



# Hornsea Project Four: Environmental Statement (ES)

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## Volume A6, Annex 5.3: Priority Archaeological Geophysical Survey – Part A

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## Glossary

Term	Definition
Agricultural trends	Anomalies created by either historical or modern agricultural activities, such as ridge and furrow ploughing, tractor track marks, ploughing headlands, field drains.
Bipolar anomaly	An anomaly composed of a positive magnetic response and a negative magnetic response. The responses often alternate and are usually in relation to a modern service pipe or cable.
Commitment	<p>A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms.</p> <p>Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES).</p> <p>Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.</p>
Definitive Archaeology - Trend	Made up of linear / curvilinear / rectilinear anomalies, either characterised by an increase or decrease in values compared to the magnetic background. This evidence is typically supported by the presence of archaeological remains and is confirmed by other forms of evidence such as Historic Environment Record (HER) records and aerial photography.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Dipolar anomaly	An anomaly composed of a single positive anomaly surrounded by / adjacent to a corresponding negative response. These responses are in relation to a single feature within the ground and are likely to relate to ferrous items.
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Enhanced magnetism	A group or area of numerous heightened magnetic responses. The responses can consist of both positive and negative readings and usually indicate disturbed ground or a spread of debris.
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
Ferrous anomalies (iron spikes)	A response normally caused by ferrous materials on the ground surface or within the topsoil, which causes a 'spike' representing a rapid variation in the magnetic response. These are generally not assessed to be archaeological when surveying on rural sites, and generally represent modern material often re-deposited during manuring.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network.). Hereafter referred to as Hornsea Four

Term	Definition
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.
Negative trend / anomaly	A linear / curvilinear magnetic response composed of negative magnetic readings. These are usually in relation to built up features where the material has a lower magnetic than its surroundings.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The onshore limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Pit-like anomaly	An anomaly composed of an increase in magnetic values with a patterning on the XY trace plot that is suggestive of buried remains, such as the infill of a pit.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Positive trend / anomaly	A linear / curvilinear magnetic response composed of positive magnetic readings. These are usually in relation to infilled features, such as ditches, field boundaries or ploughing trends.
Possible Archaeology	Trends that are indicative of archaeological remains, but lack supporting evidence from HER data, cropmark or LiDAR data or excavation to confirm an archaeological origin.
Unclear Origins	Anomalies of a linear / curvilinear form or areas of enhanced magnetism which are composed of a weak or different change in magnetic values. Coupled with poor patterning, the anomalies are difficult to interpret, and it is unclear whether they have an archaeological origin.

## Acronyms

Acronym	Definition
BGL	Below Ground Level
BGS	British Geological Survey
CifA	Chartered Institute for Archaeologists
DCO	Development Consent Order
DMV	Deserted Medieval Village
dGPS	Differential Global Positioning System
EAC	European Archaeological Council
EBI	Energy balancing infrastructure
ECC	Export Cable Corridor
ES	Environmental Statement
GPS	Global Positioning System
HER	Historic Environment Record
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LGM	Last Glacial Maximum
MHWS	Mean High Water Spring
MYA	Million Years Ago
NGET	National Grid Electricity Transmission
NHLE	National Heritage List for England
NMP	National Mapping Programme
NGR	National Grid Reference
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore substation
PEIR	Preliminary Environmental Information Report
RAF	Royal Air Force
RTK	Real-time Kinematic
WSI	Written Scheme of Investigation

## Units

Unit	Definition
ha	Hectares
km	Kilometre
kV	Kilovolt
nT	Nanotesla

## 1 Introduction

### 1.1 Project Background

1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.

1.1.1.2 AOC Archaeology Group was commissioned to undertake a Priority Archaeological Geophysical Survey along targeted sections of the Hornsea Four Order Limits ([Figure 1](#)) (i.e. the landfall, onshore export cable corridor (ECC), OnSS including EBI, and 400 kV National Grid Electricity Transmission (NGET) connection area).

1.1.1.3 This technical annex has been produced to characterise the baseline environment to inform and support [Volume A3, Chapter 5: Historic Environment](#) of the Hornsea Four Environmental Statement (ES).

1.1.1.4 Due to the amount of data collated during the Hornsea Four Priority Archaeological Geophysical Survey, this technical report has been split into three parts:

- [Annex 5.3: Priority Archaeological Geophysical Survey - Part A](#) (this document)– outlines the methodology, survey results, discussion, and conclusions; and
- [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#) – presents the Minimally Processed, Processed and Interpretation [Figure 2](#) to [Figure 42](#).
- [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#) – presents the Minimally Processed, Processed and Interpretation [Figure 43](#) to [Figure 86](#).

### 1.2 Aims

1.2.1.1 The aim of the 2019 Priority Archaeological Geophysical Survey was to identify any potential archaeological anomalies that would enhance the current understanding of the archaeological resource at targeted locations within the Hornsea Four Order Limits.

1.2.1.2 Specifically, the aims were to:

- locate, record and characterise any surviving sub-surface archaeological remains at targeted locations within the Hornsea Four Order Limits;
- inform the assessment presented in [Volume A3, Chapter 5: Historic Environment](#);
- provide an assessment of the potential significance of any identified archaeological remains in a local, regional and (if relevant) national context; and
- produce a comprehensive site archive and report.



## 2 Methodology

### 2.1 Survey Methods

- 2.1.1.1 The Priority Archaeological Geophysical Survey identified targeted locations (37 survey areas, covering a total of 385 ha) as requiring a detailed magnetometer survey. However, landowner access was only granted to 33 of the 37 survey areas and therefore these formed the basis of the Priority Archaeological Geophysical Survey.
- 2.1.1.2 The targeted locations were identified based on known locations of recorded heritage assets relating to buried archaeology within the Humber Historic Environment Record (HER). Records of heritage assets located near or adjacent to the onshore ECC were also considered and the nearest section of the onshore ECC was identified for survey. This was due to the potential for the archaeological remains to extend into the footprint of the onshore ECC.
- 2.1.1.3 The Priority Archaeological Geophysical Survey was based on a 120 m wide corridor incorporating the Pre-DCO boundary (as submitted at Preliminary Environmental Information Report (PEIR) (Orsted 2019a)) (see [Section 2.10](#) for further details). This included a 20 m buffer either side of the 80 m wide onshore ECC and comprised the full extent of the fields associated with the landfall and OnSS.
- 2.1.1.4 The scope of the survey was set out within the Written Scheme of Investigation (WSI) (Orsted 2019b) which was agreed in advance of the survey with the heritage stakeholders at a Historic Environment Technical Panel meeting on the 16<sup>th</sup> January 2019 and the 2<sup>nd</sup> April 2019 (ON-HIS-2.6 and ON-HIS-2.8 respectively).
- 2.1.1.5 All geophysical survey work was carried out in accordance with the WSI (Orsted 2019b), recommended good practice specified in the European Archaeological Council (EAC), guideline documents published by Historic England (Schmidt et al. 2016) and the Chartered Institute for Archaeologists' *Standard and Guidance for archaeological geophysical survey* (Chartered Institute for Archaeologists (CIfA) 2014).
- 2.1.1.6 Parameters were selected that were suitable for the prospective aims of the survey and in accordance with recommended professional good practice (Schmidt et al. 2016).

### 2.2 Dates of Fieldwork

- 2.2.1.1 The 2019 Priority Archaeological Geophysical Survey was undertaken in two parts; an initial mobilisation period between 8 April and 17 April 2019 and a second mobilisation period following harvest between 12 August and 1 November 2019.

### 2.3 Grid Location

- 2.3.1.1 The 2019 Priority Archaeological Geophysical Survey was conducted within a measured 30 m by 30 m grid system, with temporary markers (canes) inserted at each grid node, tailored specifically to each component Survey Area. The grids covered sections of the Hornsea Four Order Limits and Pre-DCO boundary (as submitted at PEIR (Orsted 2019a) and included a 20 m buffer either side of the onshore ECC ([Figure 1](#)) (see [Section 2.10](#) for data limitations

between PEIR and DCO). The full extent of the landfall and OnSS areas were also surveyed, where possible (see [Section 2.10](#)).

2.3.1.2 Grid nodes were set out using a Trimble R8s differential Global Positioning System (dGPS) offsetting from a 30 m grid line defined in AutoCAD LT 2009, with specific grid coordinates uploaded to the GPS controller. Grid nodes were laid out with an error no greater than +/- 0.1 m.

## 2.4 Instruments Used

2.4.1.1 The following instruments were used during the survey:

- Trimble R8s dGPS system (for the purposes outlined above); and
- Bartington Grad601-2 fluxgate gradiometers to undertake the Priority Archaeological Geophysical Survey.

2.4.1.2 It was agreed with the heritage stakeholders at the Technical Panel meeting on 2 April 2019 that this was a satisfactory survey method for Hornsea Four and that no further equipment or techniques were necessary (ON-HIS-2.8).

## 2.5 Equipment Configurations

2.5.1.1 The Trimble dGPS system used during the 2019 survey comprised a carbon-fibre detail pole, TSC3 control unit and R8s receiver, connected via Bluetooth. The GPS system used the Trimble "VRS Now" service to provide instant access to real-time kinematic (RTK) corrections enabling an accuracy of < 2 cm. It was connected via a SIM card run on the Vodafone network with good cellular signal in the survey areas, meaning a repeater was not required.

2.5.1.2 The Bartington Grad 601-2 fluxgate gradiometers comprise a data logger, battery cassette and two Grad-01-1000L sensors mounted on a carrying bar. Surveyors support the instrument array using a counter-balancing backpack to which the gradiometer can be attached.

## 2.6 Data Capture

2.6.1.1 Data was collected on an east-west alignment using zig-zag traverses, with a sample interval of 0.25 m and a traverse interval of 1 m. Care was taken to attempt to avoid metal obstacles present within the survey area, such as metal fencing around hedgerow boundaries as gradiometer survey is affected by 'above-ground noise'.

2.6.1.2 Before each survey visit, each gradiometer was balanced around a single set up point within that particular survey block, specifically chosen for use by all machines. This point is magnetically quiet and in balancing the machine around this point, produces a more uniform dataset throughout and allows all data to be plotted with ease within the stipulated plotting range of -1 nT to 2 nT.

2.6.1.3 Where significant drift occurred on a machine throughout a survey visit, the affected grid nodes were re-surveyed. Striping of the data may occur due to machine drift and it is decided in the field if this is within a sensible and acceptable limit.

## 2.7 Processing

- 2.7.1.1 Data was downloaded daily using Geoscan's Geoplot V.4 and backed up to cloud storage.
- 2.7.1.2 Digital photographs of every Survey Area were taken before, during and after geophysical survey to show any changes to field conditions following the programme of works. The photographs were downloaded and stored off-site.
- 2.7.1.3 Once downloaded, the magnetometer data was processed using Geoplot V.4 to align the grids and enhance the data results for presentation in this report. The principle steps for processing the magnetometer data are as follows:
- For the data presented as 'minimally processed', initially, a de-spike of all the data is carried out. If the data values require clipping, this process is added. A zero-mean-traverse process is then added to the data, either without thresholds or within a -5 to 5 range, (this range was determined as the most effective for display of minimally processed plots). Any data which required a greater range than this was deemed to be of poor quality and was re-surveyed. The data was then de-staggered where required. Most handheld data will require a degree of de-stagger processing; however, if the data was obviously misaligned and required any more than 4-6 steps of de-stagger; the data was re-surveyed; and
  - For 'fully processed' plots, a Low Pass filter is then applied followed by two Interpolation filters along the Y axis.
- 2.7.1.4 The gradiometer data was interpreted with linework produced in AutoCAD and converted to ESRI geodatabase feature class following Quality Assurance procedures and signoff.

## 2.8 Data Presentation

- 2.8.1.1 The final processed data are presented as Ordnance Survey (EPSG: 27700) georeferenced greyscale plots, at a suitable scale for interpretation of identified features. These appear as three panels on the figures (as presented throughout this report), showing the minimally processed data, processed data and interpretation. Individual greyscale plots will be supplied as bitmap (.bmp) files and georeferenced JPGs and deposited with the Humber HER and Archaeology Data Service as part of the archive (see [Section 2.9](#)).
- 2.8.1.2 Mapping and spatial data deliverables have been produced in accordance with the requirements of Historic England's *EAC Guidelines for the Use of Geophysics in Archaeology* (Schmidt et al 2016).

## 2.9 Archive Preparation and Deposition

- 2.9.1.1 The digital archive generated during the fieldwork will be kept secure at all stages of the project in accordance with best practice.
- 2.9.1.2 The digital archive will be produced to the national standards, including *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt 2013) and *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (ClfA 2014).

2.9.1.3 AOC Archaeology will prepare and submit an Online Access to the Index of archaeological investigations (OASIS) form (<http://ads.ahds.ac.uk/project/oasis>) as part of the archiving process and submitted to the Humber HER.

2.9.1.4 The raw data of the areas subject to geophysical survey is held by Orsted Hornsea Project Four Limited and can be shared with HAP and HE on request.

## 2.10 Survey Limitations

2.10.1.1 The 2019 Priority Archaeological Geophysical Survey was undertaken along targeted sections of the pre-DCO boundary (as submitted at PEIR (Orsted 2019a)). Since the survey was undertaken there have been refinements to the Hornsea Four Order Limits that are detailed in [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#).

2.10.1.2 The area designated for Priority Archaeological Geophysical Survey totalled approximately 385 ha; 53.2 ha of which were undertaken during the initial survey in April 2019. The remaining 294.8 ha were surveyed from August to November 2019; however, 37 ha was unable to be surveyed. The results from both phases of survey are presented in this report. The completed Survey Areas are shown on [Figure 1](#).

2.10.1.3 During the 2019 Priority Archaeological Geophysical Survey, four Survey Areas (totalling 37 ha) were unavailable for survey due to landowner access constraints; Area 32b, Area 42, Route Option B and Area 16.

2.10.1.4 A small section at the landfall (Area 1) was used as set-aside (i.e. non-cropped land outside of agricultural production) and therefore it was unable to be surveyed at the time of survey due to the overgrown nature of the vegetation. This area is shown as a data gap on [Figure 2](#) and [Figure 3](#).

2.10.1.5 The 2019 Priority Archaeological Geophysical Survey targeted Survey Areas along the onshore ECC based upon the pre-DCO boundary (submitted at PEIR). Since this time, there have been changes to the Hornsea Four Order Limits following a refinement process which considered the Section 42 responses (as detailed in [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#)). This has resulted in some of the 2019 Priority Archaeological Geophysical Survey Areas being located either partially or fully outside of the Order Limits.

2.10.1.6 A total of nine survey areas now fall outside, or partially outside, the Hornsea Four Order Limits totalling 69 ha; these are shown on [Figure 1](#) and include:

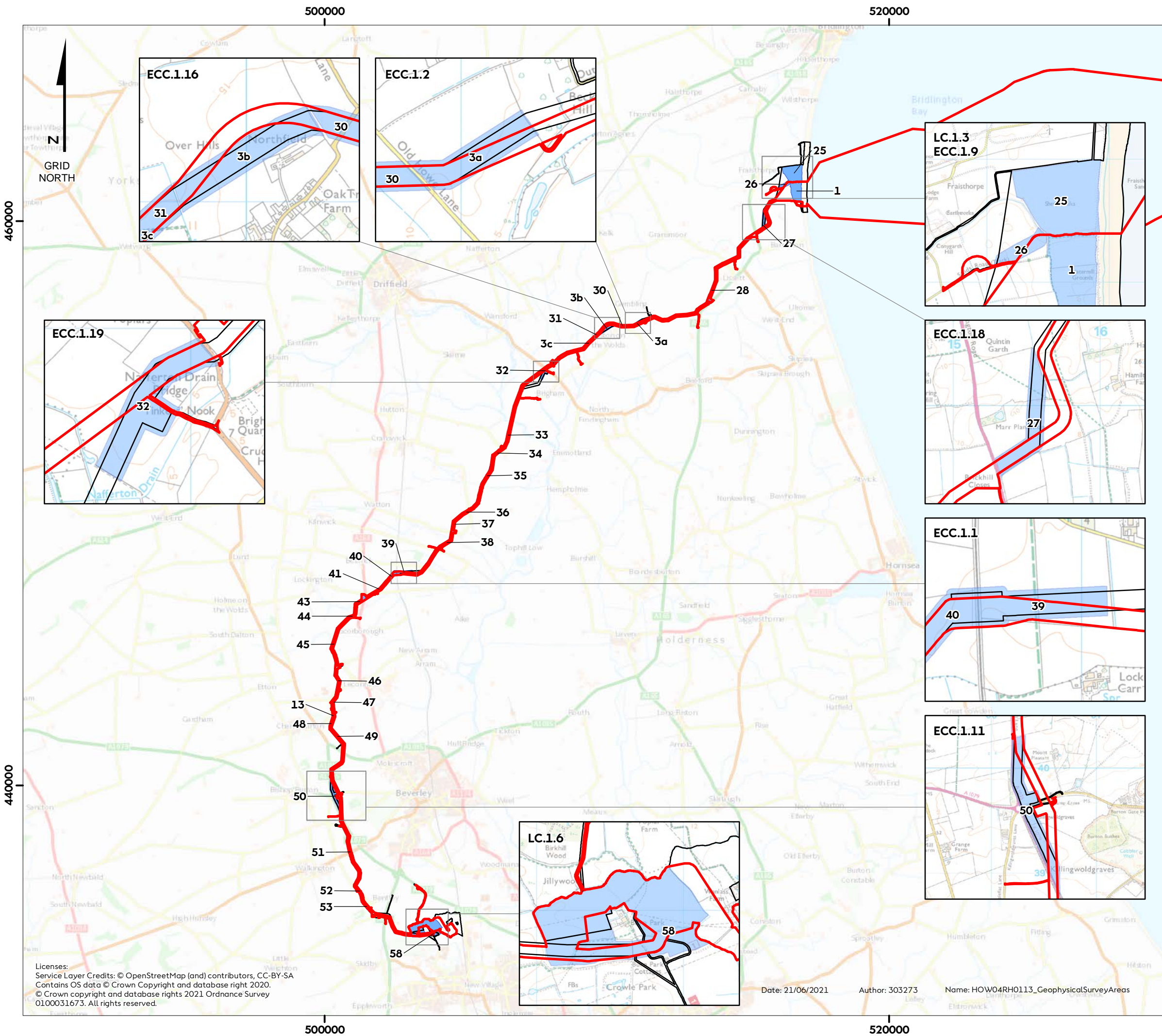
- All of Area 25 (LC.1.3 – Removal of A3 landfall compound);
- The south-western extent of Area 26 (ECC.1.9 – Reduction of ECC area to reflect the removal of A3 landfall compound);
- The central and northern sections of Area 27 (ECC.1.18 - Reroute Onshore ECC due to Badger sett (east of Bridlington Road));
- The northern extent of Area 3a (ECC.1.2 – Adjusting Onshore ECC over SHINE site at Gembling);
- The central section of Area 3b (ECC.1.16 – Reroute Onshore ECC to be further from residential receptor by HC\_019);

- The south-western section of Area 32 (ECC.1.19 – Straighten Onshore ECC by LC\_003);
- The north-eastern extent of Area 39 (ECC.1.1 – Change in Onshore ECC south of existing manhole in field);
- The central section of Area 50 (ECC.1.11 – Adjust Onshore ECC due to proposed Petrol Station within corridor); and
- A section within the western side of Area 58 (LC 1.6 - Addition of construction compound area to the south of the existing footprint accounting for reconfiguration of the OnSS temporary works area.

