



WYAS
**Archaeological
Services**

**Oxfordshire Cotswold Garden
Village
Eynsham
Oxfordshire**

Geophysical Survey

Report no. 3262
March 2019

Client: Terence O'Rourke Ltd



Oxfordshire Cotswold Garden Village

Eynsham

Oxfordshire

Geophysical Survey

Summary

A staged geophysical (magnetometer) survey, covering 113 hectares was undertaken on land to the north of the A40, north of Eynsham, Oxfordshire. Across the whole scheme, there is clear evidence of ridge and furrow cultivation. There is some evidence of geological anomalies, most notable at junctions between geological material and changes in the topography. A clear area of magnetic disturbance has been detected, relating to an area of infilled material. Anomalies with a possible archaeological origin have been identified in areas close to the clear archaeological anomalies in areas 2, 4 and 8. Based on this survey, therefore, the archaeological potential of the southern part of the survey area is deemed to be high and moderate elsewhere.



Report Information

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Address: Everdene House, Deansleigh Road, Bournemouth, BH7 7DU
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1 Introduction

Archaeological Services WYAS (ASWYAS) were commissioned by Terence O'Rourke Ltd (TOR), on behalf of their client Grosvenor Britain & Ireland to undertake a geophysical (magnetometer) survey on land known as the Oxfordshire Cotswolds Garden Village (OCGV). The survey was carried out in line with current best practice (CIfA 2014; David *et al.* 2008) in two targeted phases which ran seamlessly. This investigation was in line with a Written Scheme of Investigation approved and sent to Richard Oram at Oxfordshire County Council. Phase One targeted approximately 44ha of archaeology identified by aerial photograph interpretation (Cox 2017). Phase Two continued to test the validity of the results and focused on areas which would be affected by the development. Additional targeted areas were undertaken by SUMO and have been incorporated with this report. The survey was carried out between the 7th January and the 12th March 2019 to provide additional information on the archaeological resource of the area.

Site location, topography and land-use

The development area consists of 176ha overall. Of this total, 10ha has been earmarked for a proposed park and ride scheme, which has already been investigated. As a whole, the scheme is bounded to the west by fields, to the south by the A40, to the east by Lower Road and to the north by a brook which flows into the river Evenlode. The site is located to the immediate north of Eynsham, approximately 12km to the northwest of Oxford (see Fig. 1) and centred on SP 42858 10403. Areas to the immediate east and west of Cuckoo Lane undulate, whilst gradually levelling in the east. The height above Ordnance Datum (aOD) is between 80 to 85m in the west gradually falling to 63m in the east. The majority of the survey areas are under pasture, with a central core under stubble and scrubland.

Soils and geology

The underlying bedrock belongs to the Oxford Clay Formation and West Walton formation (undifferentiated) – mudstone. These formed approximately 157 to 166 million years ago in the Jurassic Period. A central core of superficial deposits, belonging to the Summertown-Radley sand and gravel member have been identified (BGS 2019). The soils are recorded as being slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey, belonging to the Denchworth association (712b), a river terrace gravel, defined as well-draining belonging to the Badsey association (511h) and the Kelmscot river terrace drift (SSEW 1983).

2 Archaeological Background

The following background focusses on the site and its immediate surroundings. Within the wider area around Eynsham a number of archaeological finds and events have taken place,

chronicling prehistoric through to medieval activity. Within the survey area itself, a number of events and identified archaeological anomalies have been recorded. A brief discussion will follow, in chronological order, with reference to survey areas. A fuller description will be added into the area results as appropriate.

A Palaeolithic handaxe was discovered to the immediate south of an isolated barn close to City Farm, possibly Acheulian in date, located in Area 3.

A Mesolithic flint core (SMR 10922) was found prior to the mechanical extraction of material in 1967, in an area around City Farm.

Evidence of a Neolithic cremation enclosure (SMR 3334) was recorded during the rescue excavation on land at New Wintles Farm (Area 10 in this report). It consisted of two oval pits flanked by two crescentic ditches with cremation and pottery finds within the pits. A report into the findings (Case and Whittle 1982) detailed the findings, however the location is indicative of reporting at the time and lacks the accuracy of modern day location methods.

There is significant Bronze Age activity around both New Wintles Farm and City Farm. The Bronze Age barrow complex at City Farm (SMR 15055) was excavated between 1972 and 1973 and has since been destroyed. It consisted of three ring ditches all of which discovered inhumations and pottery. A round barrow cemetery (SMR 41272) was excavated and recorded ahead of gravel extraction. In addition there was the excavation of an Anglo Saxon cremation cemetery at City Farm (SMR 28917) which is comparable and probably contemporaneous with that at New Wintles Farm (SMR 15056). Both have since been excavated prior to gravel extraction and have been destroyed.

In Area 2, a study of the Deserted Medieval Village (DMV) of Tilgarsley (SMR 5424) detailed that there were significant earthworks remaining and that hollow-ways led into the site on all sides.

Medieval and post-medieval ridge and furrow has also been identified throughout the survey area.

Immediately prior to the geophysical survey, an area of approximately 10 hectares were surveyed and excavated at the junction between the A40 and Cuckoo Lane in advance of a park and ride scheme (SUMO 2018). Predominantly ridge and furrow was recorded by the geophysics, but excavation noted that there was some evidence of earlier occupation (OA 2018).

3 Aims, Methodology and Presentation

The main aim of the geophysical survey was to provide sufficient information to enable an assessment to be made of the impact of development on potential sub-surface archaeological remains and for further evaluation or mitigation proposals, if appropriate, to be

recommended. To achieve this aim, a magnetometer survey covering all amenable parts of the PDA was undertaken (see Fig. 2).

The general objectives of the geophysical survey were:

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

Magnetometer survey

Predominantly a cart-based magnetometer apparatus was used. Where ground conditions prevented the use of such a system, a traditional hand-held approach was adopted. A hand-held approach was used by SUMO.

SENSYS methodology and data processing

The magnetometer survey was undertaken using a Sensys Magneto MXPDA cart-based instrument. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20Hz. The gradiometers have a range of recording between 0.1nT and 10,000nT. They are linked to a Trimble R6 RTK dGPS system with data recorded by Sensys Magneto MXPDA software on a rugged PDA device. The data were stored on an SD memory card within the PDA and later downloaded to a computer for processing and interpretation. MAGNETO (Sensys GmbH) and TerraSurveyor V3.0.25.0 software was used to process and present the data. Further details are given in Appendix 1.

Bartington methodology and data processing

The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble R6 model). The survey was undertaken using Bartington Grad601 magnetic gradiometers. These were employed taking readings at 0.25m intervals on zig-zag traverses 1.0m apart within 30m by 30m grids, so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for processing and interpretation. Geoplot 3 (Geoscan Research) software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 displays an overview of the processed magnetometer data at a scale of 1:7500 with Figure 3 showing the interpretation at the same scale. Figure 4 is a location plan with geological underlay at the same scale. The minimally processed data,

together with interpretations of the survey results are presented in Figures 5 to 30 inclusive at a scale of 1:1250.

Technical information on the equipment used, data processing and survey methodologies are given in Appendix 1. Technical information on locating the survey area is provided in Appendix 2. Appendix 3 describes the composition and location of the archive. A copy of the completed OASIS form is included in Appendix 4.

The survey methodology, report and any recommendations comply with guidelines outlined by English Heritage (David *et al.* 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

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

4 Results and Discussion (see Figures 5 to 30)

Survey areas (Areas 1-18) were allocated area numbers as they were surveyed and as a result are not necessarily adjoining. These areas have been retained in this report and are discussed below area by area, using ASWYAS standard categories.

The variable sizes of the areas, and the inevitable overlap of figure viewports, means that some areas feature on multiple figures. Anomalies of a possible or archaeological origin are contained within a single figure. A list of the areas and their representative figures can be seen on Figures 2 and 3. Figure 4 shows a geological underlay overlain with interpretation. In addition, each area discussed below, references all pertinent figures. Figures 5 to 30 show greyscale and interpretation at 1:1250.

Across the survey area, there are common anomalies, in particular for categories like ferrous, magnetic disturbance and geology. To a lesser degree this occurs for the agricultural anomalies category. Where distinct and noteworthy anomalies have been detected, these are discussed in greater detail. All the areas have a degree of ferrous material within them.

Ferrous anomalies, as individual 'spikes', or as large discrete areas are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on rural sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious pattern or clustering to their distribution in this survey to suggest anything other than a random background scatter of ferrous debris in the plough-soil.

Area 1 (Figs 5-8)*Ferrous anomalies*

Magnetic responses which correlate with the location of telegraph poles have been identified throughout this survey area.

Agricultural anomalies

Evidence of ridge and furrow cultivation has been detected within this area, which correlates with cropmark evidence (Cox 2017).

Geological anomalies

A geological trend has been identified, when the topography of the survey area, changes, and slopes to the south away from the road. This response has been caused by the variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations.

Possible archaeological anomalies

A long linear response, has been detected in this survey area (**P1**). It is likely to represent the break of slope and be a geological feature, but given the relatively straight nature of its alignment, it may represent the remains of a trackway connecting to the former settlement of Tilgarsley, or former boundary.

A faint linear magnetic trend has been detected in this survey area (**P2**), which may have archaeological origins. It may represent the fragmented remains of an enclosure (only two sides surviving), but given the strength of the response, this cannot be stated with certainty.

Area 2 (Figs 11-12)*Ferrous anomalies*

An area of magnetic disturbance in the west has been caused by deposited material, possibly a form of green waste.

Agricultural anomalies

Evidence of medieval ridge and furrow has been detected in this area. It corresponds with the topography of the field and is orientated in two directions.

Possible anomalies

Two linear semi-circular anomalies have been identified on the high ground of the area (**P3**). The faint nature of the response means that their origin is unclear.

Archaeological anomalies

A complex of magnetic responses (**A1**) have been detected in the northwest corner of the survey area. The location of these responses correspond with the known location of the DMV of Tilgarsley (or Tilgardesle) (www.hull.ac.uk/dmv) (SMR 5424). These responses correlate with the topography of the area and appear to form enclosures. The total dimensions of the area measures (90m by 60m) and sits on an area of gravel deposits at the base of a gentle slope (Fig 4). The negative magnetic responses are likely to be caused by the material within the earthworks.

Area 3 (Figs 19-20)

Ferrous anomalies

The magnetic disturbance recorded here indicates that the majority of this area has been used for landfill. Any archaeological anomalies identified by the aerial photographs (AP's) are obscured.

Area 4 (Figs 21-24, 27-30)

Agricultural anomalies

In the northwest corner of the survey area, medieval ridge and furrow has been identified. It is orientated along a west to east axis and reflects the direction of ridge and furrow in other fields nearby.

In the majority of the survey area, some evidence of modern agricultural practice has been identified, characterised by the direction of the plough lines and their separation. There is also a suggestion of field drains, orientated along a west to east axis.

Geological anomalies

The survey has detected a number of low magnitude anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations.

As these responses occur within an area of river gravels and terraces (Summertown-Radley, Fig. 4), at the junction between the slope and the flat of the land, these results are considered to be related to sub-surface bedrock changes.

Possible archaeological anomalies

Above these responses, a series of smaller anomalies have been identified as **P4**. They may reflect a series of pit-like responses, indicative of a former palisade.

A distinctive linear magnetic trend orientated west to east has been identified in this area (**P5**). There is no cartographic evidence to suggest that this is a former field boundary. It does

have a similar axis to that of ridge and furrow in associated fields, and may be a deeper medieval ridge or furrow which contains greater magnetic material.

Archaeological anomalies

A highly magnetic curvilinear response has been detected (**A2**). It has been previously identified on AP imagery. This corresponds with MOX2958 and it sits with superficial deposits belonging to the Summertown-Radley sands and gravels.

Area 5 (Figs 15-18)

Ferrous anomalies

Magnetic disturbance relating to telegraph poles has been detected within the survey area.

Agricultural anomalies

Evidence of faint medieval ridge and furrow has been detected.

Geological anomalies

The survey has detected a number of low magnitude anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations. A geological trend has been identified at the break of slope.

Area 6 (Figs 11-14, 19-20)

Area 6 was surveyed in two phases. The southern portion by ASWYAS and the northern area by SUMO. The ground conditions consisted of tall scrub, which was denser in some parts than others.

Ferrous anomalies

The survey has detected telegraph poles as large ferrous anomalies.

Agricultural anomalies

Distinct ridge and furrow along a west to east orientation dominates Areas 6.

Geological anomalies

A small geological response has been detected along the eastern boundary which represents the transition into the low-lying sands and gravels.

Area 7 (Figs 5-6, 13-16)*Agricultural anomalies*

This area is dominated by ridge and furrow cultivation, very likely associated with the DMV of Tigarsley located to the north. The ridge and furrow is orientated on two separate alignments.

Area 8 (Figs 17-18, 23-24)*Agricultural anomalies*

There is evidence of ridge and furrow in this area with two different orientations. The ridge and furrow in the southeast is aligned southwest to northeast, whilst the ridge and furrow to the north, is orientated northwest to southeast.

Possible archaeological anomalies

Some possible responses have been identified in close proximity to the archaeological cluster of anomalies (A3) identified in the southwest corner of the survey area. These are likely to be fragmentary responses associated with more recent agricultural processes as they are not clearly identified as part of the archaeological complex.

Archaeological anomalies

A series of strong magnetic responses (A3) has been identified in the southwest corner of the survey area as having an archaeological origin. The complex comprises a series of enclosures or sub-enclosures with a number of internal divisions. The total extent of the anomalies covers an area 170m by 124m.

Area 9 (Figs 7-8, 17-18)*Agricultural anomalies*

Probable medieval ridge and furrow cultivation can be seen throughout the area.

Area 10 (Figs 21-22, 25-28)

This area, around New Wintles Farm, is located to the immediate west of Mill Lane which - forms the eastern boundary of the scheme - is treated as Area 10 as a whole.

Agricultural anomalies

Probable medieval ridge and furrow cultivation can be seen in all aspects of Area 10.

Geological anomalies

The survey has detected a number of low magnitude anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the

variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations.

A dominant trend has been identified running north to south, between the northern and western bridleways. This band of geological material occurs at a natural junction where the sands and gravels change. This represents a natural geological fault which would have been a natural drainage channel.

Possible archaeological anomalies

A semi-circular anomaly (**P7**) has been identified as having possible archaeological potential. It is approximately 16m in diameter and occurs at the boundary between the central fields, east of the geological response. The approximate location correlates with an identified monument from HER analysis.

A faint linear response (**P8**) has been identified to the south of **A4**. They may form the remnants of a wider enclosure associated with this anomaly.

Archaeological anomalies

In the southwestern field, south of the dog-leg drain, a response has been identified as having archaeological origin (**A4**). It appears as a rectangular response, composed of two separate spaces. It measures 30m by 17m.

Area 11 (Figs 19-20)

Geological anomalies

The survey has detected a number of low magnitude anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations.

There is the suggestion of faint geological trends, indicative of where this area sits on the geological horizons (Fig. 4).

Possible archaeological anomalies A semi-circular response has been identified in the middle of this area (**P9**). As a result of the location of this anomaly, on a geological horizon, only a possible archaeological interpretation has been reached.

Area 12 (Figs 13-16, 19-22)

Agricultural anomalies

This area is dominated by ridge and furrow, orientated west to east.

