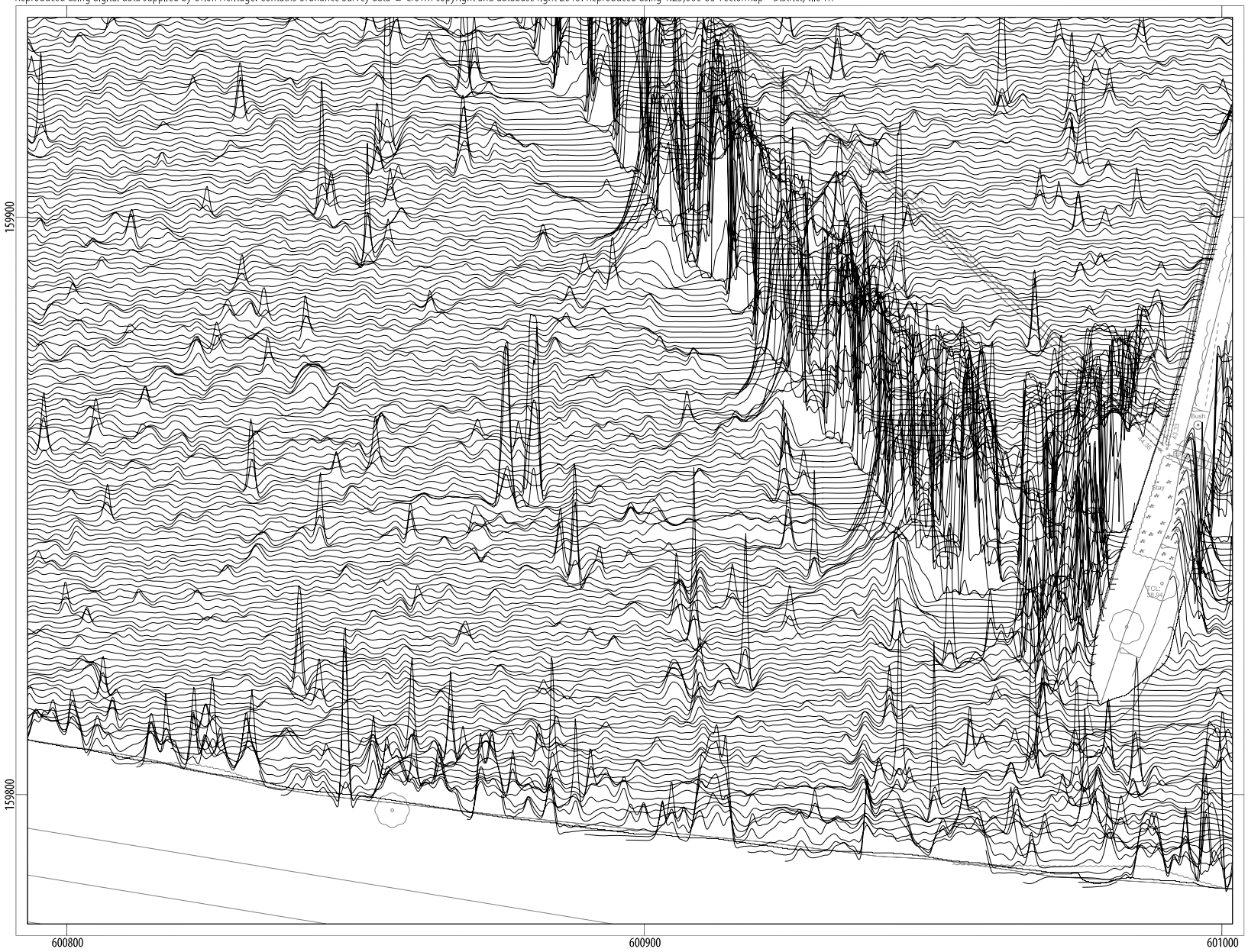
PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 17 Processed greyscale magnetometer data; Inset



15.0nT/cm

[Data clipped to -2.0 to 50.0nT/cm]