2.10.1.7 The data from the survey parcels listed above are included within this report for completeness and to inform the wider landscape context within which the Hornsea Four Order Limits are located.

2.10.1.8 The small areas within the Hornsea Four Order Limits which were not subject to the Priority Archaeological Geophysical Survey (due to the survey area being based on the pre-DCO boundary (as submitted at PEIR (Orsted 2019a)) will be captured as part of additional Archaeological Geophysical Survey at post-consent, as detailed in the outline WSI ([Volume F2.10: Outline Written Scheme of Investigation for Onshore Archaeology](#)).

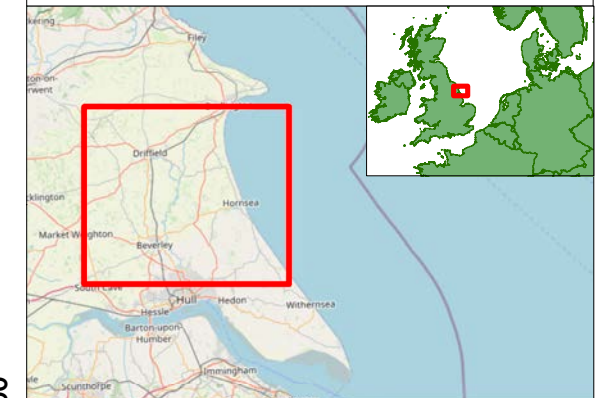
2.10.1.9 The changes to the Hornsea Four Order Limits, detailed in [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#), are not considered to significantly affect the results and interpretations made within this report and have therefore not resulted in any material changes in the overall assessment presented within [Volume A3, Chapter 5: Historic Environment](#) of the Hornsea Four ES.



# Hornsea Four

Figure 1  
Location of Priority Archaeological Geophysical Survey Areas

- Order Limits
- PEIR Boundary
- Priority Archaeological Geophysical Survey Area



Coordinate system: British National Grid  
Scale@A3: 1:130,000  
0 1.25 2.5 5 Kilometres  
0 0.75 1.5 3 Miles

REV	REMARK	DATE
	First Issue for DCO	21/06/2021

Title: Geophysical Survey Areas  
Document no: HOW04RH0113  
Created by: AZ  
Checked by: EH  
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## 3 Baseline Review

### 3.1 Geology

3.1.1.1 Hornsea Four is located within the Hull Valley and Holderness which is underlain by solid geological deposits of chalk belonging to the White Chalk Subgroup. The British Geological Survey (BGS) geology maps show the bedrock within Hornsea Four to comprise the following formations (from oldest to youngest bedrock age):

- Burnham Chalk Formation;
- Flamborough Chalk Formation; and
- Rowe Chalk Formation.

3.1.1.2 The BGS geology maps show that various superficial deposits underlie Hornsea Four. These deposits include (from oldest to youngest deposit age):

- Diamicton Till;
- Glacifluvial Sand and Gravel Deposits;
- River Terrace Sand and Gravel Deposits; and
- Alluvial Clay Silt and Sand Deposits.

3.1.1.3 A more detailed geoarchaeological background is provided in the Geoarchaeological Desk Based Assessment ([Annex 5.4: Geoarchaeological Desk Based Assessment](#)).

### 3.2 Archaeological and Historical Background Summary

3.2.1.1 The following archaeological and historical overview has been taken from the Historic Environment Desk-Based Assessment ([Annex 5.1: Historic Environment Desk Based Assessment](#)).

3.2.1.2 Early prehistoric activity is known within the region through pollen analysis, which indicates that forests were beginning to be cleared during the Mesolithic period. Following this, the Yorkshire Wolds and wider area became well settled during the Neolithic period, due to the wide range of natural resources. Evidence for this habitation is seen in the surviving Neolithic ceremonial/funerary monuments in the Wolds landscape, such as long barrows and henges. Evidence for seasonal occupation during the Mesolithic and Neolithic period within the wetlands of Holderness is also evident in environmental remains and flint scatters.

3.2.1.3 Settlement of the Wolds continued during the Bronze Age period, with over 140 Early Bronze Age round barrows known across the region, particularly on the higher ground overlooking river valleys. Groupings of barrows are notable within the valley of the River Hull and its tributaries.

3.2.1.4 A distinctive material culture called the 'Arras Culture' prevailed throughout East Yorkshire during the Iron Age. A well-known element of this culture is burial within a square barrow, a subset of which contain high-status chariot burials. Square barrows survive as cropmarks on aerial photographs, usually in small groups, and as low earthworks, such as those at a cemetery containing approximately 120 square barrows just south of Scarborough, and the grouping of earthworks at Westwood Pasture, south-west of Beverley.

- 3.2.1.5 Activity during the Romano-British period often relates to periods of enclosure and land division, seen in the form of cropmarks. Enclosures were the most common recorded feature-type during the National Mapping Programme (NMP), often rectilinear in plan and isolated, although occasionally they were found in groups, aligned with trackways. Some of these identified enclosures survive as existing earthworks such as those at Westwood Pasture, which are designated as Scheduled Monuments (National Heritage List for England (NHLE) 1013994, 1013999, 1014001 and 1310087). Trackways have been identified in archaeological excavations or from cropmarks which are thought to be Iron Age to Romano-British in origin (although could be earlier) and are often aligned to define access down into the Hull Valley. A single possible Roman villa has been identified in the cropmark records at Skidby (MHU6598).
- 3.2.1.6 There is little evidence for Anglo-Saxon archaeological remains within the region, although the earliest phases of Beverley Minster, then known as Inderauda, were constructed during the period. It was founded at the turn of the 8th century and re-founded after the reconquest from the Danes by King Athelstan in the 10th century. It is during the latter centuries of the Anglo-Saxon period that many of East Yorkshire's settlements and their open-field systems were established.
- 3.2.1.7 Medieval activity is better attested to within the region. A total of 29 moated or defended sites were recorded during the NMP, with six sites potentially indicative of monastic granges. Two are moated sites are located at Beeford and Lockington (Belagh Grange; MHU 7293). Sites of potential deer parks are located at Leconfield, Bentley, Skidby, Cottingham, Risby, Beverley and Woodmansey. Deer parks were ostentatious signals of power and wealth to the wider landscape and population, setting aside areas of managed woodland under seigniorial ownership for personal hunting use and coppicing of the woodland. They were identifiers of wealth and often developed nearby moated manor sites.
- 3.2.1.8 During the late medieval period, a worsening climate (known as the 'Little Ice Age') and poor rural economic stability, along with outbreaks of the Bubonic Plague, reduced the quantity and quality of grain production, leading to land being laid to pasture and creating opportunity to encourage peasant migration to urban centres. Deserted settlements are relatively common within the region, found at Wilsthorpe, Auburn, Hartburn (Fraisthorpe), Winkton (Barmston), Gembling, Raventhorpe (Cherry Burton), Risby, Rotsea, Winthorpe (Etton) and Bentley.
- 3.2.1.9 Rotsea is worthy of distinction (NHLE 1005212), consisting of 15 ha of preserved earthworks, with an associated nearby moated site. Beverley Minster and most parish churches within the region were built in the medieval period and retain most or much of their late medieval fabric.
- 3.2.1.10 A large number of World War II pillboxes, anti-tank defences, searchlight batteries, observation posts and other military installations and structures are common along the Holderness coast. This includes the Royal Observer Corps underground monitoring post at Skipsea and the anti-aircraft gunsite at Butt Farm, near Beverley, both of which are Scheduled Monuments.



## 4 Results

### 4.1 Description and Interpretation of the Results

- 4.1.1.1 The minimally processed and processed gradiometer survey results have been plotted at -1 nT to 2 nT as recommended by EAC guidelines. The results are presented as two greyscale plots (minimally processed and processed) alongside an interpretation of the data and the relevant figures for each area are listed within each results section.
- 4.1.1.2 For the most part, only geophysical anomalies of an archaeological, possible archaeological, uncertain or historical origin have been assigned an anomaly number on the interpretation figures. Trends that are integral to the discussion have also been assigned anomaly numbers. A table detailing the identified anomalies can be seen in [Appendix A – Characterisation of Identified Anomalies](#).
- 4.1.1.3 The results are assessed sequentially along the route of the onshore ECC, starting from the landfall close to Fraisthorpe in the north through to the OnSS near Creyke Beck Substation in the south.

### 4.2 Area 1

- 4.2.1.1 The survey area was located across three fields which form the landfall. The data is presented in [Figure 2](#), [Figure 3](#), [Figure 4](#) and [Figure 5](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

#### 4.2.2 Archaeology - Definitive

- 4.2.2.1 Anomalies have been identified across Area 1 that correlate with the locations of known Humber HER records and cropmarks and can therefore be classed as anomalies of a definitive archaeological origin.
- 4.2.2.2 In the centre of the northernmost field for Area 1, an archaeological double-ditched enclosure has been identified (1A). The enclosure consists of three parallel strong positive rectilinear trends with corresponding negative anomalies alongside them and measures approximately 52 m in width and 58 m in length. The enclosure is situated on the south-western corner of a larger field enclosure or trackway (1B). This trackway / boundary trend runs from the north-north-east to south-south-west for approximately 105 m before turning towards the south-east where it becomes weaker in magnetic strength.
- 4.2.2.3 Within enclosure 1A, further archaeological trends are visible. In the south-western corner, a sub-circular enclosure can be seen which measures approximately 15 m in diameter (1C). To the north-east of this, a partial sub-circular anomaly is also visible (1D) as well as two short parallel linear trends (1E).
- 4.2.2.4 A sub-circular anomaly is visible to the north-west of enclosure 1A and appears to have a direct relationship to it (1F). The enclosure measures approximately 32 m in diameter but only the southern extents are visible.

- 4.2.2.5 A small rectilinear enclosure is visible to the north of enclosure 1A measuring approximately 16 m in width and 17 m in length (1G). The enclosure consists of positive magnetism with a negative shadow along the northern edge.
- 4.2.2.6 In the central field another archaeological enclosure has been identified (1H). This enclosure, which also consists of strong positive rectilinear anomalies, measures approximately 45 m in width and appears to be divided into four quadrants. Similar to enclosure 1A, the feature is also situated adjacent to a road or boundary trend (1i) which is curvilinear in form and runs from east to west for approximately 106 m before turning towards the south-south-east and continuing into the southern field.
- 4.2.2.7 To the north-west of enclosure 1H, a long curvilinear trend runs towards the north-north-west before turning towards the north-west (1J). To the east of this trend, positive rectilinear anomalies have been identified which are likely to be related (1K).

### **4.2.3 Possible Archaeology**

- 4.2.3.1 Trends have been identified surrounding the features of a definitive archaeological nature that are also highly likely to be archaeological in origin; some of which have direct relationships with those identified through the Humber HER.
- 4.2.3.2 In the northern field, linear, curvilinear and pit-like anomalies within enclosure 1A are likely to relate to archaeological activity associated with the feature (1L). Some of the trends are likely to have a relationship with the archaeological trends they are immediately adjacent to (1C – 1D).
- 4.2.3.3 Immediately east of enclosure 1A and trackway / boundary trend 1B, rectilinear enclosures have been identified which are likely to be related (1M). They are somewhat fractured in appearance but could be part of the same enclosure or represent a complex of features.
- 4.2.3.4 Long linear trends running roughly north-south through the dataset (1N – 1P) and roughly east-west (1Q – 1R) either side of enclosure 1A likely relate to a former field system. It is not clear if they have a direct relationship to enclosure 1A.
- 4.2.3.5 In the central field, rectilinear, curvilinear and linear anomalies (1S) and pit-like anomalies (1T) can also be seen within archaeological enclosure 1H. It is likely they have a direct relationship with the enclosure. Further rectilinear trends can be seen either side of enclosure 1H that do not correlate with the Humber HER records (1U – 1V), suggesting the enclosure is bigger than previously recorded or is part of a complex of features.
- 4.2.3.6 Across the main dataset to the west, north and east of enclosure 1H, rectilinear and long linear anomalies are visible which are suggestive of further enclosures or field systems (1W – 1Y). Sub-circular anomalies have been identified amongst these possible field systems, suggesting the presence of archaeological settlement activity (1Z).
- 4.2.3.7 To the east and south-east of enclosure 1H, further strong positive rectilinear enclosures can be seen which are highly likely to also be archaeological in origin and have a direct relationship.

- 4.2.3.8 An enclosure immediately east of 1H is aligned with road / boundary trend 1i and appears to contain smaller circular anomalies which hint at the presence of settlement activity (1AA). The enclosure also contains a strongly magnetic pit-like anomaly surrounded by enhanced magnetic readings, which is suggestive of a hearth-type feature (1AB). An enclosure to the south of this measures approximately 30 m in width and 42 m in length and similarly has very strong positive thick linear boundaries (1AC). This enclosure also lies in alignment with linear trend 1i suggesting they have a relationship. Within this enclosure, two circular anomalies are visible measuring approximately 9 m in diameter adjacent to two curvilinear trends (1AD). The trends are likely to relate to settlement activity within the enclosure.
- 4.2.3.9 A further enclosure consisting of strong broad positive anomalies lies at the southern end of linear trend 1i. The square enclosure (1AE) measures approximately 28 m in width and is aligned with adjacent linear trends, suggesting it has a direct relationship with the possible archaeological remains surrounding it. The enclosure surrounds sub-circular and linear trends as well as two pit-like anomalies, suggesting the presence of archaeological settlement activity (1AF).
- 4.2.3.10 A complex of linear (1AG), rectilinear (1AH), curvilinear (1Ai) and circular (1AJ) trends are visible across the rest of the southern field for Area 1. The trends are slightly magnetically weaker than the broad anomalies described above, however they give the impression of a wide range of field systems, enclosures and settlement activity that are likely to be archaeological in origin.

## 4.2.4 Uncertain Origins

- 4.2.4.1 Rectilinear and curvilinear anomalies in the north of Area 1 are very magnetically weak, and their visibility could have been affected by the local geology (e.g. 1AK). The trends give the appearance of wider field systems and enclosures; however, they could equally relate to natural variations. Similarly, in the west of the dataset, strong magnetic trends that have the appearance of geological trends have a rectilinear appearance and their origins are uncertain (1AL).
- 4.2.4.2 In the east of the area between the northern and central fields, a weak semi-circular feature has been identified (1AM). The trend could be related to wartime features within the area; however, the feature has been affected by coastal erosion.
- 4.2.4.3 Across the rest of the southern field, weak linear and curvilinear trends are visible, and it is not clear if they relate to archaeological remains or natural variations in the subsoil (1AN).

## 4.2.5 Agricultural Features

- 4.2.5.1 Linear ploughing trends run across all three fields for Area 1 from east to west. The trends are closely spaced and are most likely modern in age. Further trends running parallel with the eastern coastline relate to ploughing headlands.

## 4.2.6 Non-Archaeology

- 4.2.6.1 Long swathes of magnetic variations are visible along the western and northern boundaries of Area 1. These likely originate from the streams running alongside the survey area or flood deposits from buried palaeochannels.
- 4.2.6.2 Areas of magnetic disturbance and ferrous enhancement are visible in the northern field and between the central and southern fields. These relate to modern activity such as trackways and buried ferrous objects and in the northernmost field relate to a World War II pill box still extant in the field.
- 4.2.6.3 Across the whole of the area, large quantities of isolated dipolar anomalies are visible (ferrous / iron spikes). These are commonly caused by ferrous or highly magnetic material on the surface or within the topsoil and it is likely that modern agricultural activity has created a high level of background 'noise' within the data set.

## 4.3 Area 25

- 4.3.1.1 Area 25 covered an area immediately to the north of the Order Limits at the landfall. This Survey Area was included in the survey programme as it covered a landfall option which has since been removed from the Hornsea Four Order Limits. It is presented in this report for completeness and to inform the wider character of the landscape. The data is presented in [Figure 6](#), [Figure 7](#) and [Figure 8](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### 4.3.2 Archaeology - Definitive

- 4.3.2.1 Anomalies have been detected in the dataset which correlate with the location of known Humber HER monuments and cropmarks and can therefore be definitively classed as archaeological in origin.
- 4.3.2.2 In the centre of the dataset, a rectilinear enclosure consisting of positive linear anomalies has been identified (25A). The enclosure measures approximately 39 m in width and 67 m in length and is orientated towards the north-west.
- 4.3.2.3 Smaller rectilinear anomalies have been identified in the data within enclosure 25A, however these do not match any cropmark or Humber HER data and are therefore classed as possible archaeology (25C – 25F).
- 4.3.2.4 To the north-west of enclosure 25A, a long positive linear trend runs from south-west to north-east (25B).