Area 13 (Figs 15-16, 21-22)*Agricultural anomalies*

This area is dominated by ridge and furrow, orientated west to east.

Geological anomalies

A faint geological trend has been detected which reflects the variation in soil depths and alteration in the slope of the survey area.

Area 14 (Figs 25-26)*Geological anomalies*

The survey has detected a number of low magnitude anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive and also topographical variations. Faint geological anomalies have been detected with this field, which will correspond with the changes in geology shown in Fig. 4.

Area 15 (Figs 25-26)*Ferrous anomalies*

A large area of magnetic disturbance has been detected around an existing barn structure, along the eastern boundary of this survey area.

Agricultural anomalies

This area is dominated by ridge and furrow, orientated west to east.

Possible archaeological anomalies

Within Area 15, two collections of anomalies have been identified (**P10** and **P11**). These collection of responses may be the fragments of former occupation in the form of Grubenhausen identified from HER analysis.

Area 16 (Figs 7-10)*Agricultural anomalies*

This area is dominated by ridge and furrow, orientated along a southwest to northeast axis.

Area 17 – Figs 9-10*Ferrous anomalies*

A number of larger ferrous responses were detected against the northern and western field boundaries, but this is probably associated with modern agricultural waste and debris.

Agricultural anomalies

Northeast to southwest oriented ridge and furrow has been detected close to the eastern boundary of Area 17. The responses are very faint, but appear to possess a slight curve, a trait typical of medieval ridge and furrow.

Geological anomalies

A large, linear geological trend has been identified towards the northern corner of the field. This response may reflect variation in the composition and depth of the superficial and topographic deposits, usually observed on steep or sloping ground.

Possible archaeological anomalies

A faint curvilinear trend has been detected towards the southern boundary of Area 17 (**P12**). The trend measures approximately 64m long and runs northeast to southwest, and southeast to northwest, with a wide right-angle bend in the centre. The response is weak and fragmented, but may represent the partial remains of a boundary ditch.

Area 18 – Figs 9-10*Ferrous anomalies*

A larger area of magnetic disturbance has been detected towards the northern corner of Area 18. This is a result of modern, ferrous debris on the surface of the field, rather than a subterranean geophysical response.

Agricultural anomalies

This area is dominated by northeast to southwest oriented ridge and furrow, displaying the reverse ‘S’ shape typically characteristic of medieval agriculture. This style of ridge and furrow is usually seen in the late medieval period and likely predates the modern field boundaries.

Area 19 (Figs 27-28)*Agricultural anomalies*

Evidence of a modern ploughing regime has been detected, indicative of the former stubble crop, which was evident on the survey area immediately prior to deep ploughing.

Geological anomalies

A faint geological trend has been detected which reflects the variation in soil depths and as a clear division between the bridleway and the field.

5 Conclusions

The results of the magnetometer survey have detected a number of responses, detailing the changes in landscape use over time.

Throughout the survey area there are isolated responses indicative of magnetic disturbance. An area of prominent magnetic disturbance has been recorded in Area 3. Aerial photography evidence suggested archaeological activity here, but the current landowner has indicated that this area has been filled with later material. The survey has also detected manhole covers and telegraph poles.

The entire survey area is dominated by ridge and furrow. Modern agricultural trends have only been detected in Area 19.

Geological responses have been recorded across the survey area, reflecting the changes and variations in soil depths and the topography of the site to the west. The stronger and dominant responses have been detected at known junctions of sub-surface material, predominantly to the east on flat terrain, close to known sands and gravels.

Possible archaeology has been detected in areas of known archaeology and may reflect the impact of later activity upon the response.

Areas of archaeology have been detected in the south and south-eastern aspect of the survey area, in identified areas of sands and gravels. An area to the north of the scheme has identified archaeological responses associated with the known DMV of Tigarsley, which had previously been identified by aerial photographs.

Overall, based on the magnetic results, the archaeological potential of the site is deemed low to moderate in fields dominated by ridge and furrow, on the clay bedrock. Where the geology changes to sands and gravels – a band projecting from the A40 towards City Farm – recorded archaeological anomalies, which correspond with aerial photographs and HER evidence have been identified.

With the exception of cropmark anomalies identified through aerial photographs in Area 7, there is a strong correlation between the geophysics and the other sources. There is a moderate or high archaeological potential on the low-lying, even terrains which sit on top of the sands and gravels.

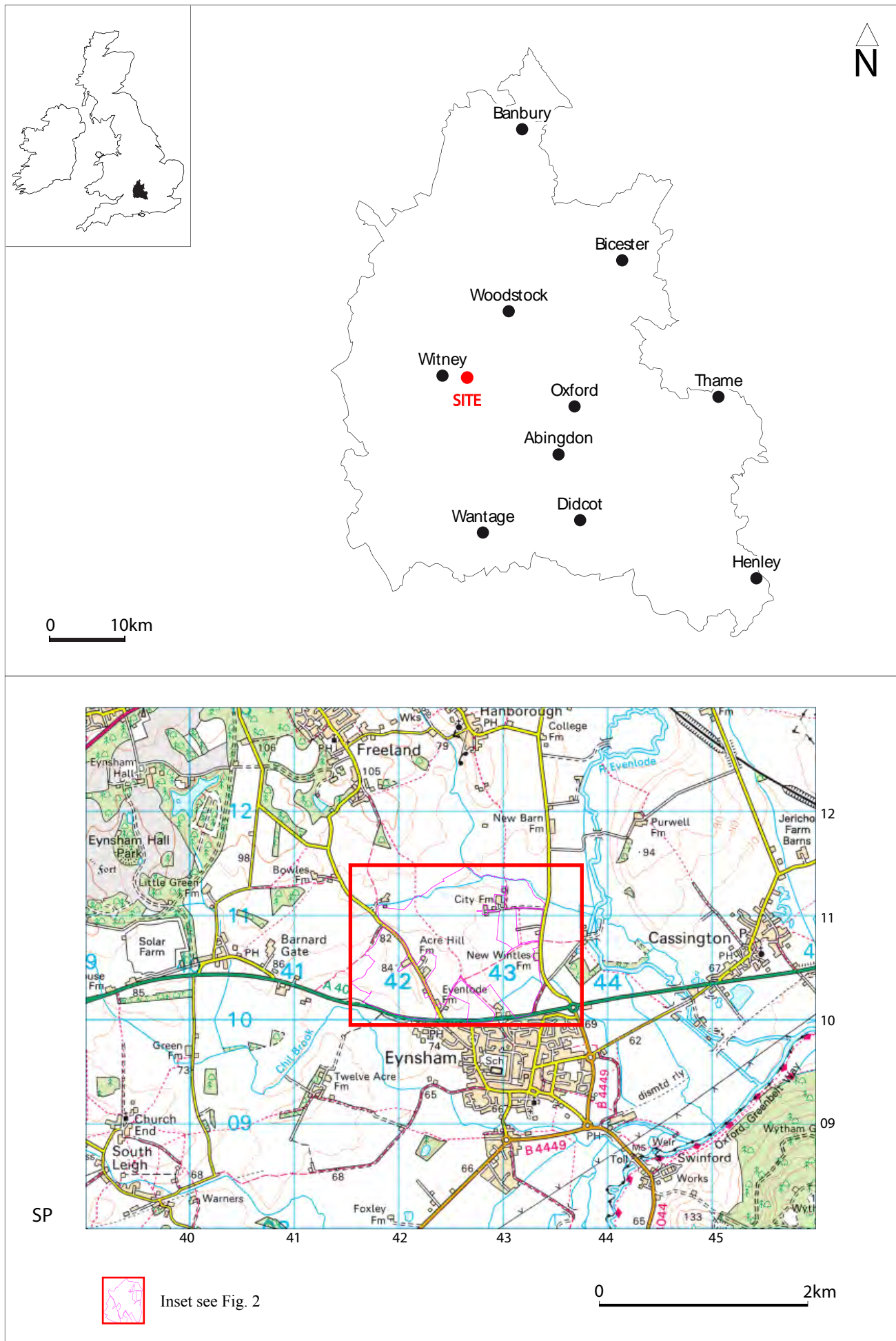


Fig. 1. Site location



Fig. 2. Location of survey areas, showing processed greyscale magnetometer data (1:7500 @ A3)

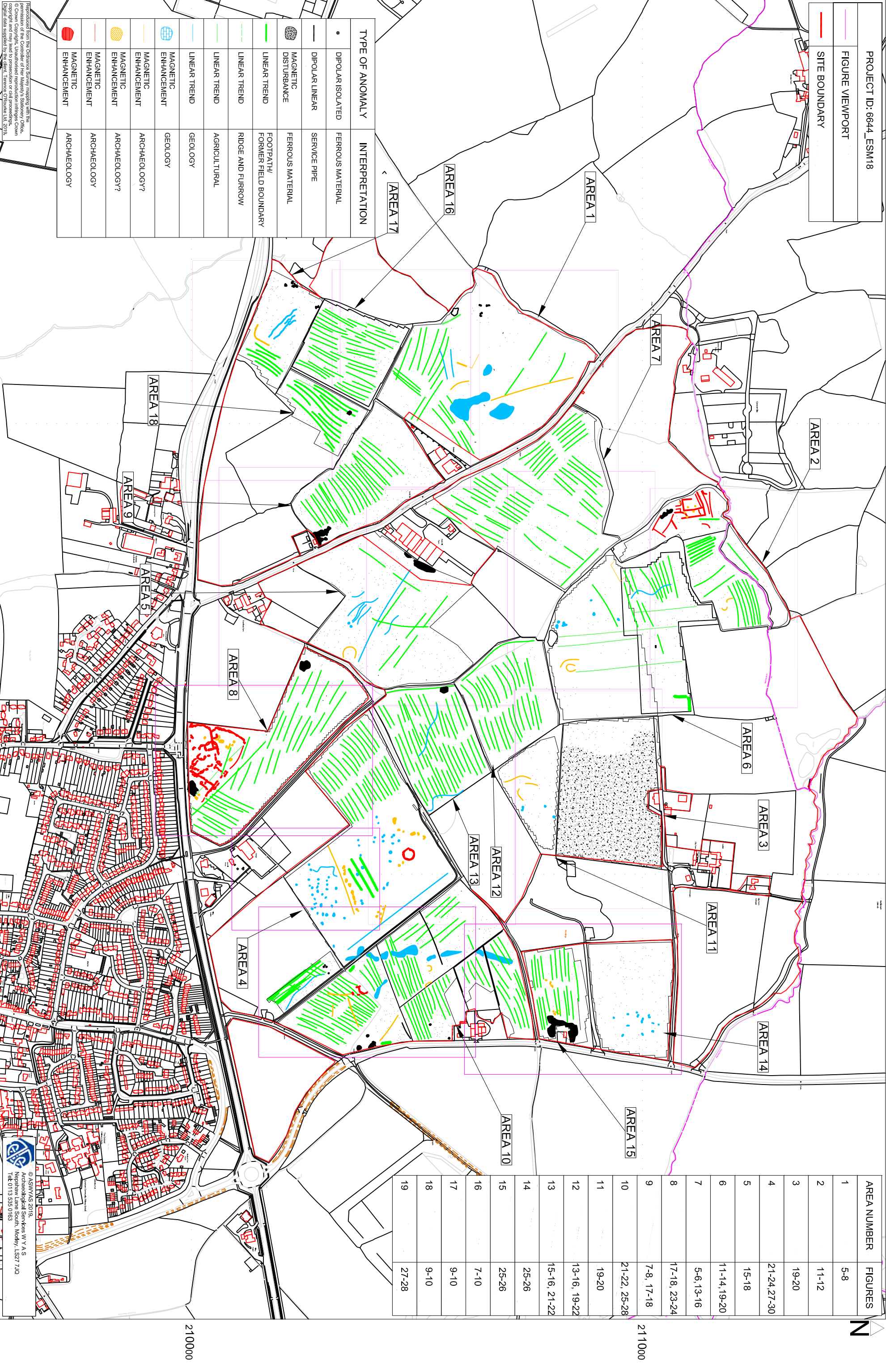


Fig. 3. Overview interpretation of magnetometer data (1:7500 @ A3)

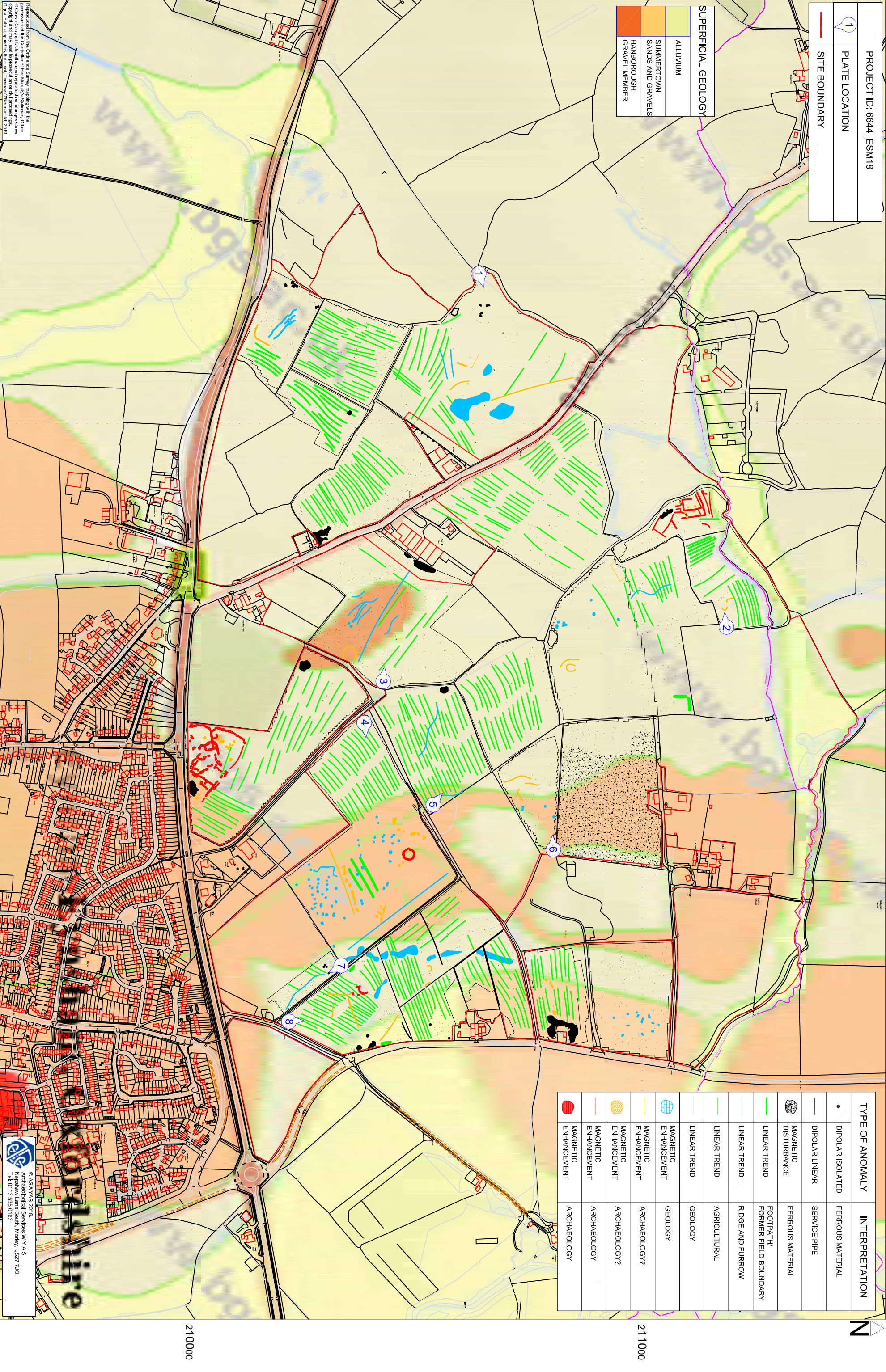


Fig. 4. Overview of interpretation over geological base map (1:7500 @ A3)

