
Imagined Land: Tasburgh Hillfort geophysical survey

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1 Summary

In February of 2017, geophysical survey (magnetometry) within the northern portion of the enclosed area at Tasburgh Hillfort revealed a complex pattern of magnetic anomalies relating to former settlement and land-use at the site. The surveyed section of the western defences revealed the course of the defensive ditch and that of the clay rampart and/or associated gravel pavement recorded during excavations in 1948, along with a possible entranceway. The location of the 1948 excavation trench was identified some 55 m south of its reported location.

Within the central section of the enclosed area tentative evidence for an early network of ditches was revealed along with the presence of a significant kiln and associated debris, most likely dating to the Late Saxon period. To the south the partially surviving remains of a rectangular enclosure were recorded, orientated towards the hypothesised SW entrance to the hillfort and tentatively ascribed an Iron Age/Romano British date on morphological grounds. A substantial network of ditches were recorded within the southern portion of the surveyed area, enclosing an area of c. 0.6 ha to the north of Church Hill. Within the enclosed space significant settlement remains were recorded, including numerous pits, internal sub-divisions, two small hearths, a possible post-build structure and possible Sunken Feature Building (SFB). Collectively these are likely to represent the northward extension of the Mid to Late Saxon settlement coalescing around the parish church, recorded during excavations south of Church Hill lane.

2 Introduction

The enclosure at Tasburgh (TM 20 96) formally known as the Tasburgh Hillfort (NHER 2258) occupies the western portion of an elevated spur of land bound principally by the River Tas to the west and north and to the south west by its confluence with a smaller river flowing westwards from Hempnall. Some 900 metres to the east lies the line of the former Roman road linking *Camulodunum* (Colchester) to *Venta Icenorum*. The extant enclosure consists of the denuded remains of a single bank and ditch surviving to a height of c. 3 m places and enclosing an area of around 8 hectares, which forms a level summit to the north of the village. The date of construction remains obscure although significant numbers of pottery sherds and other finds spanning the Iron Age, Saxon and medieval periods suggest a potentially long settlement history. In 1983 a magnetometer geophysical survey was undertaken within the perimeter of the earthwork, revealing potential archaeological activity within the southern portion of the surveyed area (north of the church), although large parts of the interior were found to be magnetically blank.[1]

The geophysical field survey described within this report was undertaken in February 2017 upon land under the ownership of the Norfolk Archaeological Trust, covering an area of c. 7 ha to the north of the parish church - see Fig. 1. The aim of the survey was to shed further light on the nature of surviving settlement remains within the enclosed area of the hillfort as part of the ‘Imagined Land’ project being undertaken by the Trust and funded by the Heritage Lottery Fund (HLF). Details of the geophysical survey have been logged with the OASIS project - see Appendix C.



Figure 1: Aerial Photograph of the study area, showing the location of the geophysical survey.

3 Geophysical methods

Archaeological geophysics provides a means of mapping surviving sub-surface remains, relying on contrasting geophysical properties between buried remains and their surrounding burial environment. In the current study, the magnetic properties of the sub-surface have been investigated by taking a number of uniform measurements of magnetic field strengths over a regular network of grids. Measured values are then plotted out as greyscale maps depicting the sub-surface along with any ‘anomalous’ responses that might relate to surviving archaeological features. An important point to bear in mind is that geophysical data represent a palimpsest of past activity, spanning the most recent of events to those of the distant past. This accumulated layering of geophysical responses is perhaps the greatest challenge to accurate data interpretation. The magnetic techniques employed are sensitive to sub-surface features down to a depth of c. 1.2 metres.

Geophysical techniques were deployed in adherence to guidelines for best practice issued by English Heritage[2] and the Chartered Institute for Archaeologists

(CIfA) Standards and Guidance for archaeological geophysical survey (2013) [3]. Technical details of the field methods employed are provided in Appendix A, while unprocessed survey data is presented in Appendix B.