### 4.3.3 Possible Archaeology

- 4.3.3.1 A number of trends have been identified throughout the dataset for Area 25 which do not correlate with the Humber HER records or cropmarks and cannot be definitively classed as being archaeological in origin; however, it is likely that they are.
- 4.3.3.2 A faint sub-circular anomaly is visible at the north-eastern edge of enclosure 25A measuring approximately 10.7 m in diameter (25C). A magnetically stronger circular anomaly is also

visible at the north-western edge of enclosure 25A, measuring approximately 15 m in diameter (25D). Anomaly 25D appears to lie on top or underneath enclosure 25A; it is not possible to determine their age, but it is considered unlikely that these features are contemporary or directly related.

- 4.3.3.3 Within the centre of enclosure 25A, a number of small rectilinear and linear anomalies are visible (25E) amongst areas of enhanced magnetism (25F). These anomalies are thought to relate to archaeological activity within the enclosure and could relate to smaller enclosures or buildings.
- 4.3.3.4 To the north of the enclosure, a long negative linear trend runs north-east from linear trend 25B (25G). It is likely that this trend is a continuation of 25B and could relate to a long boundary or trackway.
- 4.3.3.5 West of this trend, two long curvilinear trends have been identified running north-west to south-east (25H – 25i). The trends appear to cross enclosure 25A but do not appear to have a direct relationship with it, suggesting they are from a different phase of archaeological activity.
- 4.3.3.6 To the east of enclosure 25A, two parallel curvilinear trends consisting of mixed positive and negative anomalies run towards the east (25J). The trends are surrounded by a mixed enhanced magnetic response and may relate to a trackway which could have a relationship with enclosure 25A.
- 4.3.3.7 To the east of these trends, immediately adjacent to the coast, negative rectilinear anomalies are visible (25K). The anomalies have a different appearance to those observed across the rest of the field and could be more modern in origin. The trends appear to continue east beyond the field boundary and their extents have been lost to the eroding coastline.
- 4.3.3.8 In the southern half of the dataset, a cluster of circular anomalies consisting of positive magnetism have been identified (25L). Further circular (25M), square (25N) and linear trends (25O) are visible surrounding these and it is suggested these trends relate to archaeological evidence of settlement activity.
- 4.3.3.9 In the north of the dataset, a broad weak positive D-shaped anomaly has been identified (25P). The possible enclosure measures approximately 35 m in diameter and the north-western extents appear to have been fractured or were deliberately left open. A small rectilinear anomaly is visible inside the possible enclosure (25Q).
- 4.3.3.10 Two parallel linear trends have been identified immediately south of this which could be related (25R). A sub-circular anomaly is visible to the south-east of these trends measuring approximately 17 m in diameter (25S). It is not clear if this anomaly relates to an enclosure.
- 4.3.3.11 In the centre-north of the dataset, a group of rectilinear trends have been identified (25T). The anomalies are magnetically weak but appear to represent enclosures.

## 4.3.4 Uncertain Origins

- 4.3.4.1 Further trends are visible throughout the rest of the dataset for Area 25 and it is not clear whether they have an archaeological origin or relate to agricultural trends or modern disturbances.
- 4.3.4.2 Trends identified across the north-east of the dataset are magnetically very weak and represent very subtle changes in the background magnetism of the dataset (25U). The anomalies appear rectilinear in shape and could relate to older archaeological activity.
- 4.3.4.3 A rectilinear trend in the north of the dataset lies parallel to former field boundary 25AB – 25AC and could be either agricultural or archaeological, relating to a trackway or further boundary trend (25V).
- 4.3.4.4 An area of enhanced magnetism to the west of this could relate to a former building, however none are visible on historical cartographic sources (25W).
- 4.3.4.5 Long linear trends run alongside possible archaeological trends 25H and 25i, though it is unclear whether the trends are related or if they represent geological variations (25X). Weak rectilinear trends in the east of the dataset have similar uncertain origins (25Y), and further long linear trends in the south-east of the dataset have been identified which could relate to boundary trends pre-dating cartographic sources (25Z).

## 4.3.5 Old Field Boundaries and Agricultural Features

- 4.3.5.1 Five former field boundaries have been identified in the dataset for Area 25. Their locations have been confirmed through comparison with historical mapping for the area (NLS 2019).
- 4.3.5.2 Two of the former boundaries run east-north-east to west-south-west across the top half of the area (25AA – 25AB). Three further boundaries run north-north-west to south-south-east through the dataset (25AC – 25AE) forming a series of field systems.
- 4.3.5.3 Four directions of ploughing trends are visible across the dataset for Area 25. In the north of the dataset, ploughing trends run west-south-west to east-north-east, in line with adjacent former field boundaries, suggesting they are of a similar age. At the western extents of these, the trends run north-south and north-east to south-west, suggesting they may be part of a smaller field division.
- 4.3.5.4 In the western half of the dataset, ploughing trends run north-east to south-west and are widely spaced, which is typical of a former ridge and furrow ploughing regime. These trends seem to have the same orientation as enclosure 25A and linear trend 25B, which suggests there may be a relationship.
- 4.3.5.5 Ploughing trends in the eastern half of the dataset are modern in origin and have a close spacing, and their north-south orientation matches with a modern field boundary that was visible in the field at the time of survey.

## 4.3.6 Non-Archaeology

- 4.3.6.1 Along the southern and south-western field boundary, broad geological variations are visible. These likely relate to flooding and sediment deposits from the adjacent stream that borders the southern field boundary, running towards the east into the sea.
- 4.3.6.2 A linear spread of modern magnetic disturbance along the northern boundary of the dataset relates to a farm track running through the area.
- 4.3.6.3 Across the whole of Area 25, a moderate quantity of isolated dipolar anomalies and larger anomalies are visible (ferrous / iron spikes). These are commonly caused by ferrous or highly magnetic material on the surface or within the topsoil and it is likely that modern agricultural activity has created a high level of background 'noise' within the data set.

## 4.4 Area 26

- 4.4.1.1 The survey area is located across a single field, with the western extent of the survey area located outside the Hornsea Four Order Limits following route refinement. The data is presented in [Figure 9](#) and [Figure 10](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### 4.4.2 Archaeology - Definitive

- 4.4.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### 4.4.3 Possible Archaeology

- 4.4.3.1 In the south-east of the dataset for Area 26, a number of rectilinear and linear anomalies are visible which suggest the presence of archaeological features. These anomalies are located within the Hornsea Four Order Limits.
- 4.4.3.2 A broad positive linear trend runs north-west to south-east through the eastern half of the dataset and is thought to be archaeological in origin (26A). Two curvilinear trends run from this trend towards the south (26B) and towards the south-west (26C) and are likely to be related as they have a direct relationship.
- 4.4.3.3 Small areas of enhanced magnetism and positive amorphous anomalies are visible within these trends which could relate to archaeological activity (26D).
- 4.4.3.4 To the south of these, rectilinear anomalies are visible which suggest the presence of enclosures or small field systems (26E).
- 4.4.3.5 In the western half of the dataset, which is located outside the Hornsea Four Order Limits, weak positive linear and rectilinear trends have been identified which could be archaeological in origin (26F).
- 4.4.3.6 Further trends are visible to the west of these; however, they are heavily fractured, and it is not clear what they represent (26G).

#### **4.4.4 Uncertain Origins**

- 4.4.4.1 In the centre-east of the area, the dataset is dominated by geological variations, however some very weak uncertain trends have been identified amongst them (26H) which partially fall within the Hornsea Four Order Limits.
- 4.4.4.2 A U-shaped anomaly is visible in the north-east of the dataset (26i). It is unusual in form and it is not clear if it relates to a geological or archaeological anomaly.
- 4.4.4.3 Broad positive and negative anomalies are visible in the western half of the dataset which could relate to older field systems, though their magnetic appearance is very weak (26J).

#### **4.4.5 Agricultural Features**

- 4.4.5.1 Sporadic ploughing trends are visible across the eastern half of the dataset, running north-north-west to south-south-east. The trends are closely spaced and are likely to relate to modern ploughing activities.
- 4.4.5.2 Agricultural trends along the southern boundary likely relate to an agricultural trackway or headland.

#### **4.4.6 Non-Archaeology**

- 4.4.6.1 Long, curving magnetic anomalies are visible running north-west to south-east across the entire dataset and are likely to relate to geological variations. Those in the north-east are likely to relate to flooding and sediment deposits from an adjacent stream running along the northern field boundary.
- 4.4.6.2 Magnetic disturbance along the south of the dataset relates to an adjacent trackway running along the southern field boundary.
- 4.4.6.3 A patch of ferrous anomalies in the centre of the dataset are likely modern in origin and relate to larger metallic detritus in the topsoil.
- 4.4.6.4 A small quantity of isolated dipolar anomalies are visible in the dataset (ferrous / iron spikes). These are commonly caused by ferrous or highly magnetic material on the surface or within the topsoil and it is likely that modern agricultural activity has created a high level of background 'noise' within the data set.

#### **4.5 Area 27**

- 4.5.1.1 This survey area is located across two fields. The northern field and northern half of the southern field are located outside the Hornsea Four Order Limits following route refinement. The data is presented in [Figure 11](#), [Figure 12](#) and [Figure 13](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).



## 4.5.2 Possible Archaeology

- 4.5.2.1 At the northern end of the southern field, located outside of the Hornsea Four Order Limits, a positive square anomaly has been identified surrounded by a negative response (27A).
- 4.5.2.2 A slightly curved positive linear trend runs to the east of this from west-north-west to east and appears to have an entranceway towards the eastern extents (27B). It is not clear if the anomalies have a relationship. Anomaly 27B is located outside of the Hornsea Four Order Limits.
- 4.5.2.3 To the south of these, outside the Hornsea Four Order Limits, two positive rectilinear trends, orientated south-west to north-east, appear to form an entranceway or narrow boundary (27C).
- 4.5.2.4 In the centre-south of the southern field, located partially within the Hornsea Four Order Limits, a series of rectilinear enclosures have been identified (27D). Consisting of curved positive linear trends, the features measure approximately 23 m in width and are orientated north - south. To the north of these, further fractured rectilinear trends are visible adjacent to a sub-circular enclosure (27E).

## 4.5.3 Uncertain Origins

- 4.5.3.1 Long, parallel linear trends run north-north-west to south-south-east and north-east to south-west across Area 27 (27F). They are seen to continue through into the northern dataset (27G) and are thought to represent former field boundaries or a field system; however, their magnetic signal is weak and fractured.
- 4.5.3.2 Weak circular trends have been identified in the southern field, but their origins are unclear (e.g. 27H).

## 4.5.4 Agricultural Features

- 4.5.4.1 Modern ploughing trends run across the majority of the southern field for Area 27 from north-north-west to south-south-east. In the southern extents they also run from east-north-east to west-south-west.
- 4.5.4.2 Agricultural field drains, seen as thin linear trends of magnetic disturbance, run along the south of the southern field from east-north-east to west-south-west.

## 4.5.5 Non-Archaeology

- 4.5.5.1 The northern field of Area 27 is located outside of the Hornsea Four Order Limits and is dominated by swathes of geological variations. In the southern field, geological trends run in thin bands throughout the dataset towards the south-west.
- 4.5.5.2 Modern magnetic disturbance at the southern boundary of the southern field relates to detritus at the field edges and an access gate in the south-west. A moderate quantity of isolated dipolar anomalies are visible across the dataset (i.e. ferrous / iron spikes).

## 4.6 Area 28

4.6.1.1 The survey area is located across five fields. The data is presented in [Figure 14](#), [Figure 15](#), [Figure 16](#), [Figure 17](#) and [Figure 18](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### 4.6.2 Archaeology - Definitive

4.6.2.1 Anomalies have been detected that correlate with the location of known archaeological remains.

4.6.2.2 In the southern half of Area 28, three sub-circular positive anomalies leading to long linear trends are visible in a group (28A). The trends are surrounded by magnetic disturbance which is likely related. The anomalies relate to the remains of airfield features from RAF Lissett. Further trends relating to RAF Lissett can be seen further north in Area 28 (28B – 28D).

### 4.6.3 Possible Archaeology

4.6.3.1 Adjacent to these airport features, a number of rectilinear and linear anomalies have been identified. It is thought they are likely to be archaeological in origin, but it is not clear whether they relate to airfield features or if they are older.

4.6.3.2 Linear trends running east-west and north-north-west to south-south-east to the south of features 28A could be related to the airfield remains (28E).

4.6.3.3 South of this, a linear trend runs north-west to south-east adjacent to a broad weak negative response (28F). Rectilinear enclosures and linear trends have been identified to the south of this which could indicate the presence of archaeological activity (28G – 28H).

4.6.3.4 A rectilinear enclosure in the middle of these anomalies is thought to be modern in origin, perhaps relating to the airfield, due to the strong magnetic appearance of the trends (28i).

4.6.3.5 In the northern portion of the dataset, a series of rectilinear and linear trends have been identified which suggest the presence of a settlement. A positive rectilinear enclosure is visible towards the centre, measuring approximately 30 m in width and 43 m in length, though the southern boundary is not visible (28J). Linear and rectilinear divisions are visible within the enclosure.

4.6.3.6 Two curved parallel linear trends are visible to the south-west of this which could be related (28K). To the north of this, two long parallel curvilinear trends are visible which run towards the north (28L). They likely relate to boundary trends comprising part of a field system. These trends run towards a series of rectilinear enclosures which are fractured in appearance (28M).

### 4.6.4 Uncertain Origins

4.6.4.1 To the north-west of the possible settlement (28M) two broad anomalies have been identified and it is not clear if they are related to geological variations (28N).

- 4.6.4.2 Two areas of magnetic disturbance amongst the possible archaeological settlement (28M) look highly magnetic, however it is not clear if they relate to the settlement or if they have modern origins (28O). Similar areas are visible to the south of these (28P).
- 4.6.4.3 In the southern half of the dataset adjacent to military airfield trends 28A, an area of disturbance could be related to the airfield or could be geological (28Q).
- 4.6.4.4 In the south extent of the dataset, further areas of disturbance and very weak trends are visible, and it is not clear if they are natural or agricultural, or if they relate to the airfield (28R).

#### **4.6.5 Old Field Boundaries and Agricultural Features**

- 4.6.5.1 Widely spaced trends in the north of the dataset running north-west to south-east are consistent with ridge and furrow ploughing trends. Two long linear trends to the north and south of these have been confirmed as old field boundaries when compared with historical mapping (28S – 28T), however they run along a slightly different orientation to the ploughing trends, suggesting they are not related.
- 4.6.5.2 A linear trend to the south of these follows the same orientation as the ridge and furrow, suggesting they may be of a similar age (28U). A fourth old field boundary further south of this may be of a similar age and origin (28V). Both conventional and ridge and furrow trends run up to and stop at the boundary; suggesting they have a direct relationship.
- 4.6.5.3 Across the southern half of the dataset, two further boundaries can be seen running east-north-east to west-south-west (28W) and north-north-east to south-south-west (28X) adjacent to ploughing trends that run parallel / up to them. This again suggests a direct relationship between the former boundaries and the adjacent agricultural regimes.

#### **4.6.6 Non-Archaeology**

- 4.6.6.1 Some small sporadic areas of geological or natural variations are visible throughout the datasets for Area 28 but do not cause any visibility issues within the data.
- 4.6.6.2 A large bipolar anomaly surrounded by a magnetic halo runs north-west to south-east through the centre of Area 28 and most likely relates to a modern service running through the area.
- 4.6.6.3 Further magnetic disturbance around the field edges most likely relates to metallic boundary fencing and debris at the field edges. A small quantity of isolated dipolar anomalies is visible across the area (i.e. ferrous / iron spikes).

## **4.7 Area 3a**

4.7.1.1 The survey area is located across a single field with the northern corner falling outside the Hornsea Four Order Limits following route refinement. The dataset is presented in [Figure 19](#), [Figure 20](#) and [Figure 21](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.7.2 Archaeology - Definitive**

4.7.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.7.3 Possible Archaeology**

4.7.3.1 Two rectilinear trends are visible in the west of the dataset outside the Hornsea Order Limits which could be archaeological in origin (3AA).

4.7.3.2 A number of pit-like anomalies are visible throughout the dataset (3AB – 3AC).

### **4.7.4 Uncertain Origins**

4.7.4.1 Weak linear and rectilinear trends have been identified in the western (3AD) and eastern (3AE) half of the dataset which have uncertain origins; these anomalies are located outside and within the Hornsea Four Order Limits, respectively.

4.7.4.2 A large area of magnetic enhancement to the east of 3AE could be related but this is unclear (3AF). The enhancement consists of several short amorphous anomalies and negative responses, and it is possible they could relate to truncated archaeological remains.

### **4.7.5 Old Field Boundary and Agricultural Features**

4.7.5.1 An old field boundary runs through the western half of the dataset from north-east to south-west and its location matches that of one observed on historical mapping (3AG). A second boundary runs up to this boundary from the south-east (3AH) and it is apparent the two have a direct relationship and form a field system.

4.7.5.2 Ploughing trends are visible within these former boundaries running north-west to south-east in alignment, suggesting they were in use at the same time.

### **4.7.6 Non-Archaeology**

4.7.6.1 A bipolar response runs through the centre of the dataset from north-west to south-east, crossing underneath a second strongly magnetic response running north-east to south-west. The trends likely relate to modern services such as pipes.

4.7.6.2 A small number of isolated dipolar anomalies are visible in the dataset (i.e. ferrous / iron spikes).

## **4.8 Area 30**

4.8.1.1 The survey area is located across three fields. The data is presented in [Figure 22](#), [Figure 23](#) and [Figure 24](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.8.2 Archaeology - Definitive**

4.8.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.8.3 Possible Archaeology**

4.8.3.1 Pit-like anomalies are visible across the dataset which could have archaeological origins (30A).

### **4.8.4 Uncertain Origins**

4.8.4.1 A series of parallel linear trends run across the entire dataset for Area 30 from north-east to south-west (30B). The trends could relate to natural striations in the subsoil, or widely spaced sporadic agricultural trends.

4.8.4.2 Weak curvilinear and linear trends are visible in the north-west of the dataset, in the westernmost field, which have uncertain origins (30C).

### **4.8.5 Agricultural Features**

4.8.5.1 Across the central and eastern half of Area 30, ploughing trends run from north-west to south-east in line with extant modern field boundaries. In the western extent of the dataset, curved ridge and furrow ploughing trends run north-west to south-east.

### **4.8.6 Non-Archaeology**

4.8.6.1 Ferrous zones are visible throughout the dataset, which are likely related to larger ferrous items buried within the topsoil. A small quantity of isolated dipolar anomalies are also visible in the dataset (i.e. ferrous / iron spikes).