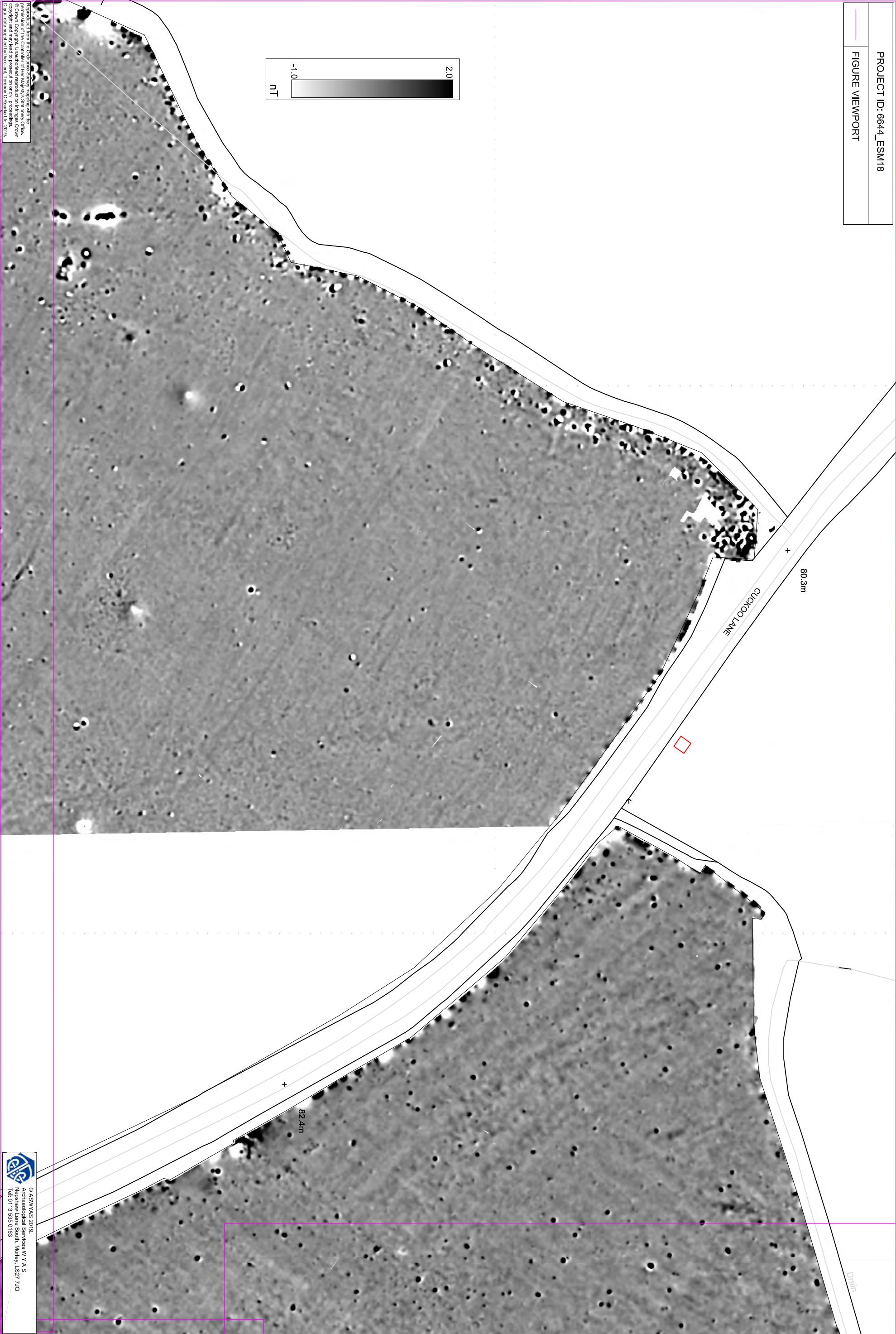


Fig. 5. Processed greyscale magnetometer data of Areas 1 and 7 (1:1250 @ A3)

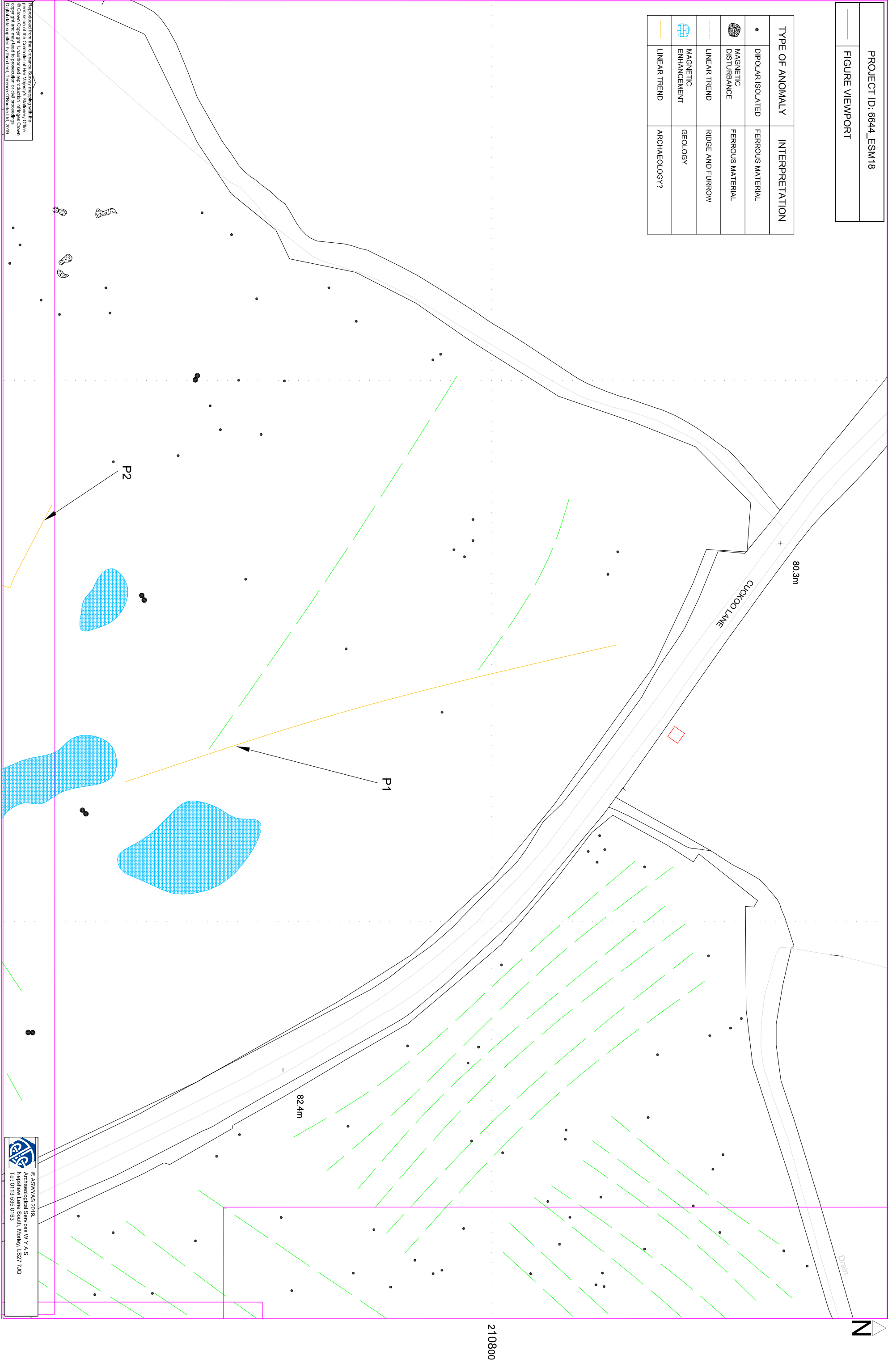


Fig. 6. Interpretation of magnetometer data of Areas 1 and 7 (1:1250 @ A3)

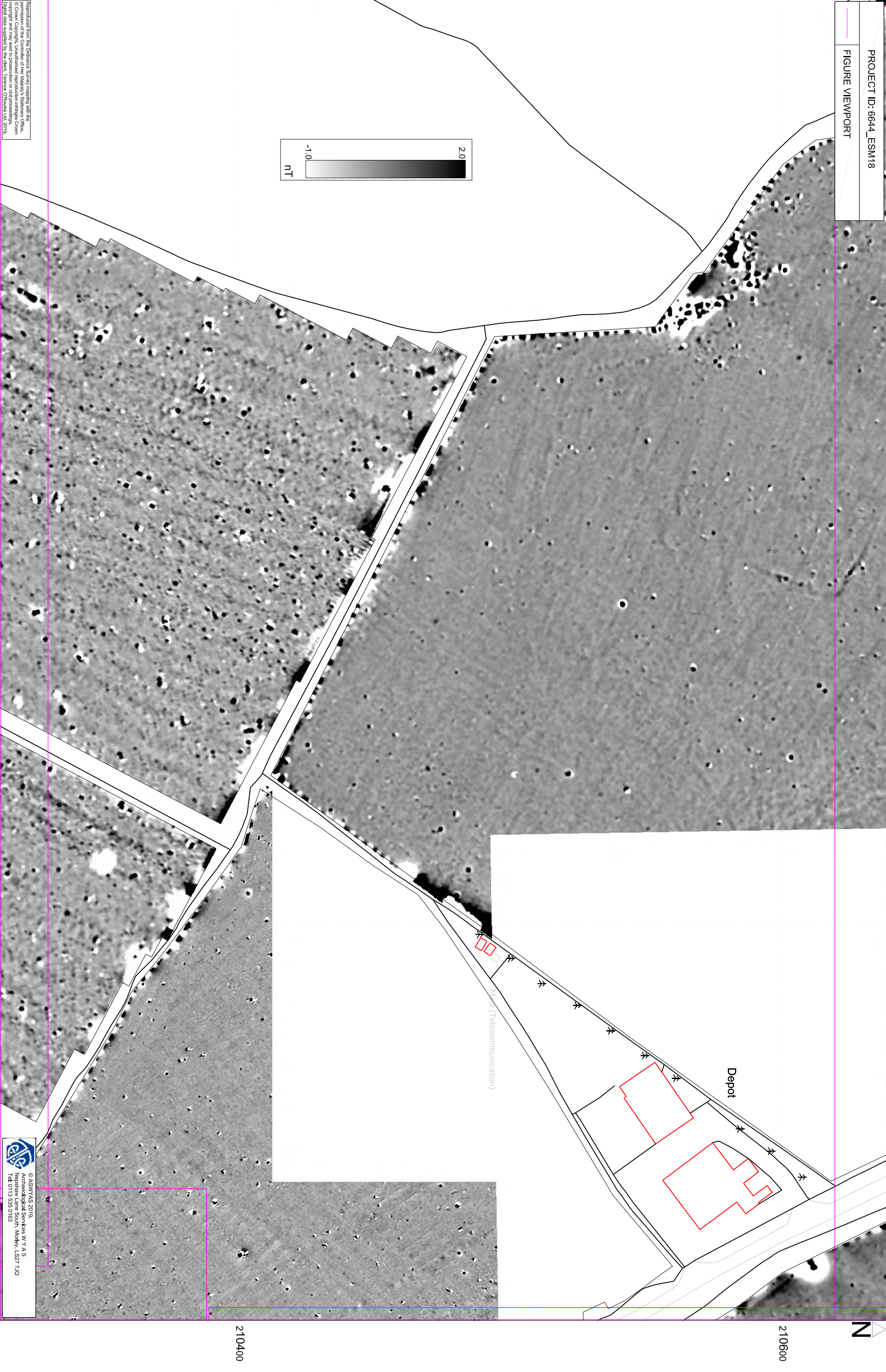


Fig. 7. Processed greyscale magnetometer data of Areas 1, 9, 16 and 18 (1:1250 @ A3)

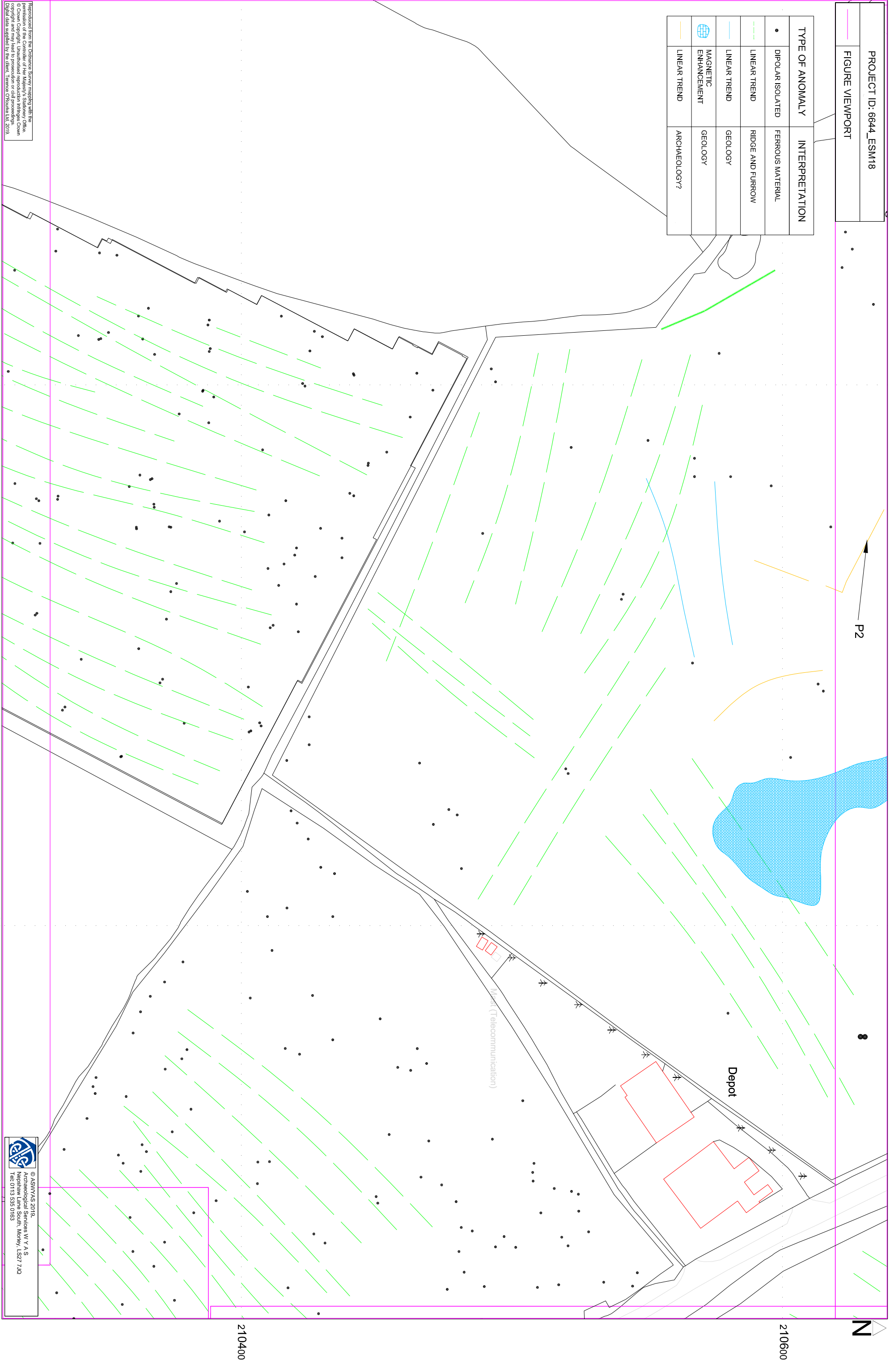


Fig. 8. Interpretation of magnetometer data of Areas 1, 9, 16 and 18 (1:1250 @ A3)