N

0 25m

scale 1:1,000 @ A4

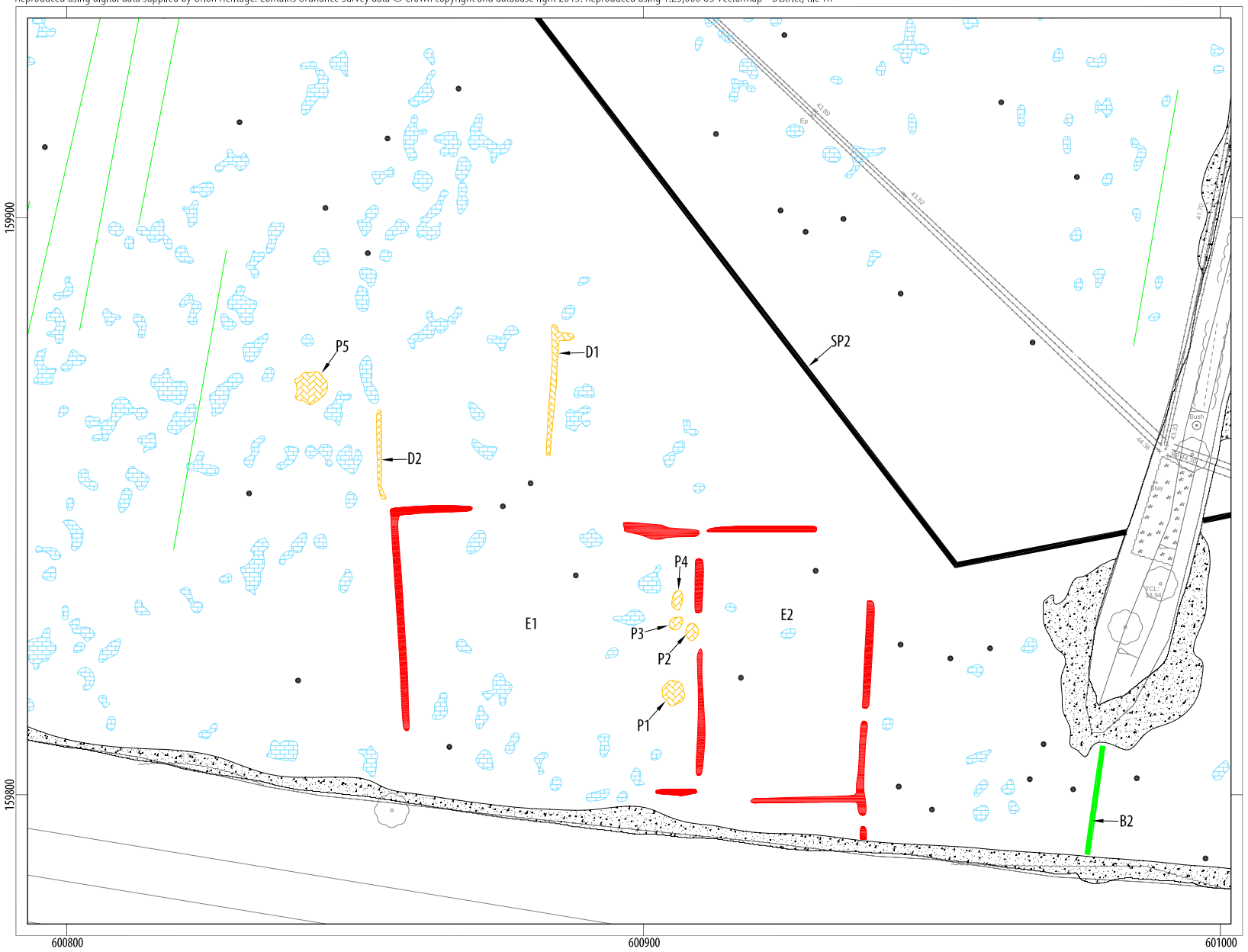
PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 18 XY trace plot of magnetometer data; Inset



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

N

0 25m

scale 1:1,000 @ A4

PROJECT PCFF/01
Perry Court Farm
Faversham
Kent

CLIENT Orion Heritage Ltd

HEADLAND ARCHAEOLOGY

NORTH Unit 16, Hillside, Beeston Road
Leeds LS11 8ND
0113 387 6430
www.headlandarchaeology.com

ILLUS 19 Interpretation of magnetometer data; Inset

7 APPENDICES

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.

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.

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.

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.