3.1 Magnetic measurements

Magnetometer survey, sensitive to minute distortions in the earth's magnetic field in the presence of buried objects, provides a rapid means of mapping sub-surface features. The interaction of the earth's magnetic field with that of buried features produces a characteristic 'dipolar' response of both positive and negative values, represented in greyscale maps as associated black and white features.

The technique is sensitive to masonry building foundations or footings constructed either from 'magnetic' materials such as fired clay brick, producing strong positive magnetic responses or non-magnetic materials such as limestone blocks which produce negatively trending magnetic responses (as they are less magnetic than the surrounding soil). Magnetometer surveys are also sensitive to archaeological features such as pits and ditches, which tend to infill with more magnetic topsoil, providing a magnetic contrast with surrounding soil. Areas of burning, burnt materials and structures relating to heating processes such as kilns and hearths all produce a strong magnetic response as heating dramatically enhances their innate magnetic properties.

3.2 Geological considerations

The area investigated is divided into two distinct units of superficial geology. The eastern portion of the surveyed area consists of a chalky flint till forming the Anglian Stage Lowestoft Formation, giving rise to heavier clayey soils [5]. The western portion of comprises Pleistocene sand and gravel glaciofluvial outwash deposits [4]. Consequently the overlying soils become progressively lighter and more sandy in nature towards the west. The change in underlying geology can be seen clearly reflected in the results of the geophysical survey, in which the western portion of the surveyed area is dominated by a polygonal patterning derived from periglacial features (see Section 4 below).

The survey area is currently under pasture providing good conditions for geophysical survey. A regular pattern of denuded ruts orientated E-W are discernible across the study area and a relic of previous ploughing activity; the effects of which are clearly visible within the survey results (see Section 4 below). It is anticipated that long-term ploughing will have led to the truncation of surviving features and

significant erosion of the western defences has been previously noted.

4 Results

The results of the magnetic survey is shown in Fig. 2. It can be seen that the survey was successful in detecting numerous anomalous magnetic responses, providing a complex map of sub-surface features derived from both cultural activity and environmental conditions during the late Pleistocene. The latter can be seen as a series of interconnected, roughly polygonal positive magnetic responses derived from periglacial features within the underlying sands and gravels.

The western portion of the defensive bank and ditch - the only fully accessible section of the defensive circuit - shows up clearly in the magnetic survey, revealing the position of the defensive ditch, discussed further in Section 5 below. Evidence of cultural activity revealed by the survey is largely confined to the south-eastern portion of the survey area.

To aid the interpretation of anomalous features that relate to surviving archaeological remains, it is useful to first identify and exclude any elements that are derived from more recent activity. Magnetic responses of non-archaeological origin are highlighted in Fig. 3. Around the perimeter of the surveyed area, a number of strong responses can be seen (shown in red in Fig. 3), derived from metal wire fencing, associated fixings and gateways. Various small, high amplitude responses can be seen scattered throughout the surveyed area (shown in light brown in Fig. 3) derived from small iron objects within the topsoil, such as nails, ploughshares and horseshoes. In the south-west corner of the site, a line of five equally spaced high amplitude dipolar responses can be seen, thought to relate to the remains of metal fence posts. Along the northern edge of the surveyed area, a weak and somewhat intermittent linear anomaly was detected (shown in dark brown in Fig. 3), thought to relate to a trackway along the edge of the field. Although potentially of some antiquity, faint traces can be seen on the present land surface, suggesting a more recent origin.

In addition to the magnetic responses described above, the magnetic map is dominated by weaker closely spaced, parallel responses orientated east-west, revealing the direction of former plough furrows, discussed in Section 3.2 above.



Figure 2: Magnetic survey results from within Tasburgh Hillfort.