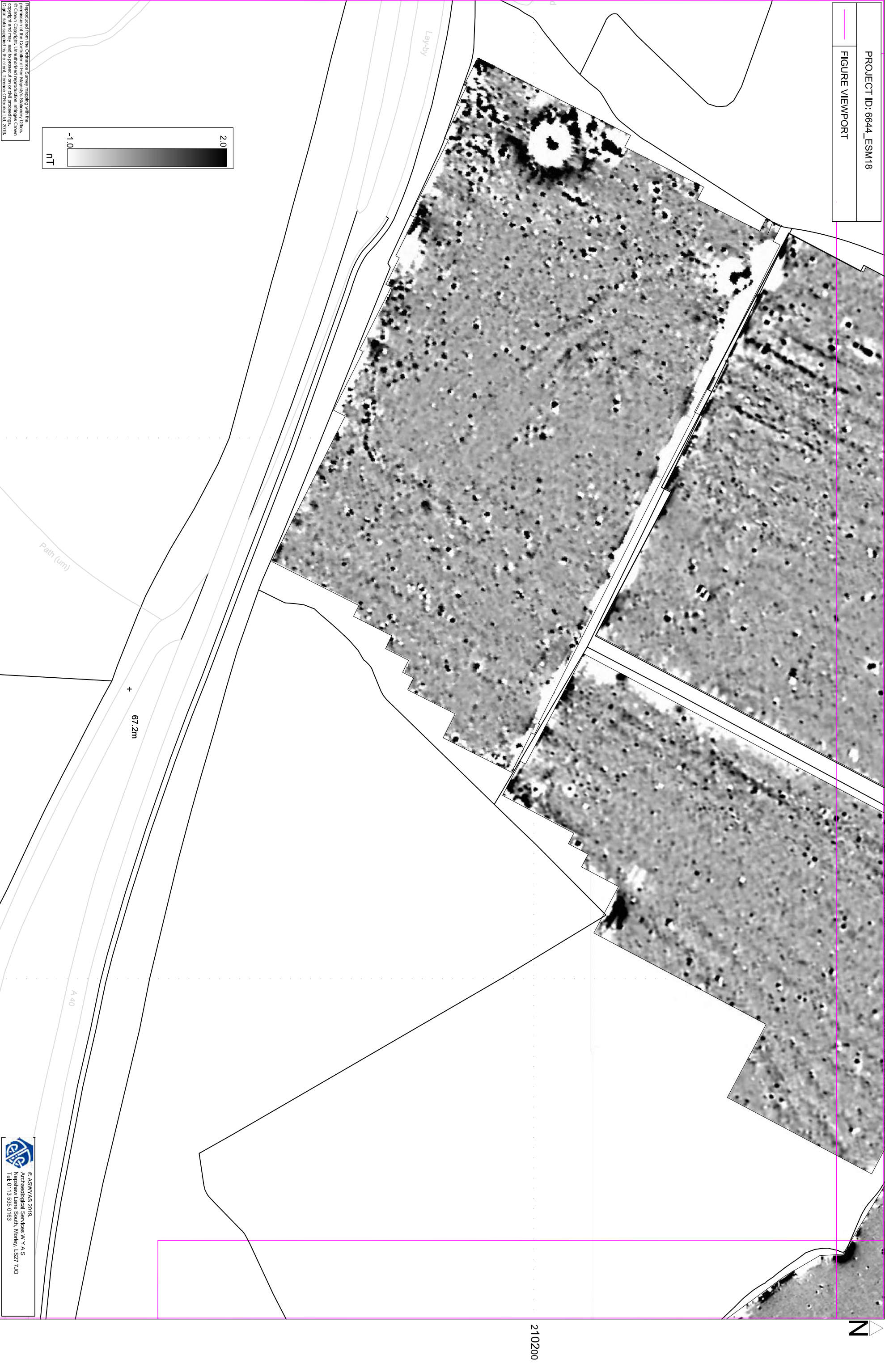


Fig. 9. Processed greyscale magnetometer data of Areas 9, 17 and 18 (1:1250 @ A3)



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Tel: 0113 535 0163

0 50m

Fig. 11. Processed greyscale magnetometer data of Areas 2 and 6 (1:1250 @ A3)

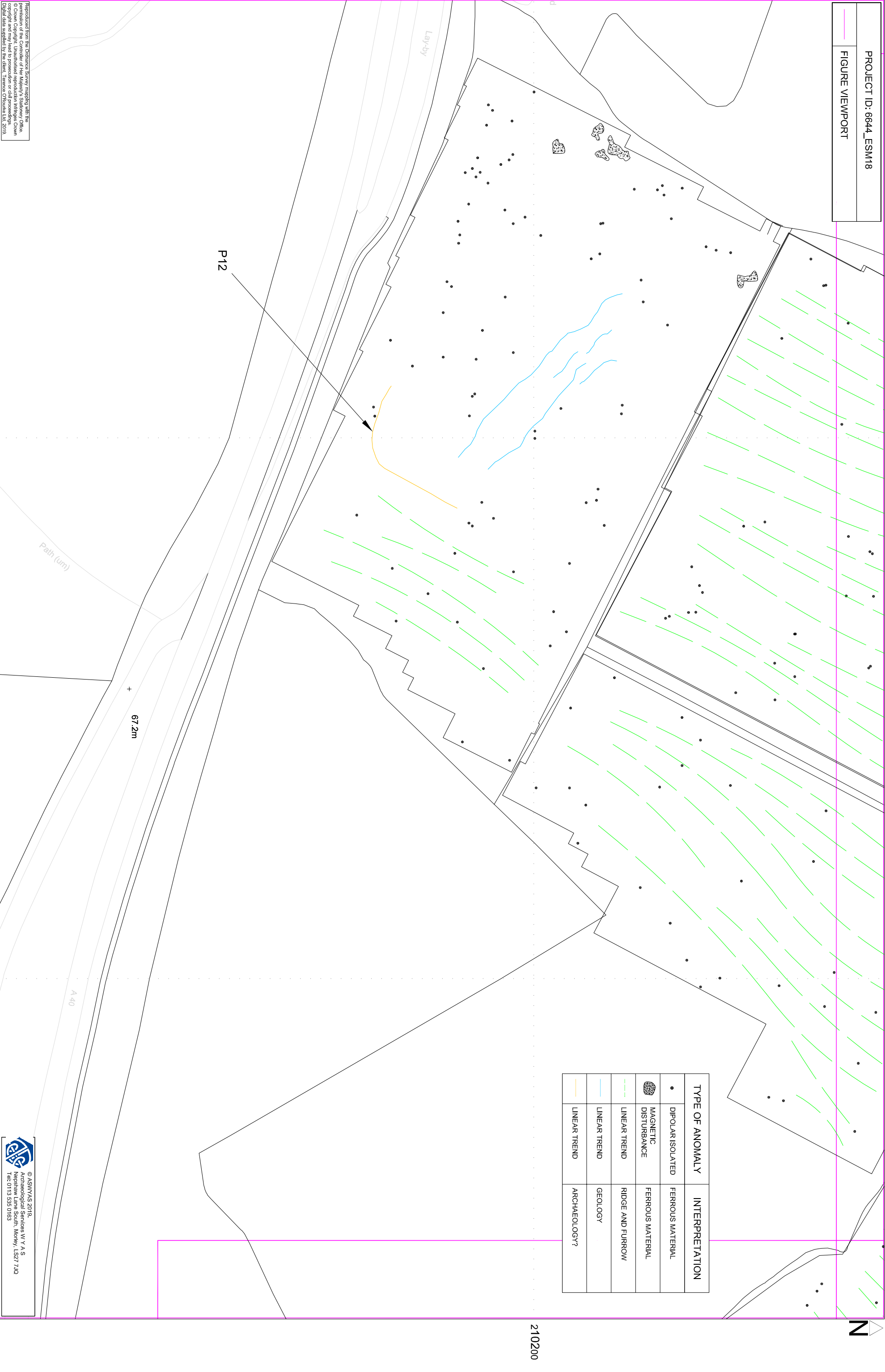
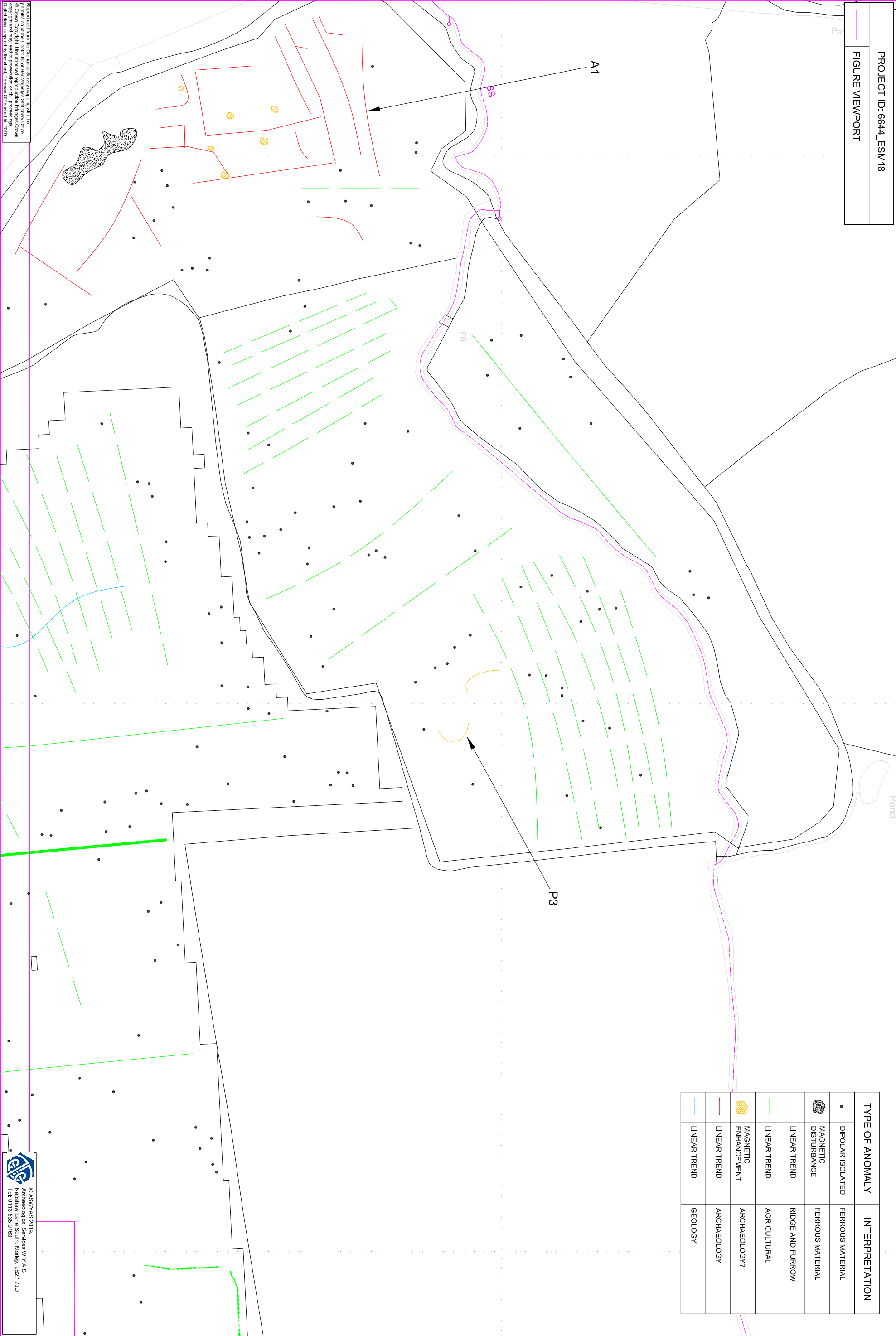


Fig. 10. Interpretation of magnetometer data of Areas 9, 17 and 18 (1:1250 @ A3)

TYPE OF ANOMALY	INTERPRETATION
<div><div></div></div> <div>DIPOLAR ISOLATED</div>	FERROUS MATERIAL
<div><div></div></div> <div>MAGNETIC DISTURBANCE</div>	FERROUS MATERIAL
<div><div></div></div> <div>LINEAR TREND</div>	RIDGE AND FURROW
<div><div></div></div> <div>LINEAR TREND</div>	AGRICULTURAL
<div><div></div></div> <div>MAGNETIC ENHANCEMENT</div>	ARCHAEOLOGY?
<div><div></div></div> <div>LINEAR TREND</div>	ARCHAEOLOGY
<div><div></div></div> <div>LINEAR TREND</div>	GEOLOGY



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Fig. 12. Interpretation of magnetometer data of Areas 2 and 6 (1:1250 @ A3)