## **4.9 Area 3b**

4.9.1.1 The survey area is located across a single field with the central portion of the survey area falling outside the Hornsea Four Order Limits following route refinement. The data is presented in [Figure 25](#), [Figure 26](#) and [Figure 27](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.9.2 Archaeology - Definitive**

4.9.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

## 4.9.3 Possible Archaeology

- 4.9.3.1 In the centre-east of the dataset, outside the Hornsea Four Order Limits, two parallel negative rectilinear trends are visible that could be archaeological in origin (3BA).
- 4.9.3.2 To the south of these, positive linear trends surrounded by a corresponding negative halo have been identified (3BB).
- 4.9.3.3 In the west of the dataset, partially within the Hornsea Four Order Limits, two long parallel negative linear trends run north-north-west to south-south-east (3BC). The trends could relate to a trackway or part of a field system. A further long negative trend cuts through the southern extents of the trend, running east-north-east to west-south-west (3BD). This is also likely to relate to part of a field system or boundary.
- 4.9.3.4 A number of pit-like anomalies have been identified across the dataset (e.g. 3BE). Some are likely to be archaeological in origin, particularly those located near to trends of a possible archaeological origin (3BF).

## 4.9.4 Uncertain Origins

- 4.9.4.1 Weak magnetic trends located near to the trends of a possible archaeological origin could be related, but their visibility against the magnetic background is poor (3BG – 3BH).

## 4.9.5 Old Field Boundaries and Agricultural Features

- 4.9.5.1 Five linear trends have been identified as old field boundaries when compared with historical mapping (NLS 2019). The boundaries form a series of field systems. Two old boundaries run east-north-east to west-south-west across the dataset (3Bi – 3Bj). Two further boundaries run north-north-west to south-south-east (3Bk – 3Bl). The fifth former boundary runs north-south (3Bm) and appears to have a relationship with former boundary 3Bj.
- 4.9.5.2 Agricultural ploughing trends run east-north-east to west-south-west amongst former boundaries 3Bi, 3Bj, 3Bk, 3Bm, suggesting they are related and were in use at the same time.
- 4.9.5.3 Wide spaced ridge and furrow trends seen across the eastern half of the dataset run north-north-west to south-south-east, respective of boundaries 3Bm and 3Bl suggesting they have a relationship.

## 4.9.6 Non-Archaeology

- 4.9.6.1 Larger ferrous anomalies are visible throughout the dataset which likely relate to buried modern detritus in the field.
- 4.9.6.2 A small number of isolated dipolar anomalies are also visible (ferrous / iron spikes). These are commonly caused by ferrous or highly magnetic material on the surface or within the topsoil and it is likely that modern agricultural activity has created a high level of background 'noise' within the data set.

## **4.10 Area 31**

4.10.1.1 The survey area is located across a single field. The data is presented [Figure 28](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.10.2 Archaeology - Definitive**

4.10.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.10.3 Possible Archaeology**

4.10.3.1 In the south-west corner of the dataset, two curvilinear trends have been identified which could be archaeological in origin (31A).

### **4.10.4 Uncertain Origins**

4.10.4.1 Adjacent to the trends of a possible archaeological origin, further weak rectilinear trends have been identified (31B). It is unclear if these are natural or if they relate to agricultural trends which run along the same orientation.

### **4.10.5 Agricultural Features**

4.10.5.1 Agricultural ploughing trends run across the entire dataset from east to west. A ploughing headland or farm track runs parallel to the eastern boundary.

### **4.10.6 Non-Archaeology**

4.10.6.1 A small number of isolated dipolar anomalies are visible in the dataset (i.e. ferrous / iron spikes).

## **4.11 Area 3c**

4.11.1.1 The survey area is located across two fields. The data is presented in [Figure 29](#), [Figure 30](#) and [Figure 31](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.11.2 Archaeology - Definitive**

4.11.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.11.3 Possible Archaeology**

4.11.3.1 Anomalies have been identified in the centre of the dataset for Area 3c which are indicative of archaeological trends. A long linear trend runs north-south (3CA), parallel to old field boundary 3CM to which it may be related. A rectilinear enclosure lies to the east which appears to have a direct relationship to the trend (3CB). The enclosure measures 11 m in width and approximately 30 m in length, however the northern extents are not visible.

4.11.3.2 To the east of this, a long positive curvilinear trend runs north-west to south-east parallel to a short curvilinear trend (3CC). A sub-circular positive anomaly has been identified to the west of this which is likely to be related (3CD).

4.11.3.3 A zone of enhanced magnetism at the southern end of these trends could relate to archaeological material in the ground which has been ploughed into the surrounding subsoil (3CE).

#### **4.11.4 Uncertain Origins**

4.11.4.1 In the north-east of Area 3c, a number of fragmented positive rectilinear and linear trends have been identified (3CF) amongst a zone of enhanced magnetism (3CG). It is not clear if they relate to fragmented archaeological remains or if they are a swathe of natural or geological variations running through the area.

4.11.4.2 Very weak trends have been identified to the south-west of this zone (3CH) and it is unclear if these are just coincidental trends appearing as a result of the numerous ploughing trends running through the area.

4.11.4.3 In the south-western half of the dataset, two parallel linear trends running parallel to boundary trend 3CL could relate to ploughing trends or could have an archaeological origin (3Ci). To the south-west and south of these, further weak trends have been identified which similarly have unclear origins and could be coincidental (3CJ – 3CK).

#### **4.11.5 Old Field Boundaries and Agricultural Features**

4.11.5.1 Two former field boundaries have been identified in the western half of the dataset, running east-west (3CL) and north-south (3CM).

4.11.5.2 A pattern of agricultural ploughing trends runs across the entire dataset from east to west.

4.11.5.3 Widely spaced ridge and furrow ploughing trends run across the western half of the dataset from north-south, in line with boundary trend 3CM to which they may be related.

#### **4.11.6 Non-Archaeology**

4.11.6.1 A moderate quantity of isolated dipolar anomalies (i.e. ferrous / iron spikes) is visible across the dataset as well as larger ferrous anomalies.

### **4.12 Area 32**

4.12.1.1 The survey area is located across three fields; the dataset within the north-eastern field falls within the Hornsea Four Order Limits, the dataset within the central field partially covers the Hornsea Four Order Limits, whereas the dataset from the south-western field falls outside the Hornsea Four Order Limits. The data is presented in [Figure 32](#), [Figure 33](#) and [Figure 34](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).



## 4.12.2 Archaeology - Definitive

4.12.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area. However, trends have been identified which are highly likely to be archaeological in origin but cannot be definitively classed as archaeological without further investigation. They have therefore been depicted as 'possible archaeology'.

## 4.12.3 Possible Archaeology

4.12.3.1 In the north-east of Area 32, a positive square enclosure is visible adjacent to some short linear trends (32A). The enclosure measures approximately 20 m in width.

4.12.3.2 Positive linear trends to the west of these could also have archaeological origins (32B).

4.12.3.3 The central section of the dataset is concentrated with rectilinear, linear and curvilinear trends. The trends are suggestive of a field system or large enclosure encompassing smaller enclosures and settlement activity. The trends have been somewhat affected by ploughing activity through the area.

4.12.3.4 A long rectilinear trend runs north-west to south-east through the centre of the trends before turning towards the south-south-west (32C). Three linear trends run parallel to this (32D) and appear to form a boundary or trackway feature, extending across the Hornsea Four Order Limits.

4.12.3.5 To the east of these trends, broad linear anomalies amongst an area of enhanced magnetism are visible (32E).

4.12.3.6 Within the boundary trends 32C and 32D, curvilinear and rectilinear trends are visible, but it is not clear what they represent (32F).

4.12.3.7 Similarly, in the east, outside the Hornsea Four Order Limits, there are trends indicative of settlement activity, but the exact features are not clear (32G).

4.12.3.8 To the south-west of this area, outside the Hornsea Four Order Limits, broader enclosures consisting of linear parallel trends and curvilinear trends have been identified (32H). The trends are likely to be related to those observed further north in the dataset.

## 4.12.4 Uncertain Origins

4.12.4.1 Magnetically weak trends are visible amongst the trends of a possible archaeological origin (32i – 32J). It is not clear if they are also archaeological or if they relate to ploughing activities that are visible throughout the dataset.

## 4.12.5 Old Field Boundaries and Agricultural Features

4.12.5.1 A mixed positive and negative linear response in the eastern extent of the central dataset is confirmed as an old field boundary (32K).

4.12.5.2 A long, slightly rectilinear trend running north-north-west to south-south-east in the south-west of the dataset has also been confirmed as a former field boundary (32L). This likely extends northwards into the Hornsea Four Order Limits.

4.12.5.3 In the very north-east of Area 32, a series of closely spaced linear trends indicate the presence of tractor tyre ruts along an agricultural trackway.

4.12.5.4 Ploughing trends run across the central and southern sections of the dataset from north-west to south-east.

4.12.5.5 Widely spaced ridge and furrow ploughing trends are also visible in the central and southern sections of the dataset, running along an east-west orientation.

#### **4.12.6 Non-Archaeology**

4.12.6.1 A moderate quantity of isolated dipolar anomalies (i.e. ferrous / iron spikes) is visible across the dataset as well as larger ferrous anomalies.

#### **4.13 Area 33**

4.13.1.1 The survey area is located across a single field. The data is presented in [Figure 35](#), [Figure 36](#) and [Figure 37](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

#### **4.13.2 Archaeology - Definitive**

4.13.2.1 No responses indicating the presence of definitive archaeological remains has been identified in this area.

#### **4.13.3 Possible Archaeology**

4.13.3.1 A group of linear and curvilinear trends have been identified within the south of Area 33, which could potentially be archaeological in origin (33A). Two parallel linear trends have been identified running roughly east-west across the south of the area, situated approximately 15 m apart. The trends could represent a prehistoric trackway through the area. Towards the western end of this potential trackway, a ring ditch feature has been identified which measures approximately 7 m in diameter.

4.13.3.2 These anomalies may relate to a ditched field system, recorded in the HER to the east of the survey area (Monument I.D. MHU2252). The remains are not close enough to be plotted on the interpretation.

4.13.3.3 A second potential trackway consisting of two parallel linear trends has been identified in the south of the dataset for Area 33 (33B). The trackway appears to run from the south-east towards the north-west, where it continues into Area 34 and is seen as anomaly 34B. The distance between these trends is approximately 10 m, which matches trackway 34B identified in Area 34, suggesting they are likely to be related or are the same feature.

4.13.3.4 In the centre of Area 33, a number of curvilinear trends of a positive magnetic enhancement have been identified (33C). These trends could potentially be archaeological in nature, given

their magnetic strength and shaping, however they are much more truncated in appearance. They could alternatively be geological in origin.

4.13.3.5 Discrete pit-like anomalies have been identified across the dataset, which although have the potential to be archaeological in nature, could also relate to geological variations.

#### **4.13.4 Uncertain Origins**

4.13.4.1 Across Area 33, many trends and areas of enhanced magnetism have been identified. Many of these could be archaeological, given the presence of possible archaeological remains, however a number could alternatively have non-archaeological origins.

4.13.4.2 An area of unclear magnetic enhancement is visible (33D) surrounding the potential archaeological features 33C. The anomaly could indicate the presence of archaeological activity; however, it could also be geological.

4.13.4.3 A further area of enhanced magnetism is located in the south of the dataset, which could indicate further possible archaeological activity (33E). Within this location, a number of linear and rectilinear trends have been identified which also have unclear origins (33F).

4.13.4.4 In the central and northern part of Area 33, a number of tentative linear trends have been identified (33G – 33I). These trends all have the potential to be archaeological in origin but due to their weak magnetic appearance they are equally likely to be a result of recent agricultural activity in the area.

4.13.4.5 Magnetically weak sub-circular trends of an unclear origin have been identified in the centre of the dataset (33J).

4.13.4.6 Rectilinear trends are visible in the north of Area 33 (e.g. 33K), but these are more likely related to agricultural drainage rather than archaeological remains.

#### **4.13.5 Old Field Boundaries and Agricultural Features**

4.13.5.1 Two former field boundaries have been identified running north-west to south-east through the dataset (33L). These boundaries appear on first edition ordnance survey mapping (National Library of Scotland 2019) and have since been removed and are now only visible in the data as an area of magnetic enhancement.

4.13.5.2 Ploughing trends are visible across the dataset which are likely of a conventional age, and follow the same orientation as the former boundaries, suggesting they are of a similar age.

#### **4.13.6 Non-Archaeology**

4.13.6.1 A number of geological variations relating to former river channels and areas of alluvium likely caused by flooding events can be seen across the dataset for Area 33.

4.13.6.2 Areas of magnetic disturbance are visible in the far north of the survey area and surrounding the former field boundaries.

4.13.6.3 Across the whole of Area 33 large quantities of isolated dipolar anomalies are visible (i.e. ferrous / iron spikes). These are commonly caused by ferrous or highly magnetic material on the surface or within the topsoil of the area and it is likely that modern agricultural activity has created a high level of background 'noise' within the data set.

## **4.14 Area 34**

4.14.1.1 The survey area is located across a single field. The data is presented in [Figure 38](#) and [Figure 39](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

### **4.14.2 Archaeology - Definitive**

4.14.2.1 Within Area 34, two square enclosures have been identified (34A). These enclosures are known and recorded within the Humber HER as a square ditched enclosure (Monument I.D MHU8109).

4.14.2.2 The larger square enclosure visible in the dataset measures approximately 40 m by 40 m alongside a circular anomaly measuring 15 m in width. The second smaller enclosure measures approximately 25 m by 25 m and adjoins the larger enclosure to the east.

### **4.14.3 Possible Archaeology**

4.14.3.1 Possible archaeology has been identified throughout Area 34 which is likely to relate to the square enclosures above, though the remains have not been recorded on the Humber HER.

4.14.3.2 Two parallel trends have been identified to the north and east of the square enclosures which are likely to be directly related (34B). The trends run north-west to south-east and are situated 10 m apart. They are likely to be the same features seen in Area 33 to the east (trends 33B). These trends could potentially represent a trackway and could relate to access into the square enclosures.

4.14.3.3 To the south of the square enclosures, but within close proximity, a number of long linear, rectilinear and curvilinear trends have been identified (34C). These are also likely to be directly related to the square enclosure and be archaeological in origin. The trends could represent further enclosures and trackways.

4.14.3.4 Several curvilinear and linear trends have been identified in the centre-west of the dataset which could be archaeological in origin (34D). The trends are not as well defined as those previously described.

4.14.3.5 In the west of Area 34, a possible archaeological large sub-circular enclosure has been identified (34E). Geological variations are visible in the vicinity of this anomaly therefore interpretation is tentative.

### **4.14.4 Uncertain Origins**

4.14.4.1 Unclear linear and curvilinear trends have been identified in the Area (34F and 34G). These trends are less well defined than other trends in the area, therefore could potentially relate to geological or agricultural origins rather than archaeological origins. However, trend 34F is similar in appearance to trends of a possible archaeological nature located close by.

4.14.4.2 A strong trend is recorded in the west of Area 34 (34H). Although the trend has the potential to relate to archaeological remains, part of the anomaly is shadowed by a negative halo which is suggestive of more modern origins, such as a modern service.

4.14.4.3 In the far west of Area 34, a number of strong sub-circular anomalies have been identified which have unclear origins (34i).

#### **4.14.5 Agricultural Features**

4.14.5.1 A former field boundary is noted running north-west to south-east through the north of the dataset (34J). This boundary appears on first edition ordnance survey mapping and has since been removed and is now only visible in the data as an area of magnetic enhancement.

4.14.5.2 Conventional ploughing trends are visible across the dataset, particularly in the west.

#### **4.14.6 Non-Archaeology**

4.14.6.1 A number of geological variations relating to former river channels are visible in the west of the area.

4.14.6.2 Areas of magnetic disturbance have been recorded around the periphery of the survey area and along upstanding field boundaries. Large quantities of ferrous are visible across the dataset.

### **4.15 Area 35**

4.15.1.1 The northern and southern extents of Area 35 were surveyed during the first phase of geophysical works (8 April to 17 April 2019). The survey has now been fully completed and the original interpretation has been reviewed and amended in light of the results obtained from the central part of the survey area.

4.15.1.2 The survey area is located across two fields. The data is presented in [Figure 40](#) and [Figure 41](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

#### **4.15.2 Archaeology - Definitive**

4.15.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area. However, trends have been identified that are highly likely to be archaeological, but without supporting evidence, they cannot be described as such.

#### **4.15.3 Possible Archaeology**

4.15.3.1 Trends have been identified in the centre of the dataset which indicate the presence of archaeological settlement activity. The anomalies identified could relate to a HER record of a rectangular enclosure found to the east (MHU 19368).

4.15.3.2 Two long positive parallel curvilinear trends run from the north-east towards the south at the centre of the dataset (35A). The trends likely indicate the presence of a main trackway

through the possible settlement. At the northern extents, two linear trends branch off towards the north-west (35B – 35C) appearing to form small field systems or enclosures.

4.15.3.3 At the northern extents of the trend, a broad, strong positive sub-circular trend has been identified (35D). The trend continues beyond the Hornsea Four Order Limits but appears to be circular in form. The anomaly could indicate the presence of a possible henge or small ditched enclosure and could be quite significant in size, measuring possibly 30 m in width.

4.15.3.4 A rectilinear enclosure is visible on the northern side of trackway trend 35A (35E). The enclosure consists of positive linear trends and measures approximately 39 m in width and 32 m in length. A smaller rectilinear trend is visible within the enclosure measuring approximately 16 m in length (35F). Two pit-like anomalies lie next to it and the trends could relate to a building.

4.15.3.5 A further incomplete enclosure-type feature has been identified to the south-west of this, measuring approximately 27 m in length (35G).

4.15.3.6 Along the southern edge of the trackway 35A, further enclosures and linear trends are visible which are likely related (35H). Some of the trends appear to have a direct relationship with the trackway suggesting they are part of the same phase of activity.

4.15.3.7 In the southern half of the dataset, trends and pit-like anomalies were identified during Phase 1 that were classed as 'uncertain in origin'. It is now clear that a number of these anomalies are a continuation of the possible archaeological settlement and they have now been highlighted as features of interest (35i).