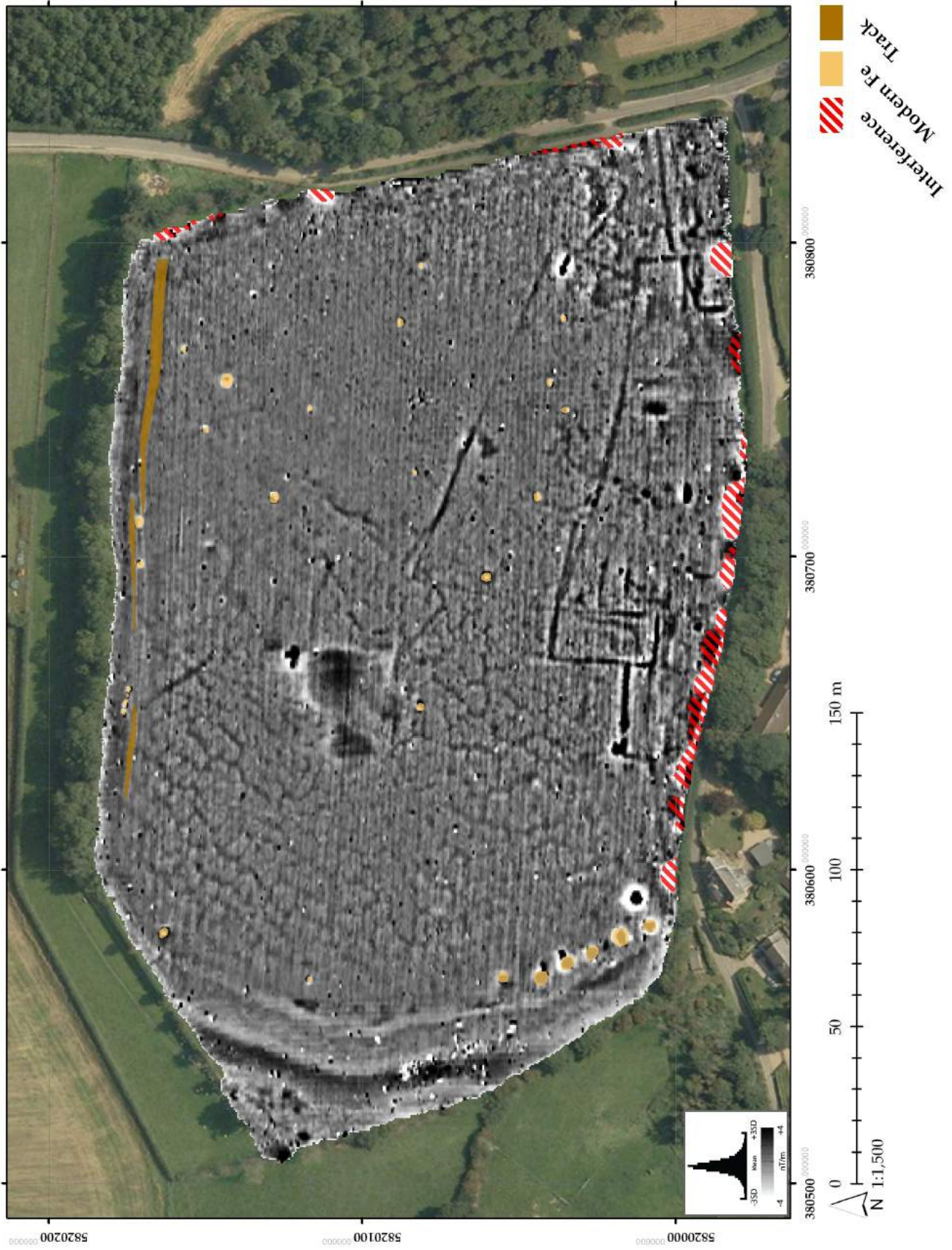


Figure 3: Magnetic anomalies that relate to modern activity.