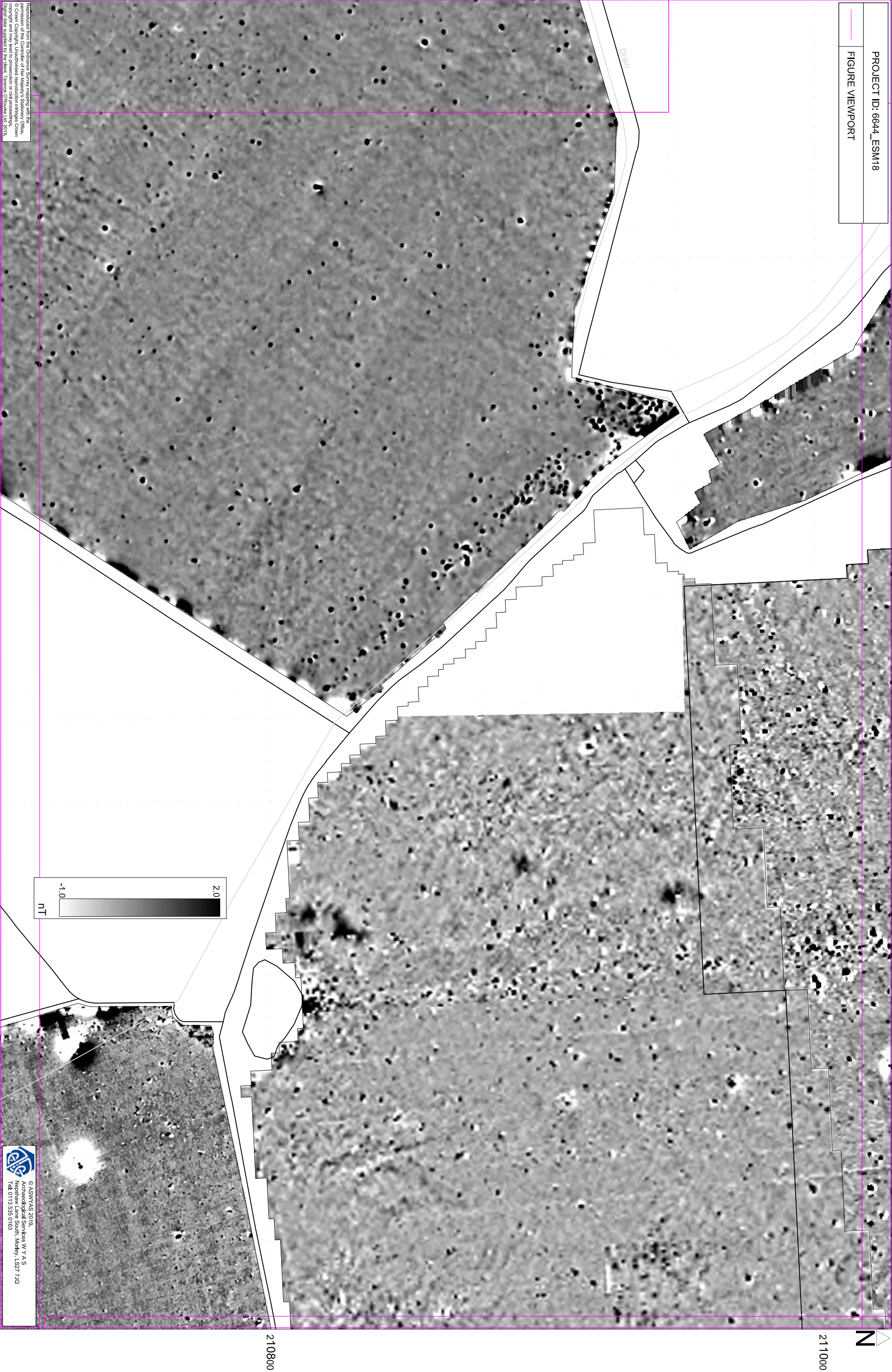


Fig. I3. Processed greyscale magnetometer data of Areas 2, 6, 7 and 12 (1:1250 @ A3)

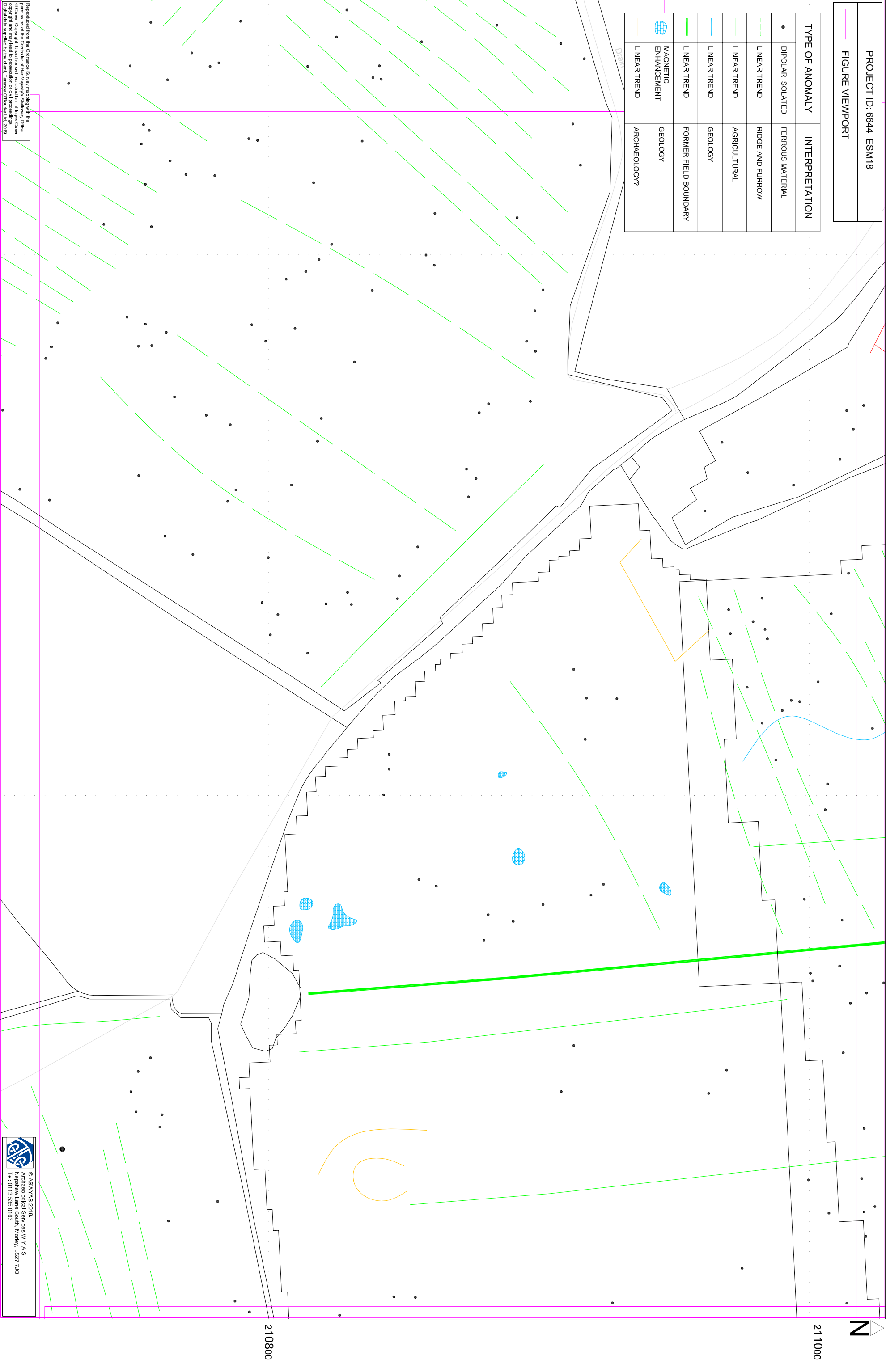


Fig. 14. Interpretation of magnetometer data of Areas 2, 6, 7 and 12 (1:1250 @ A3)

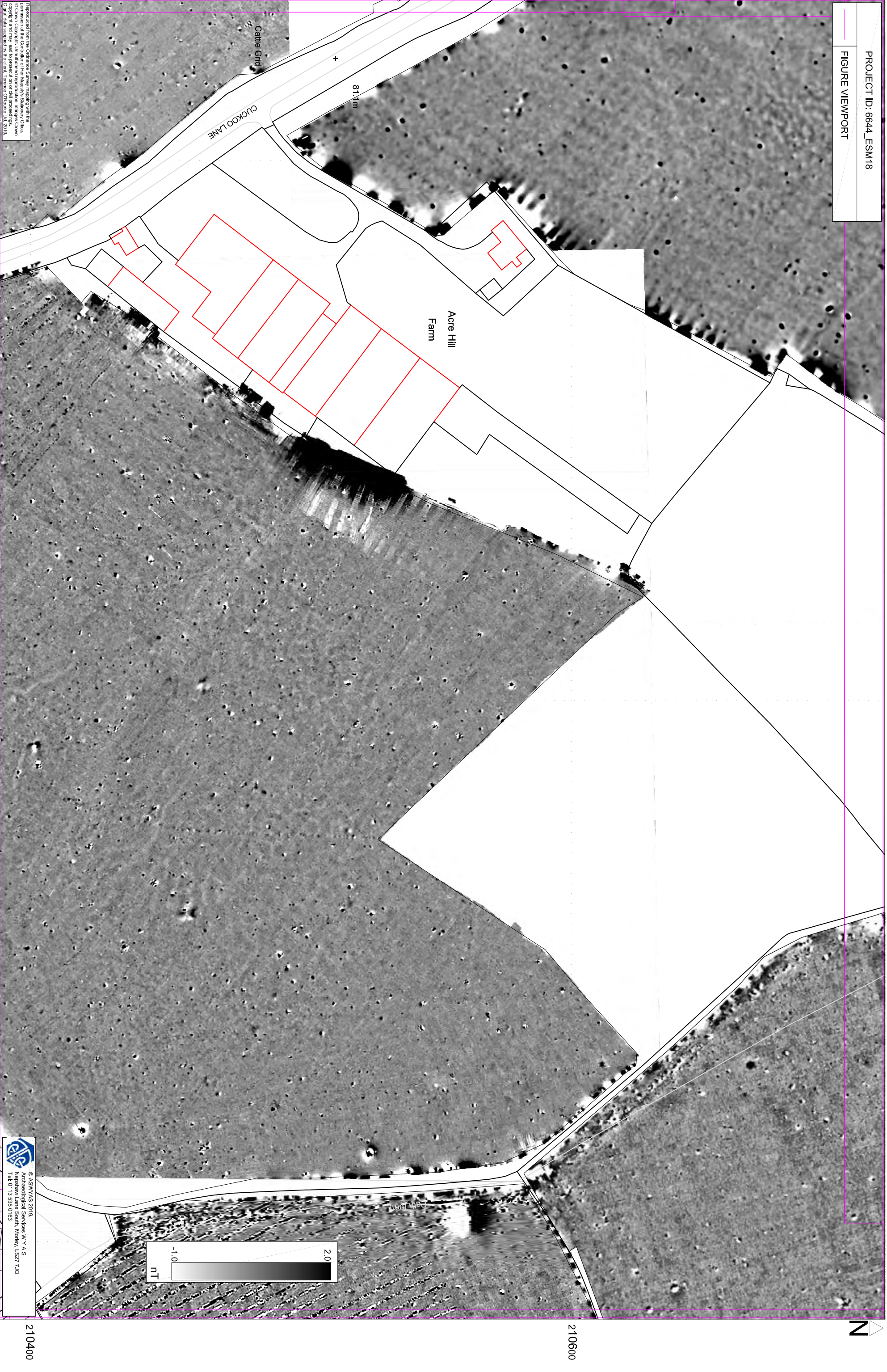
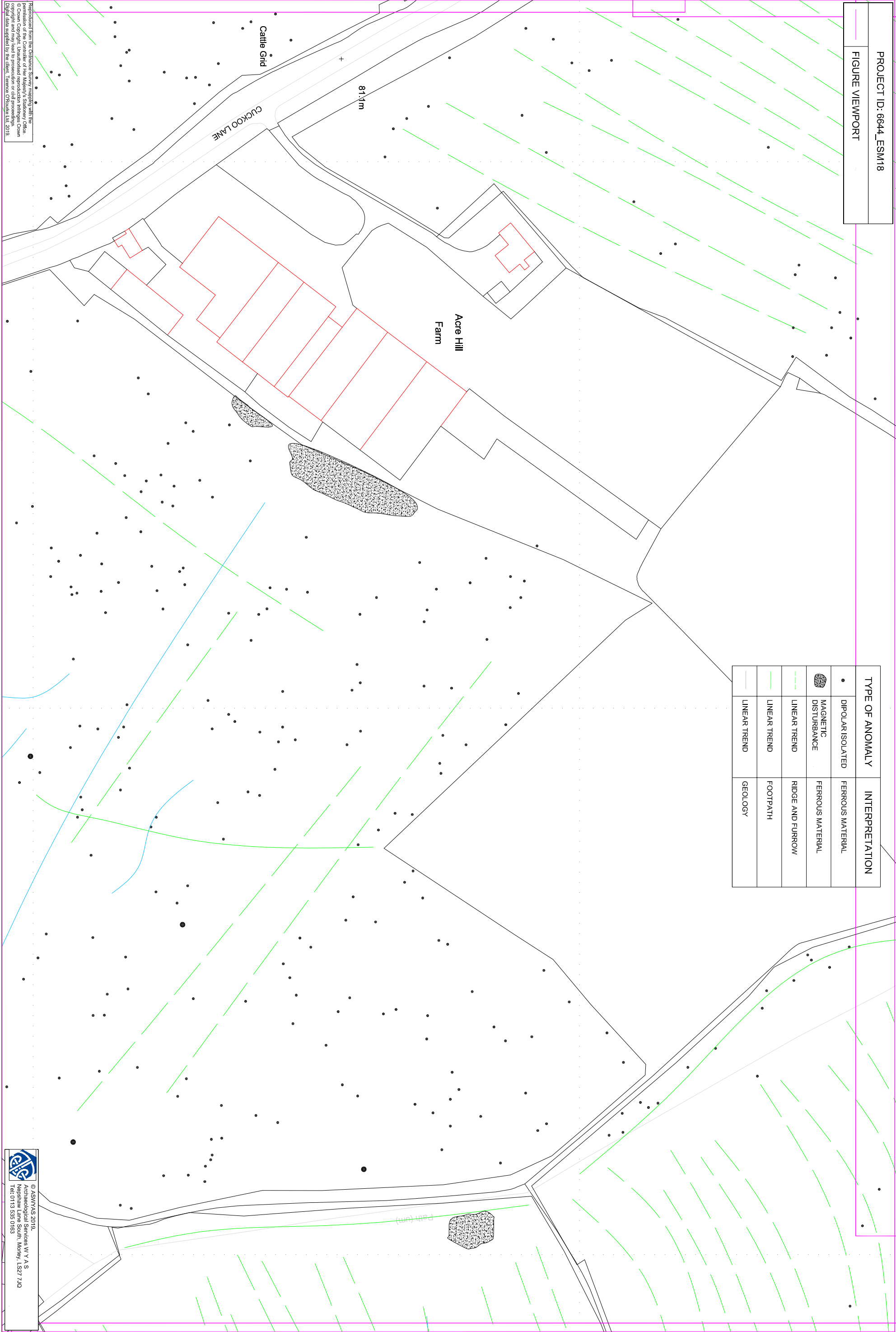


Fig. 15. Processed greyscale magnetometer data of Areas 5, 7, 9, 12 and 13 (1:1250 @ A3)

PROJECT ID: 6644_ESM18

FIGURE VIEWPORT

TYPE OF ANOMALY	INTERPRETATION
<div><div></div>DIPOLAR ISOLATED</div>	FERROUS MATERIAL
<div><div></div>MAGNETIC DISTURBANCE</div>	FERROUS MATERIAL
<div><div></div>LINEAR TREND</div>	RIDGE AND FURROW
<div><div></div>LINEAR TREND</div>	FOOTPATH
<div><div></div>LINEAR TREND</div>	GEOLOGY



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Fig. 16. Interpretation of magnetometer data of Areas 5, 7, 9, 12 and 13 (1:1250 @ A3)



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Fig. 17. Processed greyscale magnetometer data of Areas 5, 8 and 9 (1:1250 @ A3)