APPENDIX 4 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-260256

PROJECT DETAILS	
PROJECT NAME	Perry Court Farm, Faversham, Kent
SHORT DESCRIPTION OF THE PROJECT	Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey covering 26 hectares on land south of Perry Court Farm, Faversham, to support an outline planning permission for a mixed residential and commercial development and inform forthcoming archaeological strategy. Well-defined rectilinear anomalies covering 0.5 hectares and forming at least two conjoined rectangular enclosures have been identified close to the south-western boundary of the site. The enclosures are oblique to the existing and historical pattern of land division and therefore an archaeological origin is considered likely. High magnitude pit-type anomalies within the south of the site may be of interest, perhaps being due to localised chalk extraction. A possible dene-hole which was observed during the course of the fieldwork and a back-filled chalk pit to the south-west of Perry Court Farm, and in the surrounding landscape, are testament to this type of activity in the locality. Elsewhere, anomalies have been identified which are due to the former and existing agricultural use of the land, modern services and near-surface geological variation. On the basis of the geophysical survey, the archaeological potential across the majority of the site is considered to be low with a moderate to high potential ascribed to the conjoined enclosures.
PROJECT DATES	Start: 01-08-2016 End: 03-08-2016
PREVIOUS/FUTURE WORK	Not known / Not known
ANY ASSOCIATED PROJECT REFERENCE CODES	PCFF/01 - Contracting Unit No.
TYPE OF PROJECT	Field evaluation
SITE STATUS	None
CURRENT LAND USE	Cultivated Land 3 - Operations to a depth more than 0.25m
MONUMENT TYPE	N/A None
MONUMENT TYPE	N/A None
SIGNIFICANT FINDS	N/A None
SIGNIFICANT FINDS	N/A None
METHODS & TECHNIQUES	"Geophysical Survey"
DEVELOPMENT TYPE	Housing estate
PROMPT	National Planning Policy Framework - NPPF
POSITION IN THE PLANNING PROCESS	Pre-application
SOLID GEOLOGY (OTHER)	Seaford Chalk Formation with Thanet Formation
DRIFT GEOLOGY	Unknown
TECHNIQUES	Magnetometry

PROJECT LOCATION	
COUNTRY	England
SITE LOCATION	KENT SWALE OSPRINGE PERRY COURT FARM, FAVERSHAM
POSTCODE	ME13 8RY
STUDY AREA	26 Hectares
SITE COORDINATES	TR 601065 160095 50.884140424825 1.698523901892 50 53 02 N 001 41 54 E Point
LAT/LONG DATUM (OTHER)	51.304451/0.883122
HEIGHT OD / DEPTH	Min: 25m Max: 38m

PROJECT CREATORS	
NAME OF ORGANISATION	Headland Archaeology
PROJECT BRIEF ORIGINATOR	Consultant
PROJECT DESIGN ORIGINATOR	Headland Archaeology
PROJECT DIRECTOR/MANAGER	Harrison, S
PROJECT SUPERVISOR	Turner, J
TYPE OF SPONSOR/FUNDING BODY	Developer
NAME OF SPONSOR/FUNDING BODY	Hallam Land Management

PROJECT ARCHIVES	
PHYSICAL ARCHIVE EXISTS?	No
DIGITAL ARCHIVE RECIPIENT	In house
DIGITAL ARCHIVE ID	PCFF/01
DIGITAL CONTENTS	"Survey"
DIGITAL MEDIA AVAILABLE	"Geophysics"
PAPER ARCHIVE EXISTS?	No

PROJECT BIBLIOGRAPHY 1	
PUBLICATION TYPE	Grey literature (unpublished document/manuscript)
TITLE	Perry Court Farm, Faversham, Kent
AUTHOR(S)/EDITOR(S)	Harrison, D
OTHER BIBLIOGRAPHIC DETAILS	PCFF/01
DATE	2016
ISSUER OR PUBLISHER	Headland Archaeology
PLACE OF ISSUE OR PUBLICATION	Edinburgh

ENTERED BY	Sam Harrison (sam.harrison@headlandarchaeology.com)
ENTERED ON	16 August 2016

SOUTH & EAST
Headland Archaeology
Building 68C, Wrest Park, Silsoe
Bedfordshire MK45 4HS

01525 861 578
southandeast@headlandarchaeology.com

MIDLANDS & WEST
Headland Archaeology
Unit 1, Clearview Court, Twyford Road
Hereford HR2 6JR

01432 364 901
midlandsandwest@headlandarchaeology.com

NORTH
Headland Archaeology
Unit 16, Hillside, Beeston Road
Leeds LS11 8ND

0113 387 6430
north@headlandarchaeology.com

SCOTLAND
Headland Archaeology
13 Jane Street
Edinburgh EH6 5HE

0131 467 7705
scotland@headlandarchaeology.com

www.headlandarchaeology.com