5 Interpretation

The following section provides an interpretation of the main culturally derived magnetic responses revealed by the survey. An attempt is made in the following section to classify archaeologically recognisable features in terms of their morphology and to contextualise these in relation to the construction of the fortified enclosure at Tasburgh and possible periods of prehistoric and historic activity. Use is also made of the high resolution topographical data from recent LiDAR survey undertaken by the Environment Agency. The nature of geophysical survey data makes such interpretation a somewhat speculative exercise (see Section 3 above) and resulting hypotheses should be used in a heuristic way, providing ideas to be tested through further historical and archaeological research.

5.1 The bank and ditch fortification

The extant remains of the earthwork enclosure are the defining feature of Tasburgh Hillfort and the current survey included a large segment of the western section. Here a well defined magnetic response indicates the position of the now infilled ditch, as shown in Fig. 4. An approximate estimation of the width and depth of the ditch from the geophysical data suggests an average width of around 10 metres and a depth of between 2 to 3 metres. This corresponds reasonably well with data derived from an excavated section through the western side of the enclosure (G. W. T. Barnett) in 1948 [6]. Some doubt exists as to the exact location of Barnett's 1948 trench, originally depicted on a 6 inch OS map (reproduced in by Rogerson and Lawson in [6]) and the results of the current survey also cast doubt on this location, with little evidence of disturbance. In contrast, c. 55 metres to the south an area of magnetic disturbance more in keeping with excavation activity can be seen and it is suggested that this is the more likely location of the 1948 trench, as shown in Fig. 5. It can be seen from the contour plot, showing contours at 0.5 m intervals, that this location better fits the profile of the section reproduced by Rogerson and Lawson, although no vertical scale is actually given.

The geophysical survey results also show a faint linear negative response flanking the top of the western bank - see Figs. 4 and 6. This may well relate to the raised clay rampart described by Barnett during the 1948 excavation; the compacted clay structure being likely to produce a faint negative magnetic response contrasting the more magnetic deposits build up around it. Fig. 6 shows the micro-topography of this area, with contours shown at 10 cm intervals and it can be seen that the proposed rampart appears to closely follow the curvature of the