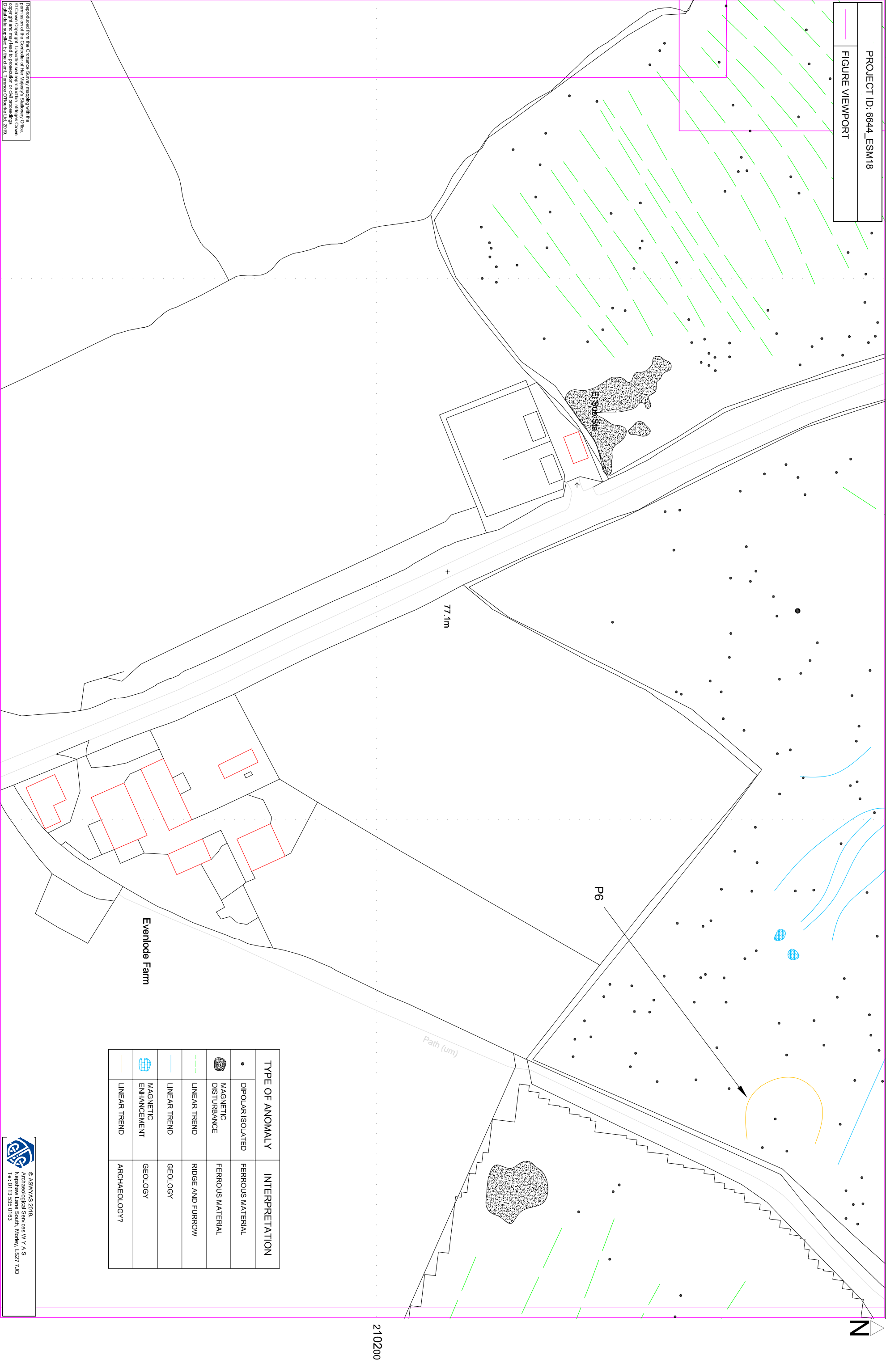
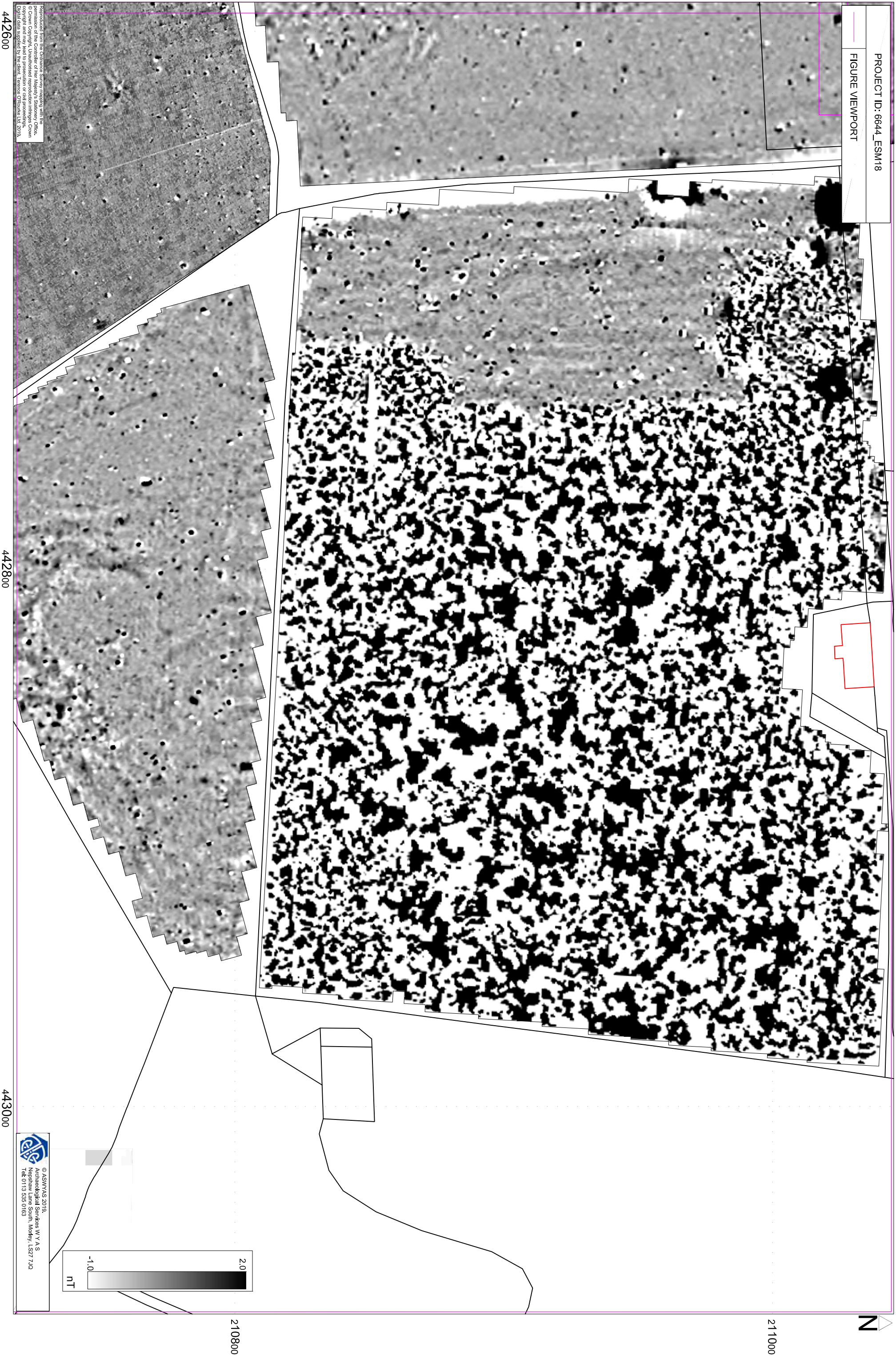


Fig. 18. Interpretation of magnetometer data of Areas 5, 8 and 9 (1:1250 @ A3)

PROJECT ID: 6644_ESM18

FIGURE VIEWPORT



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442600

442800

443000

210800

211000

2.0
-1.0
nT

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Fig. 19. Processed greyscale magnetometer data of Areas 3, 6, 11 and 12 (1:1250 @ A3)

0 50m

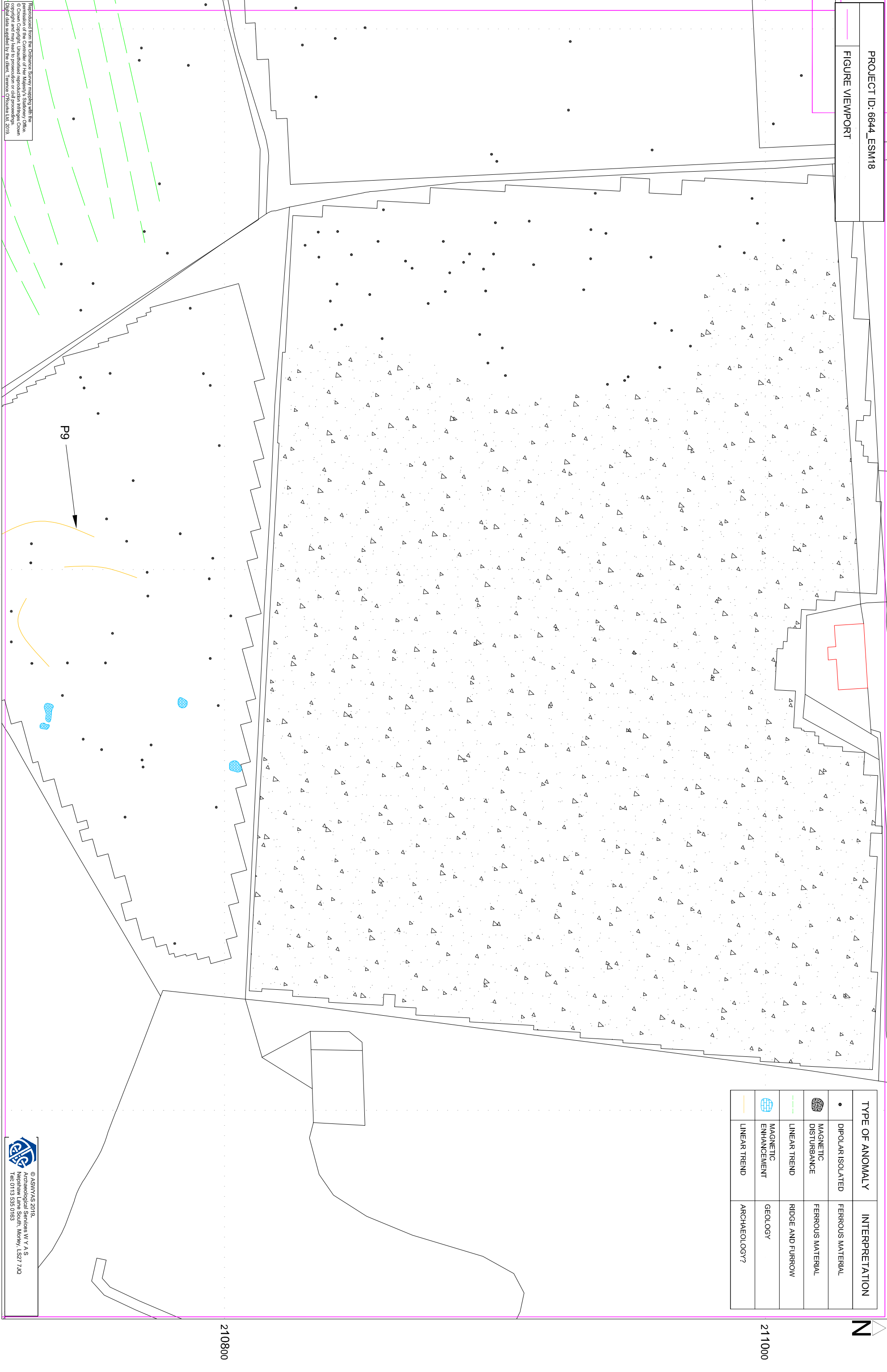


Fig. 20. Interpretation of magnetometer data of Areas 3, 6, 11 and 12 (1:1250 @ A3)

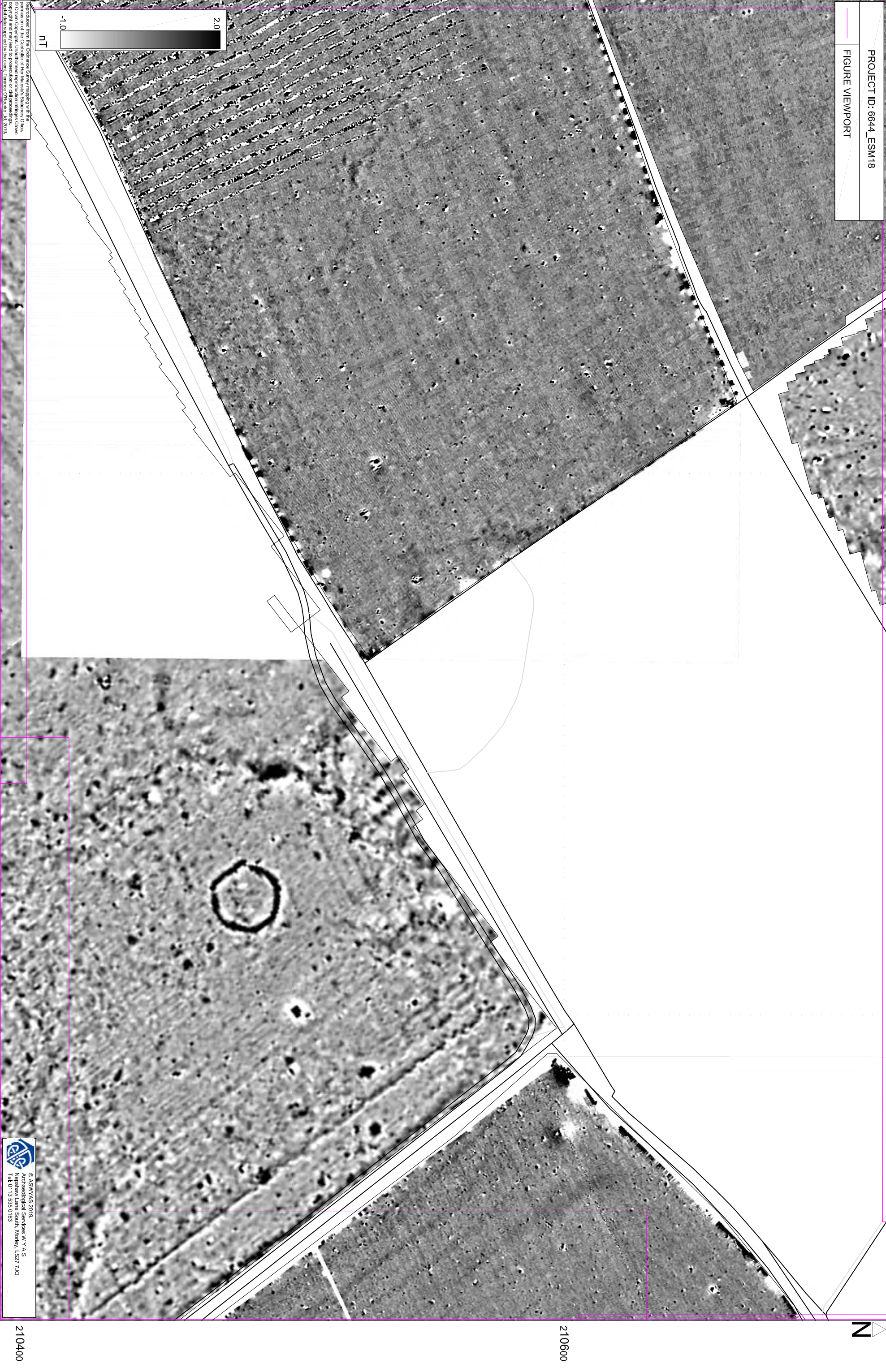


Fig. 21. Processed greyscale magnetometer data of Areas 4, 10, 11, 12 and 13 (1:1250 @ A3)