#### **4.15.4 Uncertain Origins**

4.15.4.1 Unclear linear and curvilinear trends have been identified in the southern part of Area 35. These trends are potentially archaeological in origin given their location next to a possible archaeological settlement, however the trends are not well defined. If they are archaeological, it is likely that the remains have been heavily truncated by ploughing.

4.15.4.2 In the south of the dataset, weak fractured rectilinear and linear trends have the appearance of enclosures (35J). To the south of these, circular anomalies could relate to enclosures, ring ditches or barrows (35K). Several pit-like anomalies could also be related and could be archaeological in origin (35L).

4.15.4.3 In the north of Area 35, a number of tentative negative and weak positive linear trends have been identified which have unclear origins (35M – 35O). These could similarly also relate to the possible archaeological settlement to the south, but this is unclear.

#### **4.15.5 Old Field Boundaries and Agricultural Features**

4.15.5.1 Two former field boundaries have been identified in the dataset. One former boundary is visible in the north of the dataset running from north-west to south-east before turning towards the south-west (35P) and the second is visible in the south of the dataset running north-west to south-east (35Q).

4.15.5.2 Ridge and furrow ploughing remains have been recorded in the southern part of the dataset, as well as more recent conventional ploughing trends across the centre of the dataset.

#### **4.15.6 Non-Archaeology**

4.15.6.1 A large geological variation is visible in the north of the dataset and is likely to relate to a former river channel in the area.

4.15.6.2 An area of modern magnetic disturbance was recorded in the centre north of the dataset. A moderate level of ferrous can be seen throughout the dataset.

#### **4.16 Area 36**

4.16.1.1 The survey area is located across a single field. The data is presented in [Figure 42 in Annex 5.3: Priority Archaeological Geophysical Survey - Part B](#).

#### **4.16.2 Archaeology - Definitive**

4.16.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

#### **4.16.3 Uncertain Origins**

4.16.3.1 Rectilinear and linear trends have been identified in the south-west of the dataset amongst an area of geological variations (36A). The trends could be related to the underlying geology; however, some are rectilinear in shape and could potentially be archaeological in origin.

4.16.3.2 Further very weak trends and an area of slight magnetic enhancement are also visible in the dataset (36B); however, none are thought to have an archaeological origin.

#### **4.16.4 Old Field Boundary and Agricultural Features**

4.16.4.1 A former field boundary has been identified running north-south through the western half of the dataset (36C).

4.16.4.2 Ploughing trends follow the same orientation and could have a relationship with this former boundary.

#### **4.16.5 Non-Archaeology**

4.16.5.1 Strong magnetic geological variations run across the dataset. Similar variations can be seen in the neighbouring dataset (Area 37) but the trends are not thought to be masking any archaeological remains from view.

4.16.5.2 A moderate level of ferrous can be seen throughout the dataset.

## **4.17 Area 37**

4.17.1.1 The survey area is located across a single field. The data is presented in [Figure 43](#) and [Figure 44](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.17.2 Archaeology - Definitive**

4.17.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.17.3 Possible Archaeology**

4.17.3.1 Trends have been identified which suggest the presence of archaeological activity. In the centre of the dataset, rectilinear and linear positive trends have been identified which are suggestive of former field enclosures (37A). In the south of the dataset, two positive parallel linear trends run north-south and could be archaeological in origin (37B).

### **4.17.4 Uncertain Origins**

4.17.4.1 Positive curvilinear and linear trends have been identified across the northern half of the dataset; however, they are situated amongst a zone of geological variations and it is difficult to ascertain if the trends are archaeological or natural in origin.

4.17.4.2 Some of the trends are suggestive of archaeological enclosures (37C). Long linear trends are suggestive of possible boundaries or field systems (37D).

4.17.4.3 In the south of the dataset, areas of enhanced magnetism could relate to fractured or truncated remains, but it is unclear what they could represent (37E). They could relate to material from former field boundary 37G to which they are situated next to.

### **4.17.5 Old Field Boundaries and Agricultural Features**

4.17.5.1 Three former field boundaries have been identified in the southern half of the dataset. One former boundary runs west-north-west to east-south-east (37F). To the south-east of this, a second boundary runs north-north-east to south-south-west (37G) intersecting in the south with a third boundary running east-west (37H). It is possible the boundaries have a relationship.

4.17.5.2 Agricultural ploughing trends run across the majority of the dataset in a north-north-east to south-south-west orientation. A ploughing headland or trackway is visible along the northern field boundary.

4.17.5.3 A patterning of agricultural field drains is also visible, running north-west to south-east and east-west across the central and southern part of the area. It is possible that these trends lie within former ridge and furrow ploughing trends.



## 4.17.6 Non-Archaeology

4.17.6.1 A swathe of geological variations has been identified across the northern half of the dataset which could possibly be masking archaeological features from detection by gradiometry.

4.17.6.2 Magnetic enhancement is seen at the northern and southern field boundaries and is likely to relate to modern metallic boundary fencing or nearby infrastructure. A moderate quantity of ferrous is visible throughout the dataset.

## 4.18 Area 38

4.18.1.1 The survey area is located across a single field. The data is presented in [Figure 45](#) and [Figure 46](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### 4.18.2 Archaeology - Definitive

4.18.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### 4.18.3 Possible Archaeology

4.18.3.1 In the north-east of the dataset, two parallel curvilinear trends could be archaeological in origin (38A). Two similar parallel curvilinear trends are visible to the south-west of these and could also be archaeological in origin (38B).

### 4.18.4 Uncertain Origins

4.18.4.1 The dataset for Area 38 contains unclear trends that are similar to those observed in Area 37. They are situated amongst an area of geological variations and it is not clear if the trends are archaeological, or if they relate to anomalies caused by the adjacent river, or to geological variations in the ground.

4.18.4.2 Broad positive curvilinear trends seen towards the north-east of the dataset have uncertain origins (38C). Those identified in the south-west of the dataset are magnetically weaker in form but appear to suggest the presence of rectilinear and curvilinear enclosures (38D).

4.18.4.3 A long linear area of enhanced magnetism possibly relates to the dissolution of a former field boundary that runs through the area (38E).

### 4.18.5 Old Field Boundaries and Agricultural Features

4.18.5.1 A long linear trend running north-east to south-west through the dataset is confirmed as the location of a former field boundary (38F).

4.18.5.2 Two magnetically strong anomalies in the centre of the dataset have been identified (38G – 38H). The trends correlate with the location of a former gravel pit depicted on historical mapping and it is likely the trends relate to the extents of the pit (NLS 2019). Due to the presence of this feature, it is also possible that a number of the 'uncertain trends' in the dataset relate to this pit and associated activity across the area.

## 4.18.6 Non-Archaeology

4.18.6.1 Geological variations can be seen across the dataset intermingled with trends of an unclear origin. They could relate to the adjacent river or geological variations in the subsoil.

4.18.6.2 Magnetic disturbance is observed along the western field boundary and likely relates to adjacent metallic boundary fencing or a nearby road. Ferrous spikes are also visible across the dataset.

## 4.19 Area 39

4.19.1.1 The survey area is located across three fields with the north-eastern limits of the survey area located outside the Hornsea Four Order Limits following route refinement. The data is presented in [Figure 47](#), [Figure 48](#) and [Figure 49](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### 4.19.2 Archaeology - Definitive

4.19.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### 4.19.3 Possible Archaeology

4.19.3.1 In the eastern half of the dataset, a fractured positive linear trend surrounded in parts by an associated negative halo and enhanced magnetism has been identified running north-west to south-east (39A). To the east of this, a broad positive curved trend is visible which could be archaeological in origin (39B).

4.19.3.2 Two linear trends have been identified running north-west to south-east in the east of the dataset beyond the Hornsea Four Order Limits (39C – 39D).

4.19.3.3 A small area of enhanced magnetism in the western half of the dataset could be a continuation of trend 39A (39E).

### 4.19.4 Uncertain Origins

4.19.4.1 Magnetically weak trends are visible across the eastern half of the dataset, but their origins are unclear (39F).

### 4.19.5 Old Field Boundaries and Agricultural Features

4.19.5.1 Linear trends have been identified in the eastern half of the dataset which correlate with the locations of former field boundaries observed on historical mapping (NLS 2019). A former boundary runs north-east to south-west (39G) irrespective of ploughing trends which run north-south across the dataset, suggesting the boundary pre-dates this activity. A second boundary runs north-south through the dataset (39H) acting as a boundary to an area of widely spaced ridge and furrow ploughing trends to the east, suggesting they were in use at the same time.

4.19.5.2 A pattern of agricultural drainage is also visible in this area running north-east to south-west, and their wide spacing suggests they may have made use of former ridge and furrow features.

#### **4.19.6 Non-Archaeology**

4.19.6.1 Magnetic interference is visible along the western field boundary from the adjacent railway. A small quantity of larger ferrous objects has been identified in the dataset which likely relate to debris in the field. The entire dataset for Area 39 has a heightened magnetic background, suggesting green waste may have been spread across the field at some point.

#### **4.20 Area 40**

4.20.1.1 The survey area is located across three fields. The data is presented in [Figure 50](#) and [Figure 51](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

#### **4.20.2 Archaeology - Definitive**

4.20.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

#### **4.20.3 Possible Archaeology**

4.20.3.1 The dataset for Area 40 has a heightened magnetic background, which suggests that green waste material may have been spread across the two fields. This has caused some difficulty in identifying trends across the dataset.

4.20.3.2 In the south-west of the dataset, a long rectilinear trend is visible (40A). The trend measures approximately 118 m in length and could relate to an enclosure or part of a field system, but the magnetic background makes it difficult to confidently identify the extents of the feature.

#### **4.20.4 Uncertain Origins**

4.20.4.1 In the north-east of the dataset, three unclear trends have been identified (40B). In the centre-south, curvilinear trends are visible which are suggestive of enclosures, but their magnetic appearance is weak (40C).

#### **4.20.5 Agricultural Features**

4.20.5.1 Ploughing trends run roughly north-south across the entire dataset. In the south-western half of the dataset, they run east-west alongside ploughing headlands.

#### **4.20.6 Non-Archaeology**

4.20.6.1 Magnetic disturbance along the northern edge of the dataset relates to modern boundary fencing. A number of larger ferrous objects and isolated dipolar anomalies are visible alongside swathes of green waste material throughout the dataset.

## **4.21 Area 41**

4.21.1.1 The survey area is located across four fields. The data is presented in [Figure 52](#), [Figure 53](#) and [Figure 54](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.21.2 Archaeology - Definitive**

4.21.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.21.3 Possible Archaeology**

4.21.3.1 The dataset for Area 41 has a heightened magnetic background, which suggests that green waste material may have been spread across the five fields. This has caused some difficulty in identifying trends across the dataset; however, the spread is not extensive, and some trends have been identified.

4.21.3.2 In the north-eastern half of the dataset, a sub-circular anomaly (41A) and two curvilinear trends (41B) have been identified which could be archaeological in origin.

4.21.3.3 In the south-western half of the dataset, long negative rectilinear and linear trends are visible which indicate the presence of enclosures or archaeological activity. Two sets of parallel linear trends run roughly east-west across the area (41C – 41D), the southernmost of which curves round towards the south to form a rectilinear anomaly (41D). Two parallel curvilinear trends continue from 41D towards the north-east (41E). Two parallel curvilinear trends have been identified to the east of this which are likely to be associated (41F).

4.21.3.4 Pit-like anomalies are visible across the dataset which could be archaeological in origin (41G).

### **4.21.4 Uncertain Origins**

4.21.4.1 Weak and fractured curvilinear (41H), sub-circular (41I) and linear (41J) trends are visible across the rest of Area 41 and it is not clear if they relate to truncated archaeological remains or represent natural variations.

### **4.21.5 Old Field Boundary and Agricultural Features**

4.21.5.1 Two parallel linear trends running east-west across the central part of the dataset relate to the locations of former field boundaries (41K – 41L).

4.21.5.2 Ridge and furrow ploughing trends run east-west across the majority of the dataset. They also run along the same alignment as the two former boundaries, suggesting they may have been in use at the same time. Conventional ploughing trends also follow a north-north-west to south-south-east orientation across the central part of the dataset.

## **4.21.6 Non-Archaeology**

4.21.6.1 Magnetic disturbance linked to modern metallic boundary fencing is visible in the southern half of the dataset, alongside ferrous spikes and some larger ferrous anomalies in the field.

## **4.22 Area 43**

4.22.1.1 The survey area is located across a single field. The data is presented in [Figure 55](#) and [Figure 56](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.22.2 Archaeology - Definitive**

4.22.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.22.3 Possible Archaeology**

4.22.3.1 Two linear trends in the north-east of the dataset have been identified running north-west to south-east which could be archaeological in origin (43A – 43B).

4.22.3.2 A number of pit-like anomalies have also been identified which could be archaeological in origin (43C).

### **4.22.4 Uncertain Origins**

4.22.4.1 Weak fractured trends can be seen across the dataset which have uncertain origins (43D).

4.22.4.2 An area of enhanced magnetism in the south-west could be related to the adjacent former boundary trend 43F (43E).

### **4.22.5 Old Field Boundary and Agricultural Features**

4.22.5.1 Towards the south-west edge of the dataset, a long linear trend running north-south relates to a former field boundary (43F). A second former field boundary runs north-west to south-east through the north-eastern half of the dataset (43G).

4.22.5.2 Ploughing trends are visible across the north-eastern end of the dataset running west-north-west to east-south-east.

### **4.22.6 Non-Archaeology**

4.22.6.1 Magnetic disturbance relating to boundary fencing is visible around some of the periphery of the survey area. Ferrous spikes and larger ferrous detritus are also visible across the dataset.

## **4.23 Area 44**

4.23.1.1 The survey area is located across four fields. The data is presented in [Figure 57](#), [Figure 58](#) and [Figure 59](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

## **4.23.2 Archaeology - Definitive**

4.23.2.1 A rectilinear enclosure consisting of broad positive and parallel trends is visible in the north-western extent of the dataset for Area 44 (44A), beyond the Hornsea Four Order Limits. The enclosure measures approximately 51 m in width and 76 m in length and correlates with the location of known Humber HER monument MHU22179. Features are visible within the enclosure which are likely to be related but are not visible on the Humber HER record or cropmark data and are classed as features of a possible archaeological origin.

## **4.23.3 Possible Archaeology**

4.23.3.1 Within enclosure 44A, a broad linear trend has been identified running north-south (44B). A sub-circular anomaly is visible at the northern extents of this trend measuring approximately 19 m in width (44C). Linear trends are visible either side of this trend running east-west (44D) and north-east to south-west (44E) adjacent to some amorphous positive anomalies (44F).

4.23.3.2 To the north of enclosure 44A, a possible second enclosure is visible consisting of positive rectilinear trends (44G).

4.23.3.3 A long linear trend runs north-north-west to south-south-east to the west of enclosure 44A which may or may not be related (44H).

## **4.23.4 Uncertain Origins**

4.23.4.1 Sporadic linear trends are visible throughout the dataset and it is unclear if they relate to the monument or if they reflect agricultural trends in the area (44i – 44j).

## **4.23.5 Old Field Boundary and Agricultural Features**

4.23.5.1 Two linear trends are visible in the south-west of the dataset which cross one another and have been confirmed as former field boundaries. They run from north-west to south-east (44K) and east-west (44L).

4.23.5.2 Agricultural field drains have been identified in the north of the dataset next to a beck, running east-west across the field.

## **4.23.6 Non-Archaeology**

4.23.6.1 Geological variations seen in the north of the dataset are likely related to flood deposits from the adjacent beck.

4.23.6.2 Magnetic disturbance seen around the field peripheries likely relates to modern metallic boundary fencing. Ferrous spikes are visible in the dataset as well as larger areas of ferrous enhancement.

## **4.24 Area 45**

4.24.1.1 The survey area is located across three fields. The data is presented in [Figure 60](#) and [Figure 61](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.24.2 Archaeology - Definitive**

4.24.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.24.3 Possible Archaeology**

4.24.3.1 No responses are present within the data which indicate the presence of possible archaeological remains.

### **4.24.4 Uncertain Origins**

4.24.4.1 Three areas of enhanced magnetism of an unclear origin have been recorded across the dataset (45A – 45C). The northernmost area is particularly magnetically noisy and is potentially related to an area where a former building stood. The areas visible in the centre and south of the dataset could potentially be archaeological but are most likely geological.

4.24.4.2 A number of linear and curvilinear trends have been identified across the dataset. These trends are less well defined than other trends in the area and have unclear origins. A group of unclear rectilinear and curvilinear trends are visible in the centre of the dataset for Area 45 (45D). They are indicative of enclosures or archaeological activity.

4.24.4.3 In the south of the area, a number of tentative curvilinear and rectilinear anomalies have been identified (45E and 45F). These potentially could be archaeological but are quite weak and tentative in appearance and they could instead relate to agricultural variations.

### **4.24.5 Old Field Boundaries**

4.24.5.1 Three former field boundaries are noted running through the northeast of the dataset, with a further former boundary visible in the south (45G – 45i). These boundaries appear on first edition ordnance survey mapping and have since been removed and are now only visible in the data as a magnetic enhancement. Of particular interest is the curving boundary visible in the north which appears to follow a former Authority/Parish boundary (45G). It is possible the boundary followed a former river channel that split the area. Conventional ploughing trends can be seen throughout the dataset.

### **4.24.6 Non-Archaeology**

4.24.6.1 A number of geological variations relating to former river channels and geological variations are visible across the dataset.

4.24.6.2 Areas of magnetic disturbance are visible around the periphery of the dataset and along upstanding field boundaries. A modern trackway was also recorded in the central part of Area 45. A small amount of ferrous is also visible throughout the dataset.

## **4.25 Area 46**

4.25.1.1 The survey area is located across two fields. The data is presented in [Figure 62](#), [Figure 63](#) and [Figure 64](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.25.2 Archaeology - Definitive**

4.25.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.25.3 Possible Archaeology**

4.25.3.1 Trends are visible across the dataset which have the potential to be archaeological in origin, though it is not immediately apparent what they may relate to.

4.25.3.2 In the eastern half of the dataset, two parallel positive linear trends are visible adjacent to two further trends (46A).