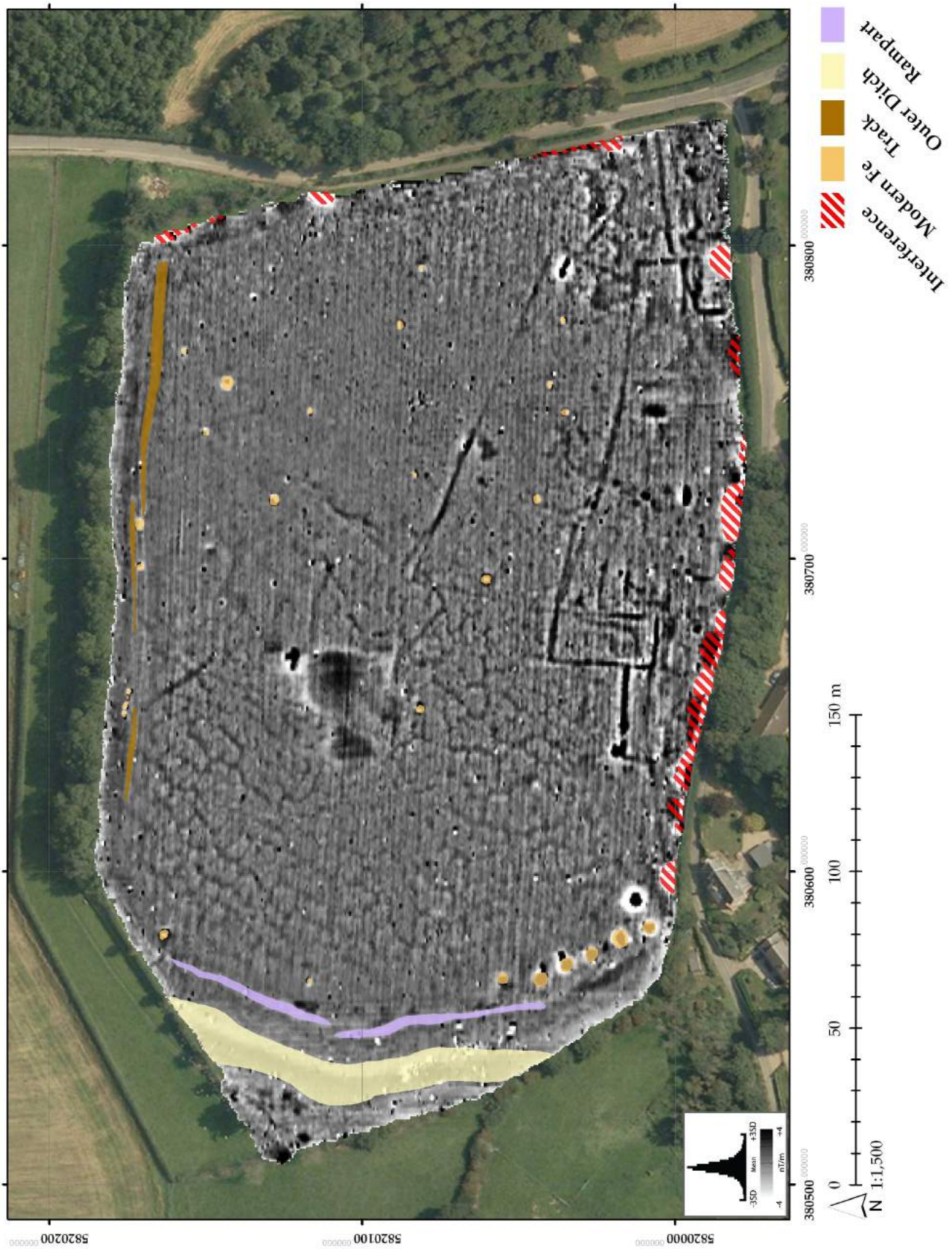


Figure 4: Remains of the encircling defensive ditch and possible rampart.

ditch. The 1948 excavation also revealed a ‘paved pathway’ running along the inner edge of the clay rampart and such a feature would also correlate to the observed magnetic response. There is also an apparent gap in the rampart, labelled ‘1’ in Fig. 6, formed by a ‘dog leg’ in the southern section which could conceivably represent some form of entranceway. A number of discrete sub-circular, weakly positive features interpreted as pits can be seen immediately behind this apparent opening - see Fig. 6.

5.2 Surviving remains from the central area

The central section of the surveyed area which slopes gently to the east revealed faint trances of a number of ditch type features, shown in Fig. 7. Although broadly aligned along NE - SW and SE - NW orientations, these features do not seem to form a coherent pattern of division and are likely to be much truncated through ploughing. It is tempting to assign a relatively early date to such features, although little can really be said about their contemporaneity to each other or their absolute age.

The central area under consideration is dominated by a large, somewhat diffuse area of elevated magnetic values, indicative of nearby industrial activity. Immediately to the north a large high amplitude anomaly was detected, characteristic of the remains of a kiln type structure and it is likely that the large plume of elevated magnetic responses reflects prolonged activity relating to this feature. Noteworthy is the fact that the weak responses produced by the nearby ditch features described above shows that these were not infilled with material derived from this activity which must, therefore, post-date their backfilling (compare this with the infilled troughs derived from later ploughing, seen as enhanced linear E-W responses through this area in Fig. 7). Most likely this activity is connected to the settlement detected in the south of the surveyed area nucleated around the church - described below in Section 5.4. A sub-rectangular pit just north of the proposed kiln measures c. 5.4 m by 4.7 m and has a response not incompatible with that derived from a Sunken Featured Building (SFB) type feature (see below).