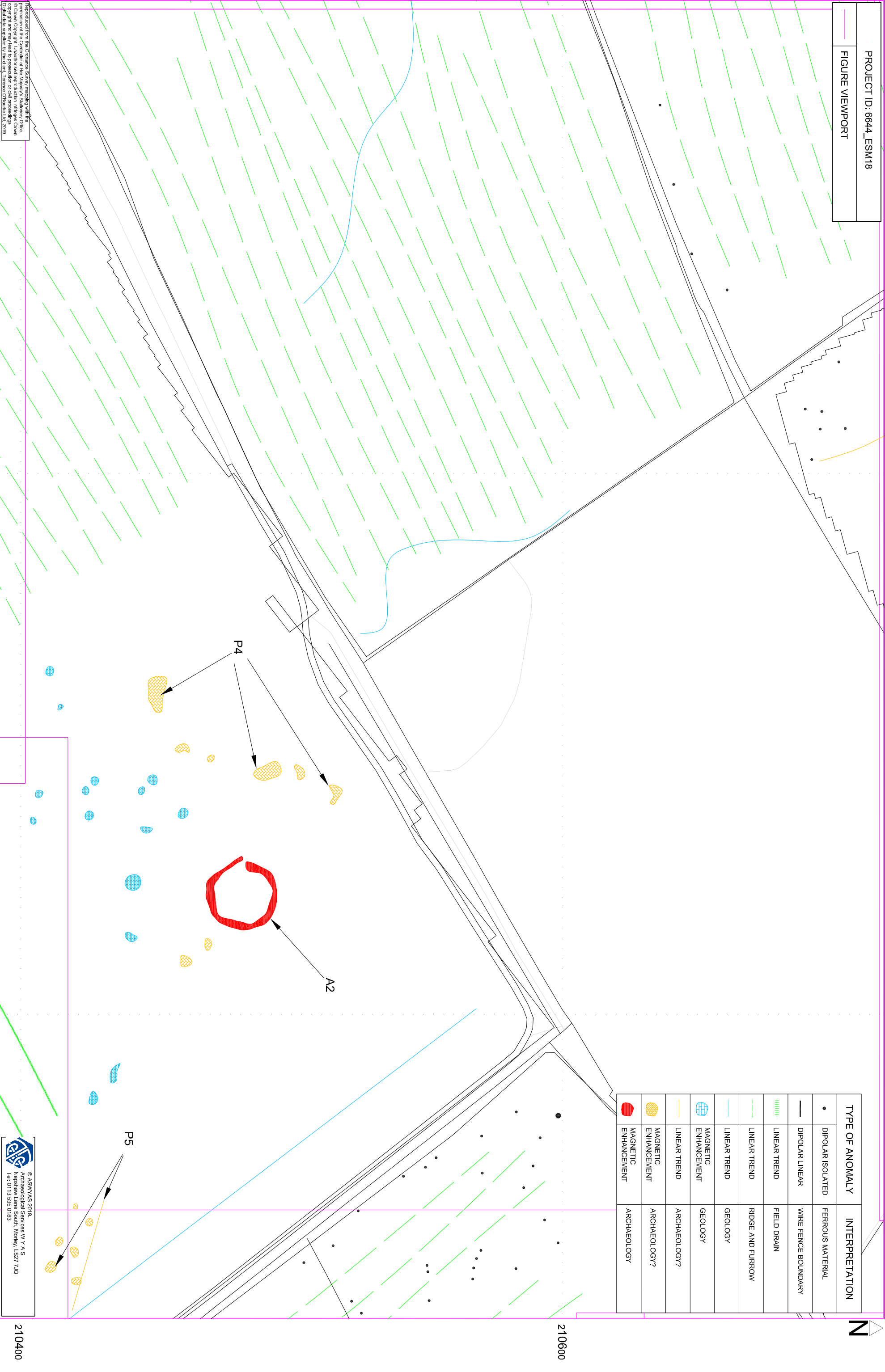


Fig. 22. Interpretation of magnetometer data of Areas 4, 10, 11, 12 and 13 (1:1250 @ A3)

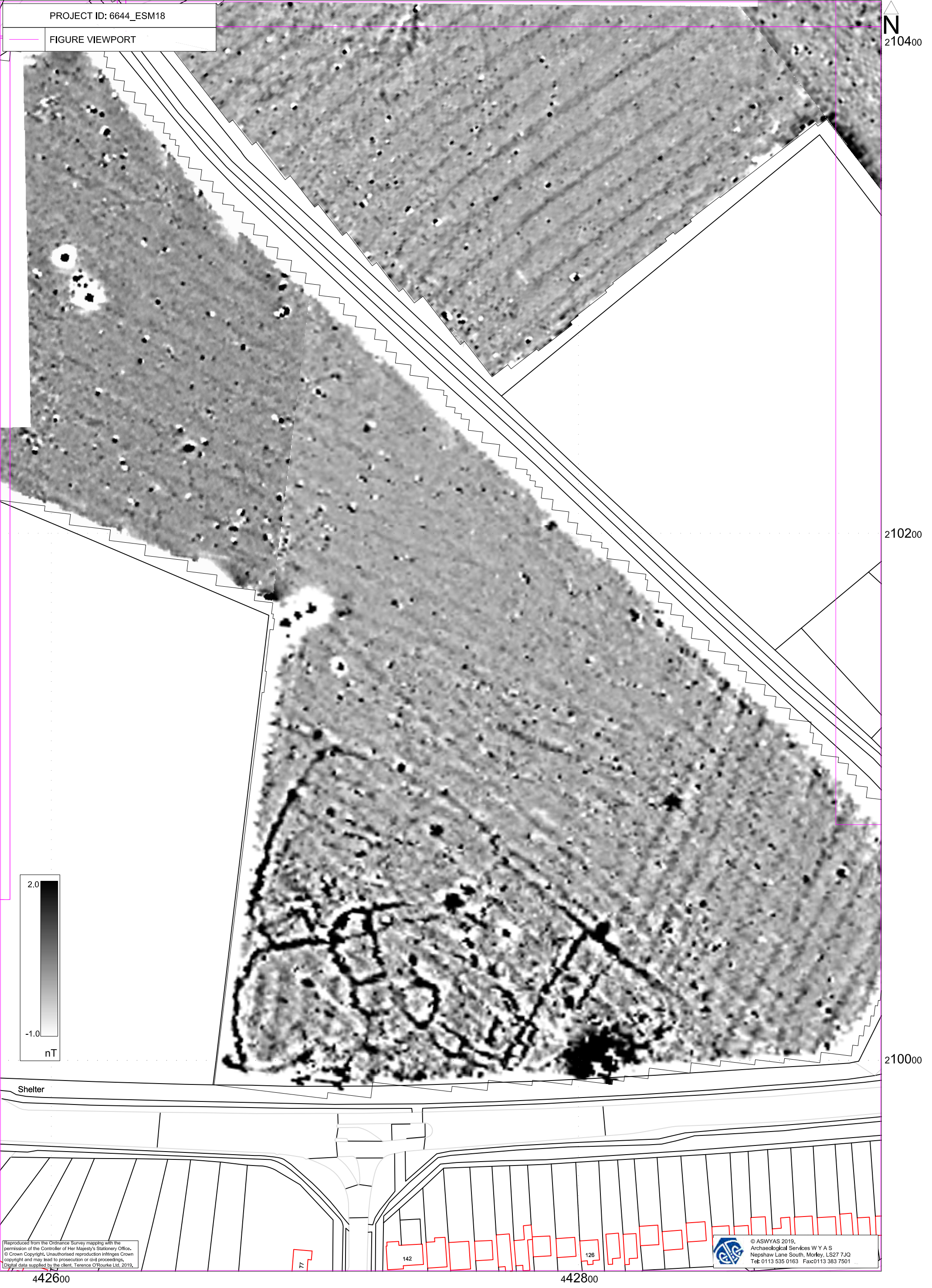


Fig. 23. Processed greyscale magnetometer data of Areas 4 and 8 (1:1250 @ A3)

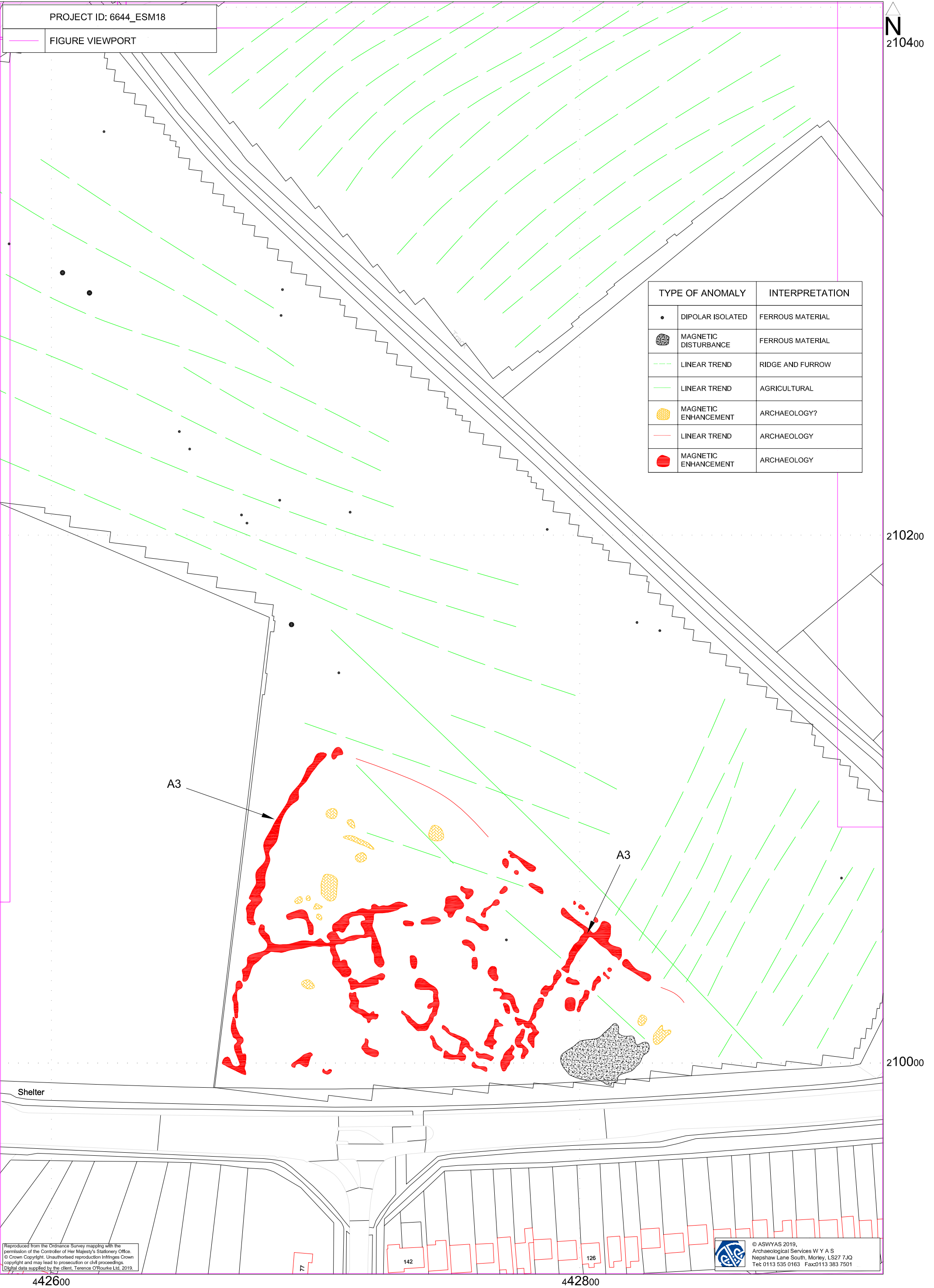


Fig. 24. Interpretation of magnetometer data of Areas 4 and 8 (1:1250 @ A3)





Fig. 25. Processed greyscale magnetometer data of Areas 10, 14 and 15 (1:1250 @ A3)

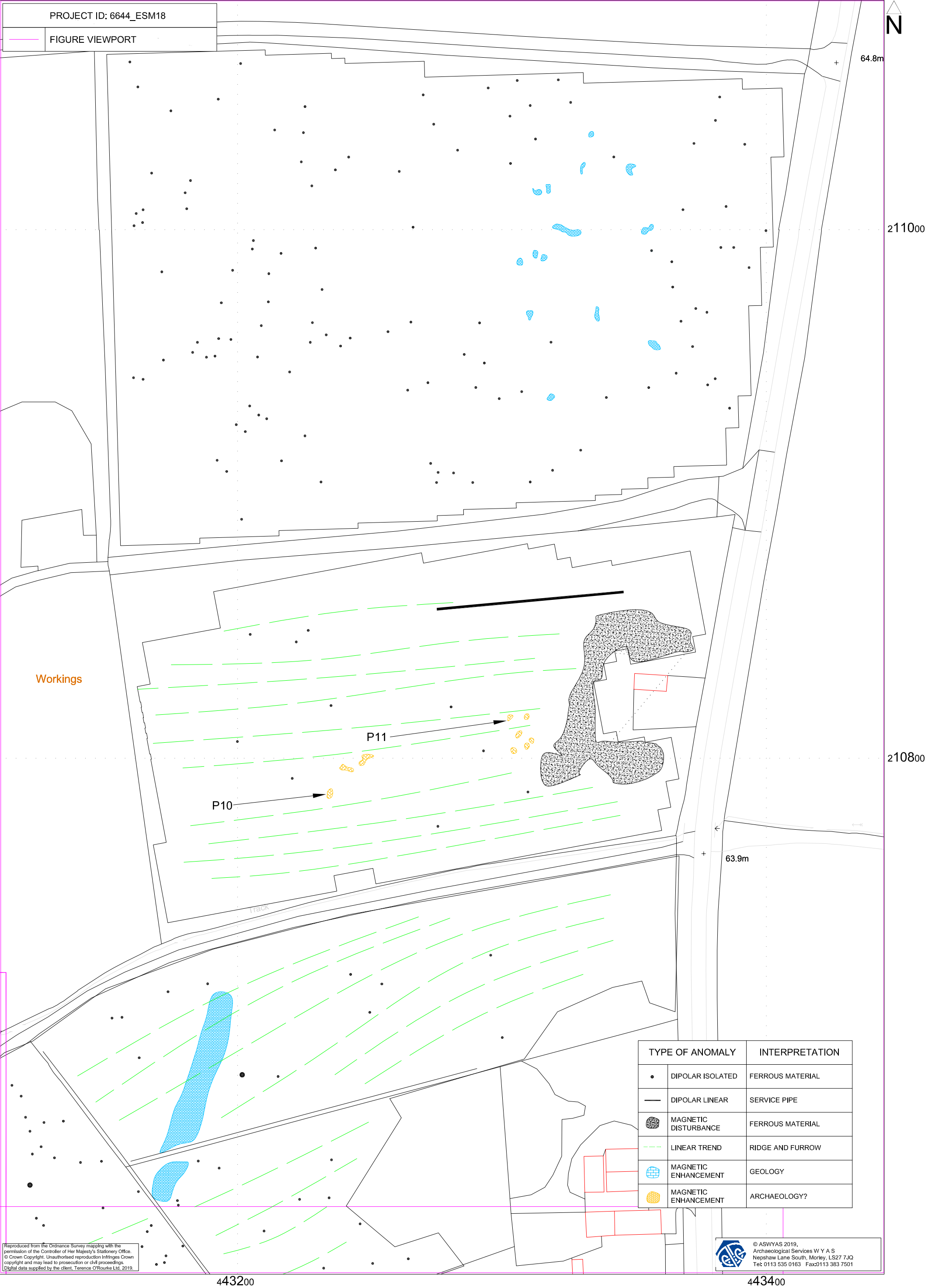


Fig. 26. Interpretation of magnetometer data of Areas 10, 14 and 15 (1:1250 @ A3)