4.25.3.3 Rectilinear trends are visible in the north of the main dataset, but they are fractured in appearance (46B).

4.25.3.4 In the southern half of the dataset, long linear positive trends have been identified (46C) adjacent to a rectilinear trend (46D) and two curvilinear trends (46E).

4.25.3.5 Pit-like anomalies have also been detected throughout the dataset (e.g. 46F).

### **4.25.4 Uncertain Origins**

4.25.4.1 Trends suggestive of small enclosures are visible in the south-west of the dataset but they are fractured, and their origins are unclear (46G). Similarly, in the northern half of the dataset, rectilinear trends have been identified that are suggestive of enclosures (46H), but the trends are weak and tentative.

### **4.25.5 Old Field Boundary and Agricultural Features**

4.25.5.1 Widely spaced ridge and furrow ploughing trends are visible across the eastern and southern sections of the dataset for Area 46, running east-north-east to west-south-west.

4.25.5.2 Modern ploughing trends can be seen following a similar orientation in the north-east and following a north-west to south-east orientation in the southern half of the dataset.

### **4.25.6 Non-Archaeology**

4.25.6.1 Modern magnetic disturbance is visible at the southern and eastern peripheries and relates to modern metallic fencing and a field gate. Ferrous spikes are also visible throughout the dataset.



## **4.26 Area 47**

4.26.1.1 The survey area is located across two fields. The data is presented in [Figure 65](#), [Figure 66](#) and [Figure 67](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.26.2 Archaeology - Definitive**

4.26.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.26.3 Possible Archaeology**

4.26.3.1 In the southern half of the dataset, trends have been identified which are suggestive of archaeological activity. Curvilinear and linear trends have been identified which could be archaeological (47A). These are situated next to a large area of magnetic enhancement (47B). This area of enhancement most likely correlates with the cut and location of a former chalk pit, seen on OS mapping from 1888 (NLS 2019).

### **4.26.4 Uncertain Origins**

4.26.4.1 Magnetic trends and areas of magnetic enhancement are visible throughout the dataset for Area 47, but it is not clear if they are archaeological or if they relate to agricultural variations (47C – 47D). In the north of the dataset, a linear trend could relate to a former boundary that is not visible on available historical mapping (47E).

### **4.26.5 Old Field Boundaries and Agricultural Features**

4.26.5.1 Two former field boundaries have been identified following comparison of the trends with historical mapping. A former boundary runs north-west to south-east through the north of the dataset (47F) and a second runs east-west through the south of the dataset (47G).

4.26.5.2 Widely spaced trends consistent with a former ridge and furrow ploughing regime dominate the dataset for Area 47. In the northern half of the dataset, they appear to fan out from the south-west of the field, running in a slightly curved fashion towards the north-east. They respect former field boundary trend 47F suggesting they may have been in use at the same time. In the southern half of the dataset, ridge and furrow ploughing trends run roughly north-south through the field.

4.26.5.3 A patterning of agricultural field drains is present in the south of the northern field, towards the centre of the dataset.

### **4.26.6 Non-Archaeology**

4.26.6.1 Magnetic disturbance is visible around the field entrance in the centre of the dataset and along the north-western and northern field periphery. A moderate quantity of ferrous spikes and objects is present in the dataset.

## **4.27 Area 13**

4.27.1.1 The survey area is located across a single field. The data is presented in [Figure 68](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.27.2 Archaeology - Definitive**

4.27.2.1 Raventhorpe Deserted Medieval Village (DMV) (non-designated Monument I.D MHU3350) is recorded as being located within Area 13 and the remains have been identified in the dataset (13A).

4.27.2.2 Several linear trends identified in the dataset correlate with identified features from aerial photographic records. The anomalies identified continue directly on from features mapped in the HER and display a continuation of a field system and smaller enclosures and features.

### **4.27.3 Possible Archaeology**

4.27.3.1 Possible archaeological trends have been identified throughout Area 13, which likely relate to Raventhorpe DMV though they are not described within the record itself. Trends identified in the south of the dataset, close to the recorded definitive archaeology, include a circular anomaly and several pit-like anomalies (13B).

4.27.3.2 Several rectilinear trends have been identified adjacent to these trends (13C). The trends are likely archaeological in origin and are related to the DMV.

4.27.3.3 In the north-east of Area 13, a possible archaeological circular ring ditch feature has been identified which does not appear to be related to the DMV, and potentially could be earlier in age (13D). A larger sub-circular anomaly has been recorded in the centre of the dataset which could also be archaeological in origin and not related to the DMV (13E).

### **4.27.4 Uncertain Origins**

4.27.4.1 Unclear linear and curvilinear trends have been identified in the area (13F and 13G). These trends are less well defined than other potential archaeological trends in the area and could be natural or geological in origin, though an archaeological origin should not be ruled out.

### **4.27.5 Old Field Boundaries and Agricultural Features**

4.27.5.1 A former field boundary is noted running roughly north-south through the survey area (13H). This boundary appears on first edition ordnance survey mapping and has since been removed and is now only visible in the data as a magnetic enhancement.

4.27.5.2 Ridge and furrow ploughing trends have been recorded across the entire dataset as well as more recent conventional ploughing trends. The ridge and furrow ploughing trends are likely to relate directly to the DMV and are a typical example of landscape management of that period.

## **4.27.6 Non-Archaeology**

4.27.6.1 Areas of magnetic disturbance were recorded in and around the periphery of the survey area and along upstanding field boundaries. A moderate amount of ferrous is visible throughout the dataset.

## **4.28 Area 48**

4.28.1.1 The survey area is located across a single field. The data is presented in [Figure 69](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.28.2 Archaeology - Definitive**

4.28.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.28.3 Possible Archaeology**

4.28.3.1 Possible archaeology has been identified in the southern part of the dataset for Area 48 and could possibly relate to a field system recorded in the HER to the west (Monument ID MHU3346).

4.28.3.2 The trends consist of small pit-like anomalies which run along a linear trend, spaced approximately 1 m apart (48A). These anomalies are suggestive of a prehistoric pit alignment and have the potential to be quite significant in terms of their heritage importance.

4.28.3.3 A number of rectilinear negative trends have also been identified in the same area which appear to form small enclosures around internal pit-like anomalies (48B). These potentially could relate to former buildings, enclosures or even small square barrow remains.

4.28.3.4 Discrete pit-like anomalies have been located throughout the dataset which potentially could be archaeological.

### **4.28.4 Uncertain Origins**

4.28.4.1 Unclear linear and curvilinear trends have been identified across the dataset. These trends are less well defined than other potential archaeological trends in the area and potentially could relate to geological or agricultural origins rather than archaeology.

4.28.4.2 A strong trend is recorded in the northern part of Area 48, which although potentially archaeological, is significantly strong in magnetic appearance (very dark grey/black), partly shadowed by a negative (white) halo and fragmented in appearance (48C). It is most likely modern in origin and appears to be associated with other unclear linear trends which converge in the area.

4.28.4.3 Similarly, in the central part of the dataset, a further set of linear trends cross the area and a particularly strong trend with some associated disturbance may also be suggestive of archaeological origins (48D).

4.28.4.4 In the far south of Area 48, a large negative magnetic curvilinear anomaly is visible (48E). The trend appears to form a potential enclosure, which could be archaeological. However, the negative nature of the anomaly is unusual. Although the remains are potentially archaeological, the curvilinear form is also suggestive of a geological origin and could possibly be related to a former stream or river channel.

#### **4.28.5 Agricultural Features**

4.28.5.1 Agricultural trends relating to former ridge and furrow ploughing regimes have been recorded across Area 48. These run north-west to south-east through the southern half of the dataset. They are formed by a number of parallel trends with spacings averaging 8.5 m apart.

4.28.5.2 Conventional ploughing trends have also been identified, running north-east to south-west across the centre of the dataset.

4.28.5.3 Several pairs of agricultural tractor ruts have also been identified running across the dataset from north-east to south-west, which suggests the background magnetism is quiet.

#### **4.28.6 Non-Archaeology**

4.28.6.1 A number of geological variations relating to former river channels have been identified in the central part of the dataset. These appear to run in a north-east to south-west direction and possibly show the location of a former river channel.

4.28.6.2 Areas of magnetic disturbance were recorded in and around the periphery of the survey and along upstanding field boundaries. Small ferrous objects are also visible throughout the dataset.

4.28.6.3 Two linear trends relating to possible modern services were also recorded running north-west to south-east across the centre and north of Area 48.

#### **4.29 Area 49**

4.29.1.1 The survey area is located across a single field. The data is presented in [Figure 70](#) and [Figure 71](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

#### **4.29.2 Archaeology - Definitive**

4.29.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

#### **4.29.3 Possible Archaeology**

4.29.3.1 No responses are present within the data which indicate the presence of possible archaeological remains.

## 4.29.4 Uncertain Origins

- 4.29.4.1 Unclear linear and curvilinear trends have been identified in the area. These trends don't represent any obvious archaeological monuments or remains and therefore their origins are uncertain.
- 4.29.4.2 Two parallel trends have been identified running north to south in the north of Area 49 and appear to form a potential trackway (49A). However, the trends are magnetically weak and have been truncated by agricultural ploughing.
- 4.29.4.3 Three circular anomalies have been identified to the south of 49A, which could be archaeological in origin and relate to ring ditches (49B). However, the strength of these responses is very weak and tentative, and the trends may not have archaeological origins.
- 4.29.4.4 A very weak curvilinear and rectilinear trend located in the centre-north of Area 49 could reflect a potential archaeological enclosure (49C).
- 4.29.4.5 A group of short, well-defined linear trends to the east of this potential enclosure could be archaeological given their magnetic strength (49D). The anomalies do not appear as any recognisable archaeological monument or remains, therefore may reflect more recent activity in the area.
- 4.29.4.6 An area of enhanced magnetism is located in the far south of Area 49 (49E). The trend has the potential to be archaeological but is magnetically weak and tentative in nature.

## 4.29.5 Old Field Boundaries and Agricultural Features

- 4.29.5.1 A former field boundary has been identified, running north-east to south-west through the centre of the dataset (49F). This boundary appears on first edition ordnance survey mapping and has since been removed and is now only visible in the data as a slight magnetic enhancement.
- 4.29.5.2 A former ridge and furrow ploughing regime is visible running north-west to south-east throughout the survey area.
- 4.29.5.3 Conventional ploughing trends have also been identified running along the same orientation as the ridge and furrow remains. As with Area 48, agricultural tractor ruts have also been identified running through the area which suggests the background magnetism is quiet.

## 4.29.6 Non-Archaeology

- 4.29.6.1 Several geological variations relating to former river channels are visible in the north-west of the dataset. These appear to run in a north-east to south-west direction and possibly show the direction of the former river channel and relate to those seen in the dataset for Area 48.
- 4.29.6.2 An area of magnetic disturbance was recorded in the far south-west of the dataset, close to the field boundary and corner of the field. Moderate levels of ferrous are visible throughout the dataset.

## **4.30 Area 50**

4.30.1.1 The northern and southern extents of the survey area fall within the Hornsea Four Order Limits however, subsequent to the route refinement process, the central part of the survey area only partially covers the western extent of the Hornsea Four Order Limits.

4.30.1.2 The survey area is located across four fields. The data is presented in [Figure 72](#), [Figure 73](#) and [Figure 74](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.30.2 Archaeology - Definitive**

4.30.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.30.3 Possible Archaeology**

4.30.3.1 The dataset for Area 50 are mostly dominated by agricultural trends, however a number of trends of possible archaeological origin have been identified within the southern half of the dataset.

4.30.3.2 At the southern extent, a rectilinear and linear trend are visible (50A).

### **4.30.4 Uncertain Origins**

4.30.4.1 Broad curvilinear trends and linear trends are visible in the southern half of the dataset, but it is not clear what the trends originate from (50B – 50C).

### **4.30.5 Old Field Boundary and Agricultural Features**

4.30.5.1 A number of former field boundaries have been identified in the dataset for Area 50. In the northern half of the area, a former boundary runs north-south adjacent to a small area of ferrous (50D).

4.30.5.2 In the southern half of the dataset, a former boundary runs north-east to south-west (50E). To the south of these, a third former boundary runs north-west to south-east (50F) adjacent to a north-south orientated boundary (50G).

4.30.5.3 South of these, a fourth former boundary runs east-west through the dataset (50H) with a fifth running north-south to the south-east of this (50i). In the very south of the dataset, a sixth former boundary runs roughly east-west (50J).

### **4.30.6 Non-Archaeology**

4.30.6.1 Magnetic variations are visible in the centre of the dataset which likely reflect the natural geology of the area. They do not affect the visibility of trends in the dataset.

4.30.6.2 Magnetic disturbance is visible alongside upstanding field boundaries and adjacent to a main road that runs along the western edge of the area. Ferrous spikes and larger ferrous objects are also visible throughout the dataset for the area.

## **4.31 Area 51**

4.31.1.1 The northern extents of Area 51 were surveyed during the first phase of geophysical works between 8 April and 17 April 2019. The southern extents of the survey area were completed as part of the second phase of works. The results from both phases of survey work have been combined and are presented below.

4.31.1.2 The survey area is located across two fields. The data is presented in [Figure 75](#) and [Figure 76](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.31.2 Archaeology - Definitive**

4.31.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.31.3 Possible Archaeology**

4.31.3.1 In the southern half of the dataset, a long positive linear trend has been identified running parallel to the eastern field boundary (51A).

### **4.31.4 Uncertain Origins**

4.31.4.1 Linear and curvilinear trends have been identified in the dataset which have unclear origins. The trends are notable in the dataset but do not represent any obvious potential archaeological remains.

4.31.4.2 A curvilinear anomaly is visible in the northern half of the dataset with a potential small enclosure attached (51B). Although it potentially looks archaeological, such as a building or enclosure, the scale and lack of associated anomalies suggests it could relate to more recent agricultural activity.

4.31.4.3 A group of trends alongside small areas of enhanced magnetism are visible in the western half of the dataset (51C). The trends are indicative of archaeological remains; however, they are very weak in strength and their interpretation is tentative.

4.31.4.4 In the far north-east of Area 51, a small area of unclear enhanced magnetism is visible which potentially could be archaeological (51D). The circular appearance of the anomaly is indicative of archaeological remains such as a barrow, however it is magnetically very weak and tentative.

4.31.4.5 Further unclear trends can be seen slightly north of the centre of the dataset (51E). These consist of two linear trends running in various orientations and a potential pit-like anomaly.

4.31.4.6 A number of further pit-like anomalies can be seen across the entire dataset which could be either agricultural or natural in origin.

4.31.4.7 In the southern half of the dataset, four strong positive linear trends have been identified in a Y-shaped pattern (51F). The trends could be archaeological in origin or could relate to a highly magnetic patterning of field drains.

## **4.31.5 Agricultural Features**

4.31.5.1 A former ridge and furrow ploughing regime has been recorded across the entire dataset, running predominantly north-north-west to south-south-east with a patch running east-west through the centre of the northern field.

4.31.5.2 Conventional ploughing trends have also been identified running predominantly north-north-west to south-south-east, as well as north-east to south-west in the southern half of the dataset.

## **4.31.6 Non-Archaeology**

4.31.6.1 Areas of magnetic disturbance were recorded in and around the periphery of the survey area, relating to modern boundary fencing and field entranceways. Moderate quantities of ferrous are visible across the entire dataset.

## **4.32 Area 52**

4.32.1.1 The survey area is located across four fields. The data is presented in [Figure 77](#), [Figure 78](#) and [Figure 79](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

### **4.32.2 Archaeology - Definitive**

4.32.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

### **4.32.3 Possible Archaeology**

4.32.3.1 No responses are present within the data which indicate the presence of possible archaeological remains.

### **4.32.4 Uncertain Origins**

4.32.4.1 Trends of an uncertain origin have been identified across the central and southern datasets for Area 52.

4.32.4.2 In the central part of the dataset, long broad linear trends have been identified amongst an area of enhanced magnetism and it is unclear what the trends relate to (52A). Similar trends are seen immediately north in the adjacent field.

4.32.4.3 A similar zone of anomalies and enhanced magnetism is visible to the south of this (52B). It is possible the trends and disturbance could relate to truncated archaeological remains, but it is not clear if they relate to geological variations instead. The trends could relate to a former chalk pit 52H located directly south of the anomalies.

4.32.4.4 In the south of the dataset, a series of parallel linear trends have unclear origins (52C). Trends adjacent to these are also unclear (e.g. 52D).



4.32.4.5 In the northern half of the dataset, several weak magnetic linear and curvilinear trends are visible, but it is unclear what they may relate to (e.g. 52E – 52F). Those observed in the far north of the area could relate to woodland and disturbance from nearby housing (52G).

4.32.4.6 Pit-like anomalies are visible throughout the dataset which could relate to archaeological activity or natural infilled features.

#### **4.32.5 Agricultural Features**

4.32.5.1 A large area of magnetic disturbance in the southern half of the dataset (52H) correlates with the location of a former 'Old Chalk Pit' seen on historical mapping from 1888 (NLS 2019).

4.32.5.2 Ploughing trends are visible across the northern half of the dataset running in an east-west direction. A ploughing headland is also visible in the north of the area.

4.32.5.3 In the southern half of the dataset, ploughing trends predominantly run in a north-east orientation and are most likely modern in origin due to their close spacing.

#### **4.32.6 Non-Archaeology**

4.32.6.1 Two strong bipolar magnetic anomalies are visible in the northern half of the dataset and relate to the presence of two modern services.

4.32.6.2 Magnetic disturbance around the field edges relates to metallic boundary fencing. Moderate quantities of ferrous are also visible across the dataset.

#### **4.33 Area 53**

4.33.1.1 The survey area is located across a single field. The data is presented in [Figure 80](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

#### **4.33.2 Archaeology - Definitive**

4.33.2.1 No responses indicating the presence of definitive archaeological remains have been identified in this area.

#### **4.33.3 Possible Archaeology**

4.33.3.1 In the south of the dataset, a linear trend running roughly east-west could relate to a former boundary that predates available historic mapping (53A).

#### **4.33.4 Uncertain Origins**

4.33.4.1 Long linear trends and amorphous anomalies in the north of the dataset are suggestive of activity, however the trends are unclear and fractured (53B).