5.3 Large ditched enclosure

To the south, the magnetic map is dominated by a number of well defined linear responses conforming to the survival of further infilled ditch type features. Fig. 9 highlights what appears to be a large rectangular enclosure orientated NWW - SEE and defined in the most part by irregular and discontinuous weakly positive

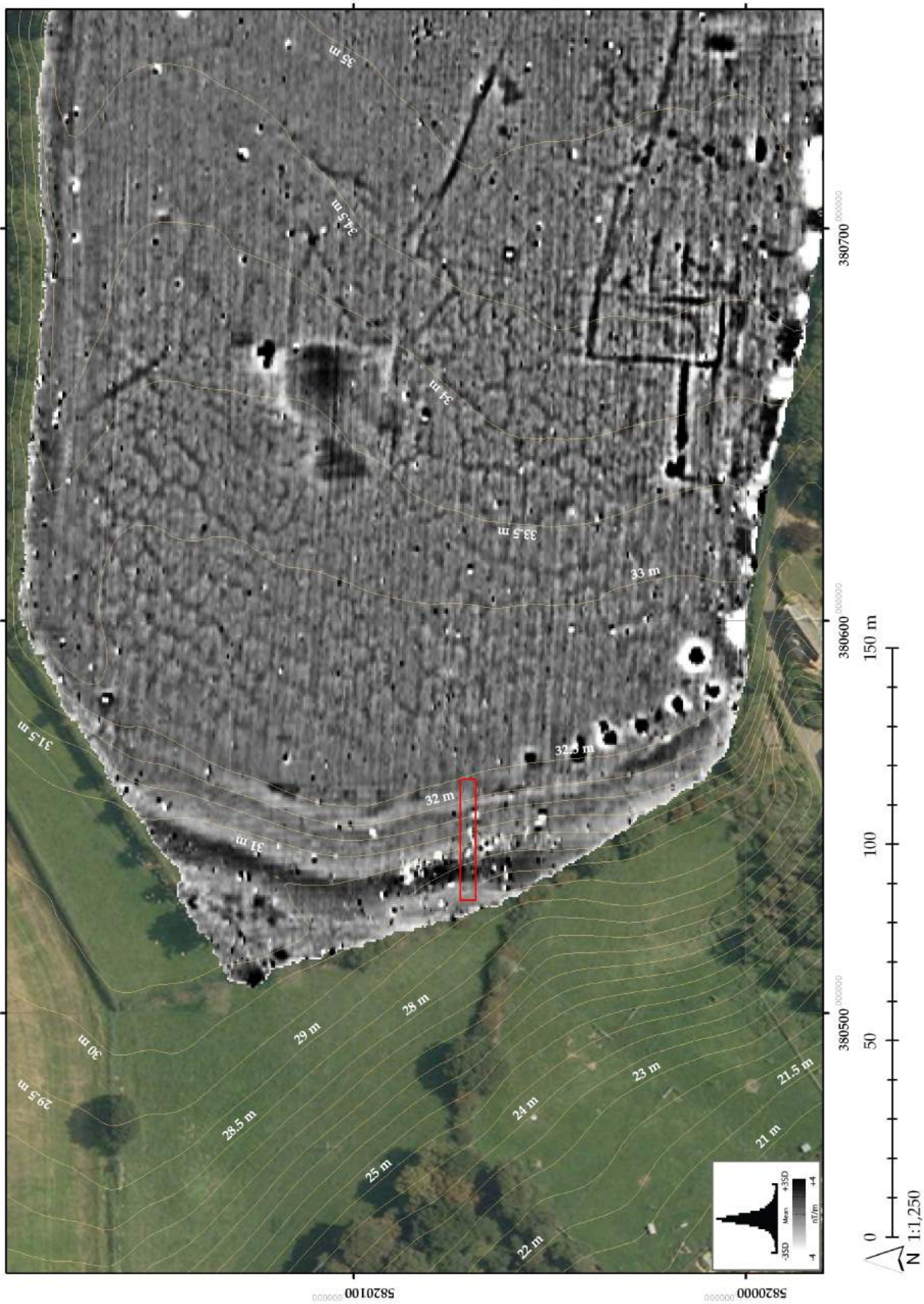
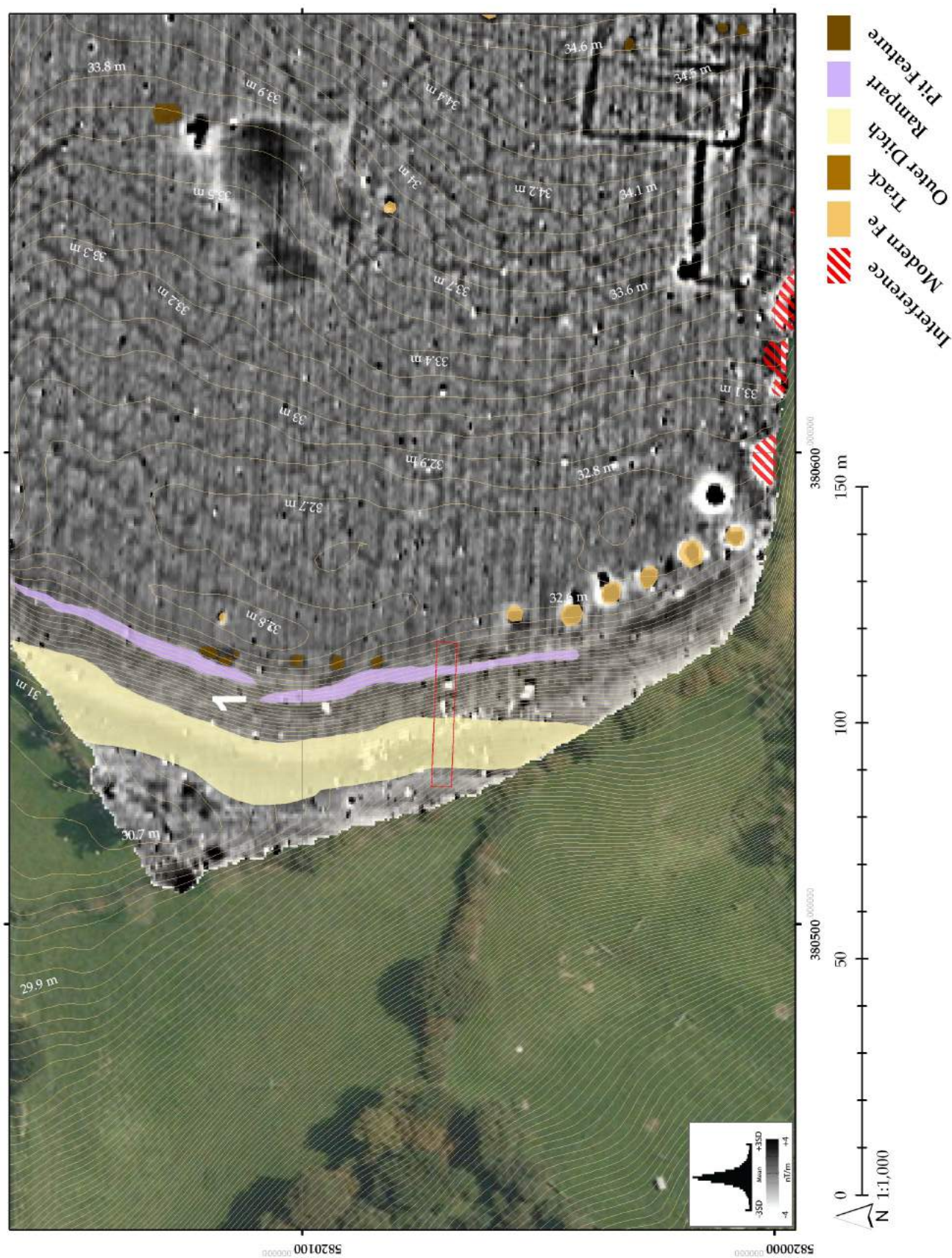