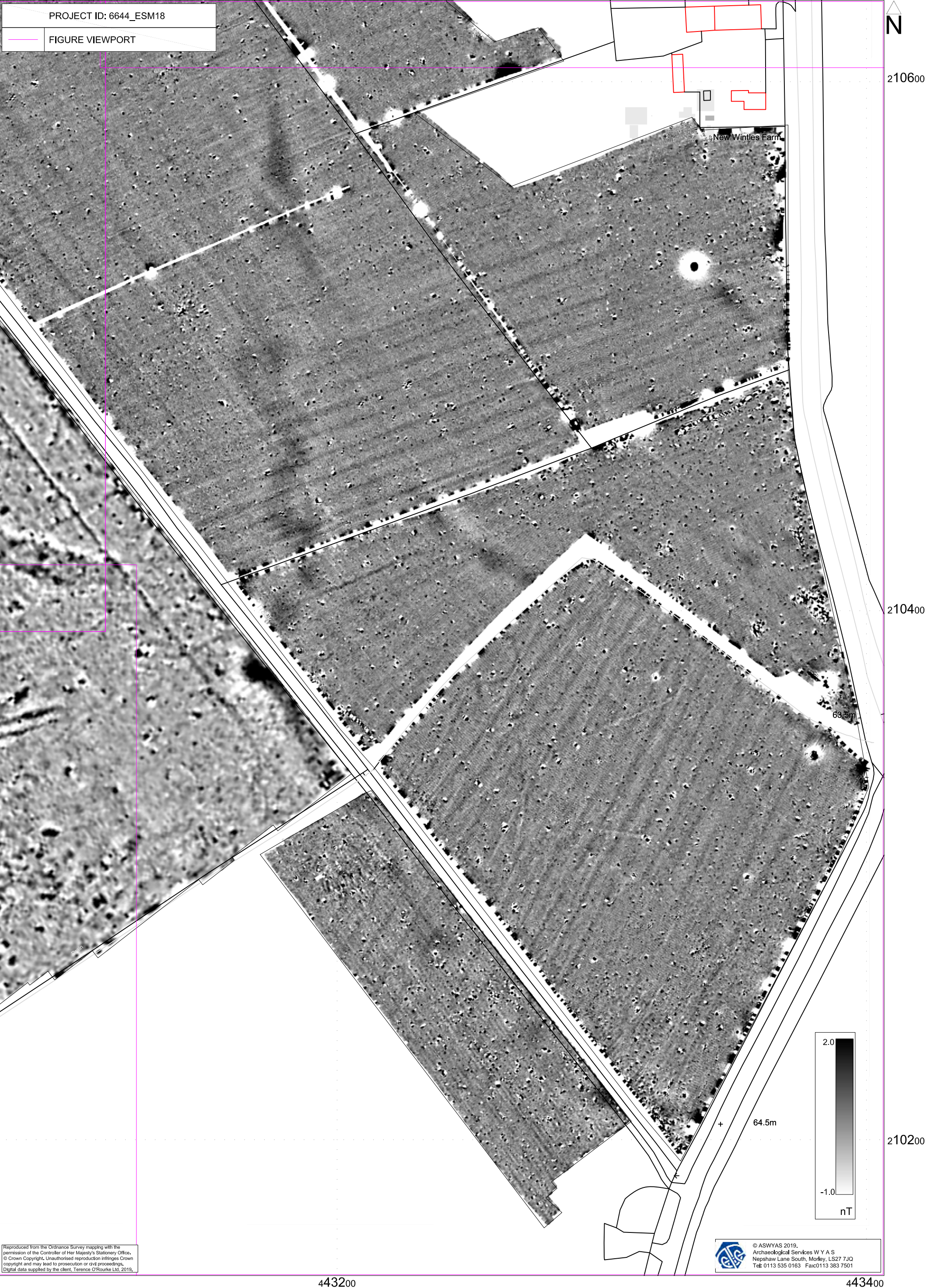


Fig. 27. Processed greyscale magnetometer data of Areas 4, 10 and 19 (1:1250 @ A3)

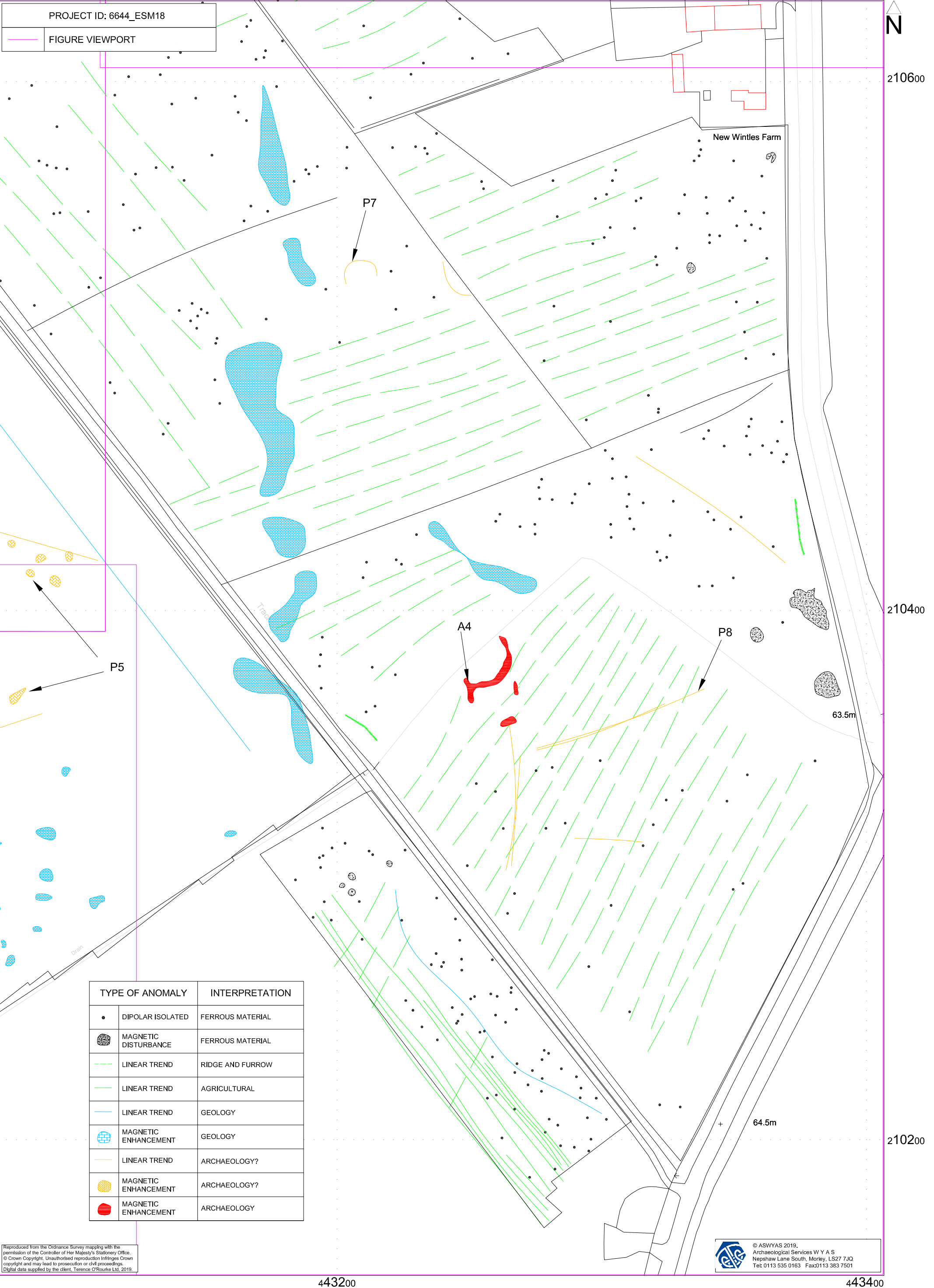


Fig. 28. Interpretation of magnetometer data of Areas 4, 10 and 19 (1:1250 @ A3)

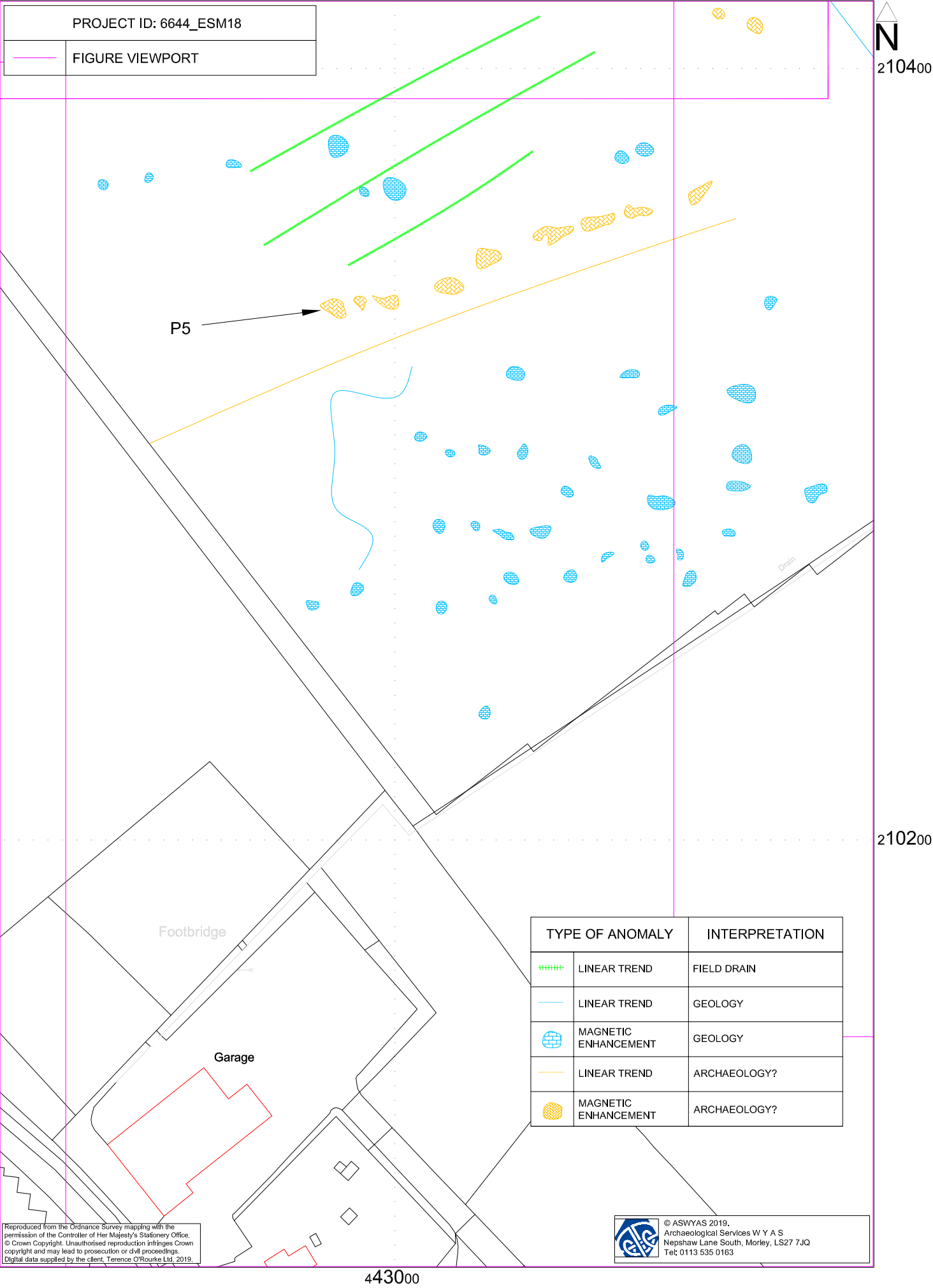


Fig. 30. Interpretation of magnetometer data of Area 4 (1:1250 @ A4)

0

50m



Plate 1. General view of area 1, facing east



Plate 2. General view of area 2, facing west



Plate 3. General view of area 5, facing west



Plate 4. General view of area 4, facing east



Plate 5. General view of area 13, facing west



Plate 6. General view of area 11, facing west



Plate 7. General view of area 19, facing south



Plate 8. General view of area 10, facing north

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

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

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough.

Types of Magnetic Anomaly

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

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

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

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

Isolated dipolar anomalies (iron spikes)

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

Areas of magnetic disturbance

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

Linear trend

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

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

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

Methodology: Gradiometer Survey

The main method of using the fluxgate gradiometer for commercial evaluations is referred to as **detailed survey** and requires the surveyor to walk at an even pace carrying the instrument within a grid system. A sample trigger automatically takes readings at predetermined points, typically at 0.25m intervals, on traverses 1m apart. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation.

During this survey a Bartington Grad601 magnetic gradiometer was used taking readings on the 0.1nT range, at 0.25m intervals on zig-zag traverses 0.5m apart within 30m by 30m square grids. The instrument was checked for electronic and mechanical drift at a common point and calibrated as necessary. The drift from zero was not logged.

The gradiometer data have been presented in this report in processed greyscale format. The data in the greyscale images have been interpolated and selectively filtered to remove the effects of drift in instrument calibration and other artificial data constructs and to maximise the clarity and interpretability of the archaeological anomalies.

Methodology: Gradiometer Survey

The survey was undertaken using a Sensys Magneto MXPDA cart-based instrument. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20Hz. The gradiometers have a range of recording between 0.1nT and 10,000nT. They are linked to a Trimble R6 RTK dGPS system with data recorded by Sensys Magneto MXPDA software on a rugged PDA device. The data were stored on an SD memory card within the PDA and later downloaded to a computer for processing and interpretation.

Data Processing and Presentation

The detailed gradiometer data has been presented in this report in minimally processed greyscale format. MAGNETO (Sensys GmbH) software was used to process and present the data. The data in the greyscale images has been selectively filtered to remove extraneous data collected at source, with traverses containing less than four readings removed to maximise the clarity and interpretability of the archaeological anomalies.

The results and subsequent interpretation of data from geophysical surveys should not be treated as an absolute representation of the underlying archaeological and non-archaeological remains. Confirmation of the presence or absence of archaeological remains can only be achieved by direct investigation of sub-surface deposits.

Appendix 2: Survey location information

An initial survey station was established using a Trimble VRS differential Global Positioning System (Trimble R6 model). The data was geo-referenced using the geo-referenced survey station with a Trimble RTK differential Global Positioning System (Trimble R6 model). The accuracy of this equipment is better than 0.01m. The survey grids were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if co-ordinates are measured off hard copies of the mapping rather than using the digital co-ordinates.

Archaeological Services WYAS cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

Appendix 3: Geophysical archive

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2000), and graphics files (Adobe Illustrator CS6 and AutoCAD 2008) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the Oxfordshire Historic Environment Record).

Appendix 4: Oasis form

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