## 4.33.5 Agricultural Features

4.33.5.1 Linear ploughing trends run across the dataset from north-north-west to south-south-east. A ploughing headland or agricultural trackway is visible along the southern boundary.

## 4.33.6 Non-Archaeology

4.33.6.1 Areas of ferrous have been identified across the dataset which are considered to be modern in origin. They most likely relate to modern detritus in the ground.

## 4.34 Area 58

4.34.1.1 The survey area covers two fields incorporating the OnSS and two fields to the south which incorporates the Onshore ECC. The data is presented in [Figure 81](#), [Figure 82](#), [Figure 83](#), [Figure 84](#), [Figure 85](#) and [Figure 86](#) in [Annex 5.3: Priority Archaeological Geophysical Survey - Part C](#).

## 4.34.2 Archaeology - Definitive

4.34.2.1 A complex of anomalies indicating the presence of an archaeological settlement has been discovered across Area 58. Many of the trends identified in the dataset correlate with trends identified in aerial cropmark data and can be classed as definitive archaeological remains. Other trends situated around these remains are also highly likely to be archaeological in origin.

4.34.2.2 The archaeological remains appear to be situated along a palaeochannel or river gravel terraces, which is visualised as a highly magnetic strip of anomalies running from the north-west corner, the south-west corner and across the eastern part of Area 58.

4.34.2.3 In the west of the dataset, the archaeological anomalies appear very similar to the geological band they are located on top of, but positive and negative rectilinear trends can be made out that most likely relate to enclosures (58A).

4.34.2.4 To the south of these, long linear trends running north-west to south-east most likely relate to former field systems and boundaries (58B – 58C). A square enclosure is visible measuring approximately 32 m in width (58D).

4.34.2.5 In the north-eastern half of the dataset, the spread of anomalies continues towards the east, considered likely to be a continuation of the settlement. Many of the anomalies display as negative trends amongst the geological variations and are slightly more visible.

4.34.2.6 Two large enclosures consisting of broad positive rectilinear trends with associated negative magnetic halos are visible in the south. The enclosure to the west measures approximately 55 m in width and 30 m in length (58F) and the enclosure to the east measures approximately 44 m in width and 45 m in length (58E).

4.34.2.7 The two enclosures are situated either side of a double ditched trackway which runs towards the north-east (58G). This trackway intersects a second trackway running north-south (58H).

A third double-ditched trackway is visible to the west of these also running along a north-south orientation (58i).

4.34.2.8 Large rectilinear enclosures (58J) are visible to the east of the central enclosures 58E/58F, and further enclosures are visible to the east and west of these (58K).

4.34.2.9 A large semi-circular trend is visible in between these enclosures (58L). The trend could relate to a large enclosure or some form of trackway.

4.34.2.10 Long linear trends running north-north-west to south-south-east through the north-eastern part of the dataset most likely relate to a former field system (58M). The trends have a slightly different alignment to the aforementioned enclosures and may relate to a different phase of activity.

### **4.34.3 Possible Archaeology**

4.34.3.1 A large quantity of linear, rectilinear and curvilinear trends is visible across Area 58 that are likely to be directly related to the archaeological settlement that has been identified. Many of the trends continue directly on from definitive archaeological trends and it is suggested that they are associated.

4.34.3.2 In the western half of the dataset, parallel linear trends and rectilinear trends are suggestive of enclosures and possible trackways (58N). Sub-circular and D-shaped enclosures are also visible to the south of these (58O).

4.34.3.3 To the east of this, rectilinear trends and a possible rectilinear enclosure are visible (58P).

4.34.3.4 In the eastern half of the dataset, the anomalies are very concentrated and form part of the main body of settlement in Area 58. The number, orientation and placing of each anomaly is very complex.

4.34.3.5 A strong rectilinear enclosure is visible in the eastern extent of the dataset which measures approximately 7 m in width and 40m in length, though the southern extents are not visible (58Q). Three strongly magnetic negative rectilinear trends surround a positive trend and are suggestive of the presence of a building.

4.34.3.6 Pit-like anomalies are visible throughout the dataset and given the presence of the archaeological settlement, it is likely that a number will be archaeological in origin and relate to rubbish pits, hearths and buried features.

### **4.34.4 Uncertain Origins**

4.34.4.1 Weak long linear trends are visible in the north of the dataset which have uncertain origins (58R). Some of the trends could be archaeological, but they are situated away from the main body of settlement and could relate to a separate phase of activity.

4.34.4.2 In the south-east of the dataset, long linear trends could relate to boundaries or trackways, but they are magnetically weak in appearance (58S).

## **4.34.5 Old Field Boundaries and Agricultural Features**

- 4.34.5.1 Several trends located across Area 58 correlate with the locations of former field boundaries when compared with historical mapping for the area.
- 4.34.5.2 In the western half of the dataset, two former boundaries run north-west to south-east (58T). Two further boundaries run east-west (58U).
- 4.34.5.3 A fifth former boundary runs north-east to south-west through the south-western half of the dataset (58V). To the east of this, a sixth boundary runs north-west to south-east (58W).
- 4.34.5.4 Ploughing trends run predominantly across the north-western part of the dataset from east to west. In the north they run north-east to south-west and in the south-west a number of ploughing headlands or trackways are visible.

## **4.34.6 Non-Archaeology**

- 4.34.6.1 As discussed above, a swathe of geological variations cross the dataset from the north-west, the south-west and across the eastern part of Area 58. The trends likely relate to a former palaeochannel or river course where gravel terraces have built up. The survey results indicate that the archaeological settlement has been built upon this in-filled geological feature and it is possible that the geological anomalies could be hiding further archaeological trends from view.
- 4.34.6.2 A number of large circular highly magnetic anomalies are visible across the dataset which relate to the presence of modern pylons. Magnetic interference on the survey equipment is evident in the dataset from the pylon wires and this is seen as strange intermittent magnetic strips across the dataset.
- 4.34.6.3 Smaller magnetic anomalies with a 'button' like appearance relate to the former locations of pylons and relate to their foundations still being present underground.
- 4.34.6.4 A linear strip of magnetic disturbance in the south of the dataset is a response to a trackway running through the area to a house located at the centre of Area 58.
- 4.34.6.5 Magnetic disturbance around the peripheries relates to metallic boundary fencing. A moderate quantity of ferrous objects is also visible.
- 4.34.6.6 Small areas of ferrous noise are visible across the dataset which are most likely related to buried pieces of modern detritus. However, those located amongst the areas of archaeological interest could relate to magnetic buried features or areas of burning and should be taken into account.

## 5 Discussion and Conclusion

### 5.1 Assessment and Interpretation of the Results

- 5.1.1.1 The 2019 Priority Geophysical Survey has successfully identified anomalies that are related to the presence of definitive archaeology in the following Areas (running from landfall, along the ECC to the OnSS): 25, 1, 28, 34, 44, 13 and 58.
- 5.1.1.2 A pattern of archaeological enclosures, trackways, field enclosures and field systems, roundhouses and settlement activity is visible across Areas 25 (noting this area is outside of the Hornsea Four Order Limit), 26 and 1. The anomalies identified across these three areas represents a large multi-phase archaeological settlement spanning over 67 ha of coastal land.
- 5.1.1.3 In Area 25, a rectilinear enclosure was identified in the centre of the dataset adjacent to a linear trend. The trends could relate to the locations of HER records of Prehistoric enclosures and findspots (Humber HER ref. MHU 327, 331, 21055 and 21056). Possible archaeological trends identified throughout the rest of Area 25 are likely associated with this enclosure.
- 5.1.1.4 In Area 1 (located across the landfall area), two large square enclosures have been identified adjacent to further square, rectilinear and curvilinear enclosures. These anomalies directly match those recorded in the Humber HER and add further information to the records held regarding their extents, as well as providing information on internal and external features associated with the enclosures (Humber HER ref. MHU 21075, 21076, 21077, 21078, 21080 and 21086). Trends of a possible archaeological nature identified across the rest of Area 1 are likely associated with these enclosures or could represent a separate phase of activity.
- 5.1.1.5 Features identified across Area 28 relate to the historical Royal Air Force (RAF) Lissett and provide information on the location of former runways and features of the airbase (Humber HER. Ref MHU 11147, 13470 and 21798).
- 5.1.1.6 In Area 34, a double-ditched square enclosure was identified in the dataset which correlates with the location of a Humber HER record of a square enclosure (Humber HER ref. MHU8109). Furthermore, the survey has added to the existing detail and knowledge of this monument by establishing the likely extent of the remains and illustrating a wider previously unknown archaeological landscape which they fall within.
- 5.1.1.7 Further south, in Area 44, a square enclosure was identified surrounding linear and circular features. The square enclosure matches the location of Humber HER records for a possible Bronze Age Barrow, Iron Age Square Barrow and undated building (Humber HER ref. MHU 12884, 1519 and 6590). The internal and external features of the enclosure, identified during the geophysical survey, will contribute valuable detail to these Humber HER records and provide more information on their probable extents.
- 5.1.1.8 In Area 13, anomalies identified in the dataset correlate with HER linework indicating the location of the remains of Raventhorpe DMV (Humber HER ref. MHU3350). Further

evidence supplementing the Humber HER records for the former village have likely been identified in the dataset.

- 5.1.1.9 The dataset for Area 58 (located across the OnSS area) contains a complex multi-phase patterning of enclosures, trackways, ditches, pits and field systems associated with an archaeological settlement. Many of the identified trends correlate with cropmarks observed in the Humber HER, however a large amount of additional information has been gathered which adds to the Humber HER regarding this large settlement which spans over 50 ha of land (Humber HER Ref. MHU 1381 and 6559). The topographic location of this site is of particular interest as it is located on river terrace or along a palaeochannel, illustrating how the former settlement made use of natural landscape features. A large number of the geophysical trends were barely detectable due to this geological deposit and therefore the geophysical survey may have only identified a fraction of the archaeological remains present in Area 58.
- 5.1.1.10 The geophysical survey has also located remains of a potential archaeological origin in the following Areas (running from landfall to the OnSS): 25, 26, 1, 27, 28, 3a, 3b, 3c, 32, 33, 34, 35, 37, 39, 43, 46, 13, 48, 50 and 58.
- 5.1.1.11 Of these areas, seven contain trends that are consistent with the presence of archaeological settlements which have not yet been recorded through cropmark or aerial photography data.
- 5.1.1.12 As discussed, Areas 25, 26 and 1 show a vast archaeological settlement next to the coast, some of which is likely to have been lost to coastal erosion over time. The identified anomalies consist of enclosures, trackways, roundhouses, pits, field systems and areas of enhanced magnetism suggesting archaeological activity.
- 5.1.1.13 The dataset for Area 28 shows archaeological settlement evidence in the form of rectilinear enclosures, square enclosures, field boundaries and possible buildings. These could relate to Iron Age linear features recorded in the Humber HER (Humber HER Ref. MHU 11147, 13470 and 21798).
- 5.1.1.14 Area 32 displays a strongly magnetic possible archaeological settlement in the form of a large triple ditched enclosure surrounding trends and enclosures suggestive of a settlement. These could relate to Humber HER records for Iron Age and Roman features to the west of the area (Humber HER Ref. MHU8186).
- 5.1.1.15 In Area 33, two linear trackway features were identified along with a ring ditch feature, which could possibly represent a small barrow. In Area 34, where the HER record relating to an archaeological square enclosure is located, a number of other linear and rectilinear features likely associated to the enclosure were identified as well as a trackway continuing through from Area 33.
- 5.1.1.16 Further evidence relating to possible archaeological enclosures were identified in Area 34, however they appear to be un-associated with the square ditched enclosure.
- 5.1.1.17 The data collected for Area 35 shows a settlement organised along a central road or trackway, which consists of square enclosures, pits and possible buildings. Undated cropmarks and prehistoric finds are recorded in the Humber HER and these results could

indicate the location of a potential prehistoric settlement (Humber HER Ref. MHU 9878 and 18079).

- 5.1.1.18 In Area 13, the trends identified most likely relate to Raventhorpe DMV just to the east of the survey area.
- 5.1.1.19 The dataset for Area 48 also identified a number of potential archaeological anomalies, including a potential pit or post-hole alignment and a number of small rectilinear shapes with associated pit-like anomalies.
- 5.1.1.20 The dataset for Area 58, as discussed, displays an extensive system of enclosures and settlement activity over 50 ha of land. The trends that have been highlighted as possible archaeology in origin are most likely related to the archaeological settlement. They add to the existing Humber HER information providing further indications on the character, extent and internal features of the settlement.
- 5.1.1.21 As well as evidence for previously unrecorded archaeological settlements, further features of a possible archaeological origin were discovered across the rest of the route.
- 5.1.1.22 Anomalies of an unclear origin have been located in all the areas surveyed. It is likely that some of these anomalies may be archaeological, but only intrusive works will establish the potential of these remains and it is likely that a number will relate to agricultural, geological or natural variations. These anomalies should not be disregarded, particularly those observed in areas containing possible archaeological remains.
- 5.1.1.23 Throughout the scheme, agricultural trends have been identified in the form of old field boundaries, ridge and furrow ploughing, drainage and conventional ploughing trends.
- 5.1.1.24 Former field boundaries were identified, and their locations confirmed through comparison with historical mapping sources in the following Areas (running from landfall to the OnSS): 25, 28, 3a, 3b, 3c, 32, 33, 34, 35, 36, 37, 38, 39, 41, 43, 44, 45, 47, 13, 49, 50 and 58.
- 5.1.1.25 Notably, the boundary running through Area 45 winds sporadically across the north-east of the area and is thought to follow a former stream or river channel dividing up the land.
- 5.1.1.26 The large number of ploughing trends seen throughout the datasets is characteristic of a rural landscape that has been intensively and historically farmed. Ridge and furrow ploughing trends can be seen across the following Areas (running from landfall to the OnSS): 28, 3b, 3c, 32, 35, 39, 41, 46, 47, 13, 48, 49, 50 and 51. It is possible that these medieval agricultural practises were in use over more of the areas but have been removed by modern ploughing over time.
- 5.1.1.27 Areas of modern disturbance and ferrous spikes have been identified in the majority of survey areas. Many of these anomalies relate to recent activities in these areas in the form of services, modern boundary fencing and gates, infrastructure and manuring.
- 5.1.1.28 The clarity of the geophysical survey results within this report is an indication that if archaeological magnetically enhanced remains were to exist in the adjacent survey areas, that this method would successfully identify the remains. As such, a high level of

confidence can be placed in the interpretation of the results and it is not deemed necessary at this point to recommend further study through alternative geophysical survey methods.

## 5.2 Assessment of the Results against the Survey Objectives

5.2.1.1 The aim of the 2019 Priority Archaeological Geophysical Survey was to identify any potential archaeological anomalies that would potentially enhance the current understanding of the archaeological resource at targeted locations within the Hornsea Four Order Limits.

5.2.1.2 A number of definitive and possible archaeological anomalies have been identified across the Hornsea Four Order Limits. The identification of definitive features within the datasets has added to the knowledge of the extent and characteristics of a number of Humber HER records. The anomalies that have been identified and classed as 'possible archaeology' have added a wealth of knowledge to the existing archaeological resource within the Hornsea Four Order Limits and beyond.

5.2.1.3 The results and interpretation within this report will inform the wider historic environment baseline presented within the Hornsea Four ES ([Volume A3, Chapter 5: Historic Environment](#)) and inform subsequent stages of (non-intrusive and intrusive) archaeological evaluation. The results have contributed to the existing knowledge of HER records located within and near to the Hornsea Four Order Limits and will allow for a more informed assessment of the significance of the potential archaeological features.

5.2.1.4 The site archive (produced as a result of this survey) and the report will be archived in accordance with the WSI for Priority Archaeological Geophysical Survey (Orsted 2019b) (see [Volume F2.10: Outline Onshore Written Scheme of Investigation](#)).



## 6 References

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## Appendix A: Characterisation of Identified Anomalies

**Table A1: Area 25**

Site Specific Anomaly Code: 25

Anomaly Reference	Type of Archaeology
25A	Archaeology – Rectilinear Enclosure
25B	Archaeology – Linear Trend
25C	Possible Archaeology – Circular Anomaly
25D	Possible Archaeology – Circular Anomaly
25E	Possible Archaeology – Anomalies
25F	Possible Archaeology – Enhanced magnetism
25G	Possible Archaeology – Linear Trend
25H	Possible Archaeology – Curvilinear Trend
25i	Possible Archaeology – Curvilinear Trend
25J	Possible Archaeology – Curvilinear Trends
25K	Possible Archaeology – Rectilinear Anomalies
25L	Possible Archaeology – Circular Anomalies
25M	Possible Archaeology – Circular Anomalies
25N	Possible Archaeology – Square Anomaly
25O	Possible Archaeology – Linear Trends
25P	Possible Archaeology – D-shaped anomaly
25Q	Possible Archaeology – Rectilinear Anomaly
25R	Possible Archaeology – Linear Trends
25S	Possible Archaeology – Sub-circular Anomaly
25T	Possible Archaeology – Rectilinear Anomalies
25U	Uncertain Origins – Rectilinear Trends
25V	Uncertain Origins – Rectilinear Trends
25W	Uncertain Origins – Enhanced Magnetism
25X	Uncertain Origins – Linear Trends
25Y	Uncertain Origins – Linear Trends
25Z	Uncertain Origins – Linear Trends
25AA	Old Field Boundary
25AB	Old Field Boundary
25AC	Old Field Boundary
25AD	Old Field Boundary
25AE	Old Field Boundary

**Table A2: Area 26**

Site Specific Anomaly Code: 26

Anomaly Reference	Type of Archaeology
26A	Possible Archaeology – Linear trend
26B	Possible Archaeology – Curvilinear trend
26B	Possible Archaeology – Curvilinear trend
26D	Possible Archaeology – Trends
26E	Possible Archaeology – Rectilinear trends
26F	Possible Archaeology – Trends

Anomaly Reference	Type of Archaeology
26G	Possible Archaeology – Trends
26H	Uncertain Origins - Trends
26i	Uncertain Origins – U-shaped anomaly
26J	Uncertain Origins - Trends

**Table A3: Area 1**

Site Specific Anomaly Code: 1

Anomaly Reference	Type of Archaeology
1A	Archaeology – Rectilinear Enclosure
1B	Archaeology – Linear Trend
1C	Archaeology – Sub-circular Enclosure
1D	Archaeology – Sub-circular Enclosure
1E	Archaeology – Linear Trends
1F	Archaeology – Sub-circular Enclosure
1G	Archaeology – Rectilinear Enclosure
1H	Archaeology – Rectilinear Enclosure
1i	Archaeology – Linear Trend
1J	Archaeology – Rectilinear Trends
1K	Archaeology – Rectilinear Anomalies
1L	Possible Archaeology – Anomalies
1M	Possible Archaeology – Rectilinear enclosures
1N	Possible Archaeology – Linear Trends
1O	Possible Archaeology – Linear Trends
1P	Possible Archaeology – Linear Trends
1Q	Possible Archaeology – Linear Trends
1R	Possible Archaeology – Linear Trends
1S	Possible Archaeology – Anomalies
1T	Possible Archaeology – Pit-like Anomalies
1U	Possible Archaeology – Rectilinear enclosures
1V	Possible Archaeology – Rectilinear enclosures
1W	Possible Archaeology – Rectilinear enclosures
1X	Possible Archaeology – Rectilinear enclosures
1Y	Possible Archaeology – Rectilinear enclosures
1Z	Possible Archaeology – Sub-circular enclosures
1AA	Possible Archaeology – Rectilinear enclosure
1AB	Possible Archaeology – Pit-like hearth feature
1AC	Possible Archaeology – Rectilinear enclosure
1AD	Possible Archaeology – Sub-circular enclosures
1AE	Possible Archaeology – Square enclosure
1AF	Possible Archaeology – Anomalies
1AG	Possible Archaeology – Linear Anomalies
1AH	Possible Archaeology – Rectilinear Anomalies
1Ai	Possible Archaeology – Curvilinear Anomalies
1AJ	Possible Archaeology – Circular Anomalies
1AK	Unclear Origin – Trends
1AL	Unclear Origin – Trends

Anomaly Reference	Type of Archaeology
1AM	Unclear Origin – Semi-circular Trend

**Table A4: Area 27**

Site Specific Anomaly Code: 27

Anomaly Reference	Type of Archaeology
27A	Possible Archaeology – Square Enclosure
27B	Possible Archaeology – Curvilinear trend
27C	Possible Archaeology – Rectilinear trends
27D	Possible Archaeology – Rectilinear trends
27E	Possible Archaeology – Trends
27F	Unclear Origin – Linear Trends
27G	Unclear Origin – Linear Trends
27H	Unclear Origin – Circular Trends

**Table A5: Area 28**

Site Specific Anomaly Code: 28

Anomaly Reference	Type of Archaeology
28A	Archaeology – Airfield trends
28B	Archaeology – Airfield trends
28C	Archaeology – Airfield trends
28D	Archaeology – Airfield trends
28E	Possible Archaeology – Linear trends
28F	Possible Archaeology – Linear trend
28G	Possible Archaeology – Rectilinear trends
28H	Possible Archaeology – Linear trends
28i	Possible Archaeology – Rectilinear enclosure
28J	Possible Archaeology – Rectilinear enclosure
28K	Possible Archaeology – Linear trends
28L	Possible Archaeology – Curvilinear trends
28M	Possible Archaeology – Rectilinear enclosures
28N	Unclear Origin – Trends
28O	Unclear Origin – Area disturbance
28P	Unclear Origin – Area disturbance
28Q	Unclear Origin – Area disturbance
28R	Unclear Origin – Area disturbance and trends
28S	Old Field Boundary
28T	Old Field Boundary
28U	Old Field Boundary
28V	Old Field Boundary
28W	Old Field Boundary
28X	Old Field Boundary

**Table A6: Area 3A**

Site Specific Anomaly Code: 3A

Anomaly Reference	Type of Archaeology
3AA	Possible Archaeology – Rectilinear trend
3AB	Possible Archaeology – Pit-like anomalies
3AC	Possible Archaeology – Pit-like anomalies
3AD	Unclear Origin – Trends
3AE	Unclear Origin – Trends
3AF	Unclear Origin – Area disturbance
3AG	Old Field Boundary
3AH	Old Field Boundary

**Table A7: Area 30**

Site Specific Anomaly Code: 30

Anomaly Reference	Type of Archaeology
30A	Possible Archaeology – Pit-like anomalies
30B	Unclear Origin – Linear trends
30C	Unclear Origin – Trends

**Table A8: Area 3B**

Site Specific Anomaly Code: 3B

Anomaly Reference	Type of Archaeology
3BA	Possible Archaeology – Linear trends
3BB	Possible Archaeology – Linear trends
3BC	Possible Archaeology – Linear trends
3BD	Possible Archaeology – Linear trend
3BE	Possible Archaeology – Pit-like anomalies
3BF	Possible Archaeology – Pit-like anomalies
3BG	Unclear Origin – Trends
3BH	Unclear Origin – Trends
3Bi	Old Field Boundary
3BJ	Old Field Boundary
3BK	Old Field Boundary
3BL	Old Field Boundary
3BM	Old Field Boundary

**Table A9: Area 31**

Site Specific Anomaly Code: 31

Anomaly Reference	Type of Archaeology
31A	Possible Archaeology – Curvilinear trends
31B	Unclear Origin – Rectilinear trends

**Table A10: Area 3C**

Site Specific Anomaly Code: 3c

Anomaly Reference	Type of Archaeology
3CA	Possible Archaeology – Linear trend
3CB	Possible Archaeology – Rectilinear enclosure
3CC	Possible Archaeology – Curvilinear trend
3CD	Possible Archaeology – Sub-circular trend
3CE	Possible Archaeology – Magnetic enhancement
3CF	Unclear Origin – Trends
3CG	Unclear Origin – Magnetic enhancement
3CH	Unclear Origin – Trends
3Ci	Unclear Origin – Trends
3CJ	Unclear Origin – Trends
3CK	Unclear Origin – Trends
3CL	Old Field Boundary
3CM	Old Field Boundary

**Table A11: Area 32**

Site Specific Anomaly Code: 32

Anomaly Reference	Type of Archaeology
32A	Possible Archaeology – Enclosure
32B	Possible Archaeology – Linear trends
32C	Possible Archaeology – Rectilinear trend
32D	Possible Archaeology – Linear trends
32E	Possible Archaeology – Trends
32F	Possible Archaeology – Trends
32G	Possible Archaeology – Trends
32H	Possible Archaeology – Enclosures
32i	Unclear Origin – Trends
32J	Unclear Origin – Trends
32K	Old Field Boundary
32L	Old Field Boundary

**Table A12: Area 33**

Site Specific Anomaly Code: 33

Anomaly Reference	Type of Archaeology
33A	Possible Archaeology – Linear trend
33B	Possible Archaeology – Linear trend
33C	Possible Archaeology – Linear trend
33D	Unclear Origin – Area disturbance
33E	Unclear Origin – Area disturbance
33F	Unclear Origin – linear trend
33G	Unclear Origin – linear trend
33H	Unclear Origin – linear trend

Anomaly Reference	Type of Archaeology
33i	Unclear Origin – linear trend
33J	Unclear Origin – linear trend
33K	Agricultural – Old field boundary

**Table A13: Area 34**

Site Specific Anomaly Code: 34

Anomaly Reference	Type of Archaeology
34A	Definitive Archaeology – Linear trend
34B	Possible Archaeology – Linear trend
34C	Possible Archaeology – Linear trend
34D	Possible Archaeology – Linear trend
34E	Possible Archaeology – Linear trend
34F	Unclear Origin – linear trend
34G	Unclear Origin – linear trend
34H	Unclear Origin – linear trend
34I	Unclear Origin – linear trend
34J	Agricultural – Old field boundary

**Table A14: Area 35**

Site Specific Anomaly Code: 35

Anomaly Reference	Type of Archaeology
35A	Possible Archaeology – Curvilinear trends
35B	Possible Archaeology – Linear trends
35C	Possible Archaeology – Linear trends
35D	Possible Archaeology – Sub-circular trend
35E	Possible Archaeology – Rectilinear trend
35F	Possible Archaeology – Rectilinear trend
35G	Possible Archaeology – Enclosure trend
35H	Possible Archaeology – Trends
35i	Possible Archaeology – Trends
35J	Unclear Origin – Linear trends
35K	Unclear Origin – Circular trends
35L	Unclear Origin – Pit-like anomalies
35M	Unclear Origin – Trends
35N	Unclear Origin – Trends
35O	Unclear Origin – Trends
35P	Agricultural – Old field boundary
35Q	Agricultural – Old field boundary

**Table A15: Area 36**

Site Specific Anomaly Code: 36

Anomaly Reference	Type of Archaeology
36A	Unclear Origin – Trends
36B	Unclear Origin – Trends

36C	Old Field Boundary
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**Table A16: Area 37**

Site Specific Anomaly Code: 37

Anomaly Reference	Type of Archaeology
37A	Possible Archaeology – Trends
37B	Possible Archaeology – Linear trends
37C	Unclear Origin – Trends
37D	Unclear Origin – Linear Trends
37E	Unclear Origin – Area disturbance
37F	Old Field Boundary
37G	Old Field Boundary
37H	Old Field Boundary

**Table A17: Area 38**

Site Specific Anomaly Code: 38

Anomaly Reference	Type of Archaeology
38A	Possible Archaeology – Curvilinear trends
38B	Possible Archaeology – Curvilinear trends
38C	Unclear Origin – Curvilinear trends
38D	Unclear Origin – Trends
38E	Unclear Origin – Area disturbance
38F	Old Field Boundary
38G	Former Gravel Pit
38H	Former Gravel Pit

**Table A18: Area 39**

Site Specific Anomaly Code: 39

Anomaly Reference	Type of Archaeology
39A	Possible Archaeology – Linear trend
39B	Possible Archaeology – Curved trend
39C	Possible Archaeology – Linear trends
39D	Possible Archaeology – Linear trends
39E	Possible Archaeology – Enhanced magnetism
39F	Unclear Origin – Trends
39G	Old Field Boundary
39H	Old Field Boundary

**Table A19: Area 40**

Site Specific Anomaly Code: 40

Anomaly Reference	Type of Archaeology
40A	Possible Archaeology – Rectilinear trend
40B	Unclear Origin – Linear trends
40C	Unclear Origin – Curvilinear trends



**Table A20: Area 41**

Site Specific Anomaly Code: 41

Anomaly Reference	Type of Archaeology
41A	Possible Archaeology – Sub-circular trend
41B	Possible Archaeology – Curvilinear trend
41C	Possible Archaeology – Linear trend
41D	Possible Archaeology – Rectilinear trend
41E	Possible Archaeology – Linear trends
41F	Possible Archaeology – Curvilinear trends
41G	Possible Archaeology – Pit-like anomalies
41H	Unclear Origin – Curvilinear trends
41i	Unclear Origin – Sub-circular trends
41J	Unclear Origin – Linear trends
41K	Old Field Boundary
41L	Old Field Boundary

**Table A21: Area 43**

Site Specific Anomaly Code: 43

Anomaly Reference	Type of Archaeology
43A	Possible Archaeology – Linear trend
43B	Possible Archaeology – Linear trend
43C	Possible Archaeology – Pit-like anomalies
43D	Unclear Origin – Trends
43E	Unclear Origin – Area disturbance
43F	Old Field Boundary
43G	Old Field Boundary

**Table A22: Area 44**

Site Specific Anomaly Code: 44

Anomaly Reference	Type of Archaeology
44A	Archaeology – Rectilinear enclosure
44B	Possible Archaeology – Linear trend
44C	Possible Archaeology – Sub-circular anomaly
44D	Possible Archaeology – Linear trend
44E	Possible Archaeology – Linear trend
44F	Possible Archaeology – Amorphous anomalies
44G	Possible Archaeology – Rectilinear anomaly
44H	Possible Archaeology – Linear trend
44i	Unclear Origin – Linear trends
44J	Unclear Origin – Linear trends
44K	Old Field Boundary
44L	Old Field Boundary

**Table A23: Area 45**

Site Specific Anomaly Code: 45

Anomaly Reference	Type of Archaeology
45A	Unclear Origin – Area of disturbance
45B	Unclear Origin – Area of disturbance
45C	Unclear Origin – Area of disturbance
45D	Unclear Origin – linear trend
45E	Unclear Origin – linear trend
45F	Unclear Origin – linear trend
45G	Agricultural – Old field boundary
45H	Agricultural – Old field boundary
45i	Agricultural – Old field boundary

**Table A24: Area 46**

Site Specific Anomaly Code: 46

Anomaly Reference	Type of Archaeology
46A	Possible Archaeology – Linear trends
46B	Possible Archaeology – Rectilinear trends
46C	Possible Archaeology – Linear trends
46D	Possible Archaeology – Rectilinear trend
46E	Possible Archaeology – Curvilinear trends
46F	Possible Archaeology – Pit-like anomaly
46G	Unclear Origin – Possible enclosures
46H	Unclear Origin – Possible enclosures

**Table A25: Area 47**

Site Specific Anomaly Code: 47

Anomaly Reference	Type of Archaeology
47A	Possible Archaeology – Trends
47B	Possible Archaeology – Former chalk pit
47C	Unclear Origin – Trends
47D	Unclear Origin – Trends
47E	Unclear Origin – Linear trend
47F	Old Field Boundary
47G	Old Field Boundary

**Table A26: Area 13**

Site Specific Anomaly Code: 13

Anomaly Reference	Type of Archaeology
13A	Definitive Archaeology
13B	Possible Archaeology – Linear trend
13C	Possible Archaeology – Linear trend
13D	Possible Archaeology – Linear trend

Anomaly Reference	Type of Archaeology
13E	Possible Archaeology – Linear trend
13F	Unclear Origin – linear trend
13G	Unclear Origin – linear trend
13H	Agricultural – Old field boundary

**Table A27: Area 48**

Site Specific Anomaly Code: 48

Anomaly Reference	Type of Archaeology
48A	Possible Archaeology – Linear trend
48B	Possible Archaeology – Linear trend
48C	Unclear Archaeology – Linear trend
48D	Unclear Archaeology – Linear trend
48E	Unclear Archaeology – Linear trend

**Table A28: Area 49**

Site Specific Anomaly Code: 49

Anomaly Reference	Type of Archaeology
49A	Unclear Archaeology – Linear trend
49B	Unclear Archaeology – Linear trend
49C	Unclear Archaeology – Linear trend
49D	Unclear Archaeology – Linear trend
49E	Unclear Archaeology – Linear trend
49F	Agricultural – Linear trend

**Table A29: Area 50**

Site Specific Anomaly Code: 50

Anomaly Reference	Type of Archaeology
50A	Possible Archaeology – Trends
50B	Unclear Origin – Trends
50C	Unclear Origin – Trends
50D	Old Field Boundary
50E	Old Field Boundary
50F	Old Field Boundary
50G	Old Field Boundary
50H	Old Field Boundary
50i	Old Field Boundary
50J	Old Field Boundary

**Table A30: Area 51**

Site Specific Anomaly Code: 51

Anomaly Reference	Type of Archaeology
51A	Possible Archaeology – Linear trend
51B	Unclear Archaeology –Trends

Anomaly Reference	Type of Archaeology
51C	Unclear Archaeology – Trends
51D	Unclear Archaeology – Enhanced magnetism
51E	Unclear Archaeology – Trends
51F	Unclear Archaeology – Linear trend

**Table A31: Area 52**

Site Specific Anomaly Code: 52

Anomaly Reference	Type of Archaeology
52A	Unclear Origin – Trends
52B	Unclear Origin – Trends
52C	Unclear Origin – Trends
52D	Unclear Origin – Trends
52E	Unclear Origin – Trends
52F	Unclear Origin – Trends
52G	Unclear Origin – Trends
52H	Old boundary – Former Old Chalk Pit

**Table A32: Area 53**

Site Specific Anomaly Code: 53

Anomaly Reference	Type of Archaeology
53A	Possible Archaeology – Linear trend
53B	Unclear Origin – Linear trend

**Table A33: Area 58**

Site Specific Anomaly Code: 58

Anomaly Reference	Type of Archaeology
58A	Archaeology – Enclosures
58B	Archaeology – Linear trends
58C	Archaeology – Linear trends
58D	Archaeology – Enclosure
58E	Archaeology – Enclosure
58F	Archaeology – Enclosure
58G	Archaeology – Trackway
58H	Archaeology – Trackway
58i	Archaeology – Trackway
58J	Archaeology – Enclosure
58K	Archaeology – Enclosure
58L	Archaeology – Enclosure / trackway
58M	Archaeology – Trends
58N	Possible Archaeology - Trends
58O	Possible Archaeology - Enclosures
58P	Possible Archaeology - Trends
58Q	Possible Archaeology - Enclosures
58R	Uncertain Origins - Trends

58S	Uncertain Origins - Trends
58T	Old Field Boundary
58U	Old Field Boundary
58V	Old Field Boundary
58W	Old Field Boundary

## Appendix B: Processing steps - Geoplot

**Table B34: Description of Geoplot processes**

Process Type	Effect
Clip	Limits data values to within a specified range
De-spike	Removes exceptionally high readings in the data that can obscure the visibility of archaeological features. In gradiometer survey, these can be caused by highly magnetic items such as buried ferrous objects.
De-stagger	Corrects a misalignment of data when the survey is conducted in a zig-zag traverse pattern.
Interpolate	Increases the resolution of a survey by interpolating new values between surveyed data points, creating a smoother overall effect.
Low Pass filter	Uses a Gaussian filter to remove high-frequency, small scale detail, typically for smoothing the data.
Zero Mean Traverse	Resets the mean value of each traverse to zero, in order to address the effect of striping in the data and counteract edge effects.

**Table B35: Details of Geoplot processing**

Process Used	Extent
Zero Mean Traverse	All LMS =on, threshold: none / -5 to 5
De-spike	X=1 Y=1 Thr = 3 Repl = Mean
Clip	Min =-5 Max = 5
De-stagger	Line Pattern 34-78 Dual-DS
Low Pass filter	X=1 Y=1 Wt=G
Interpolate	Y, Expand – Expand
Raw Palette Scale	Grey08 Min= -1nT Max= 2nT
Palette Scale	Grey08 Min= -1nT Max= 2nT