Figure 5: Likely location of the 1948 Barnett trench sectioning the western bank and ditch.



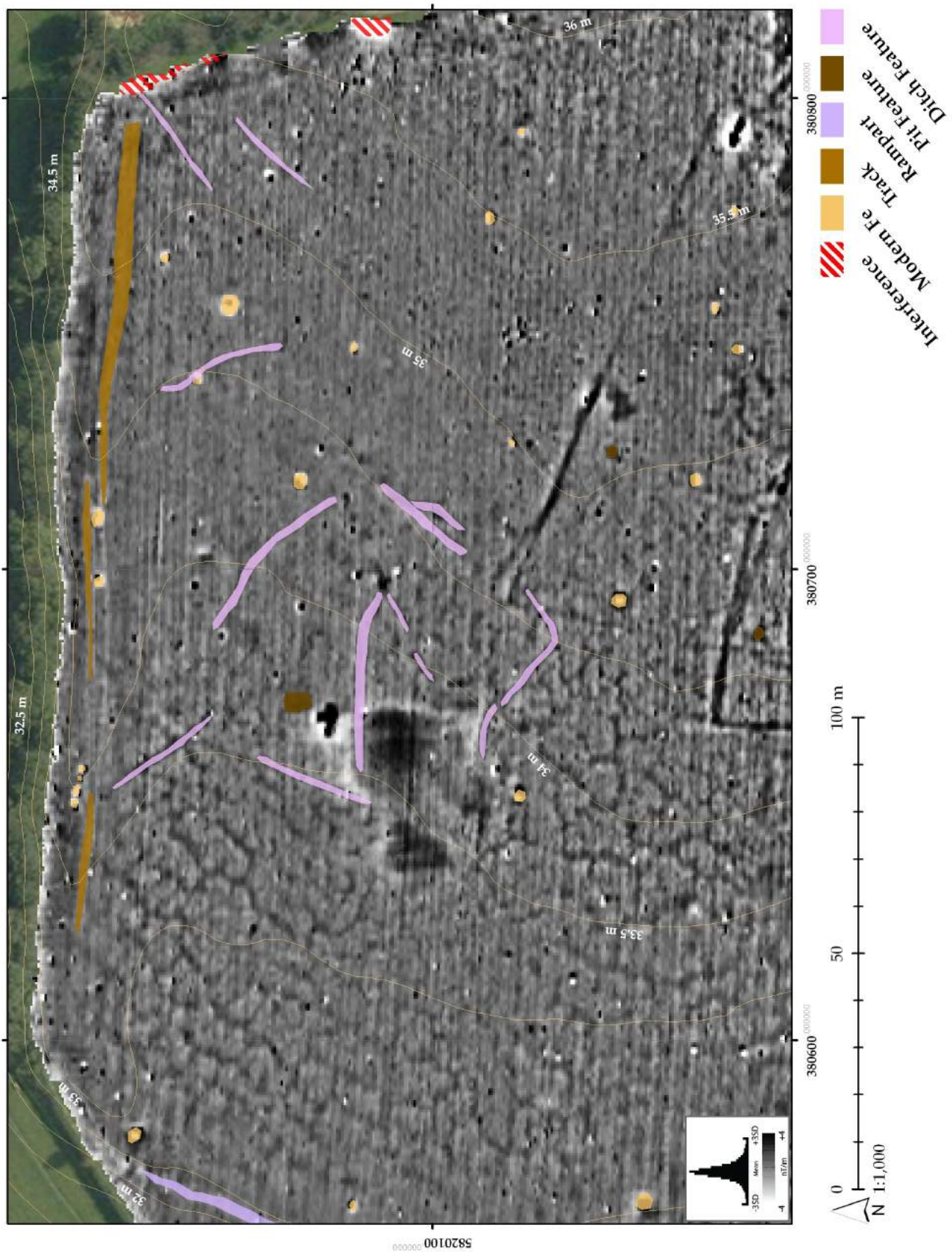


Figure 7: Evidence for ditch features in the north-central area of the Hillfort.

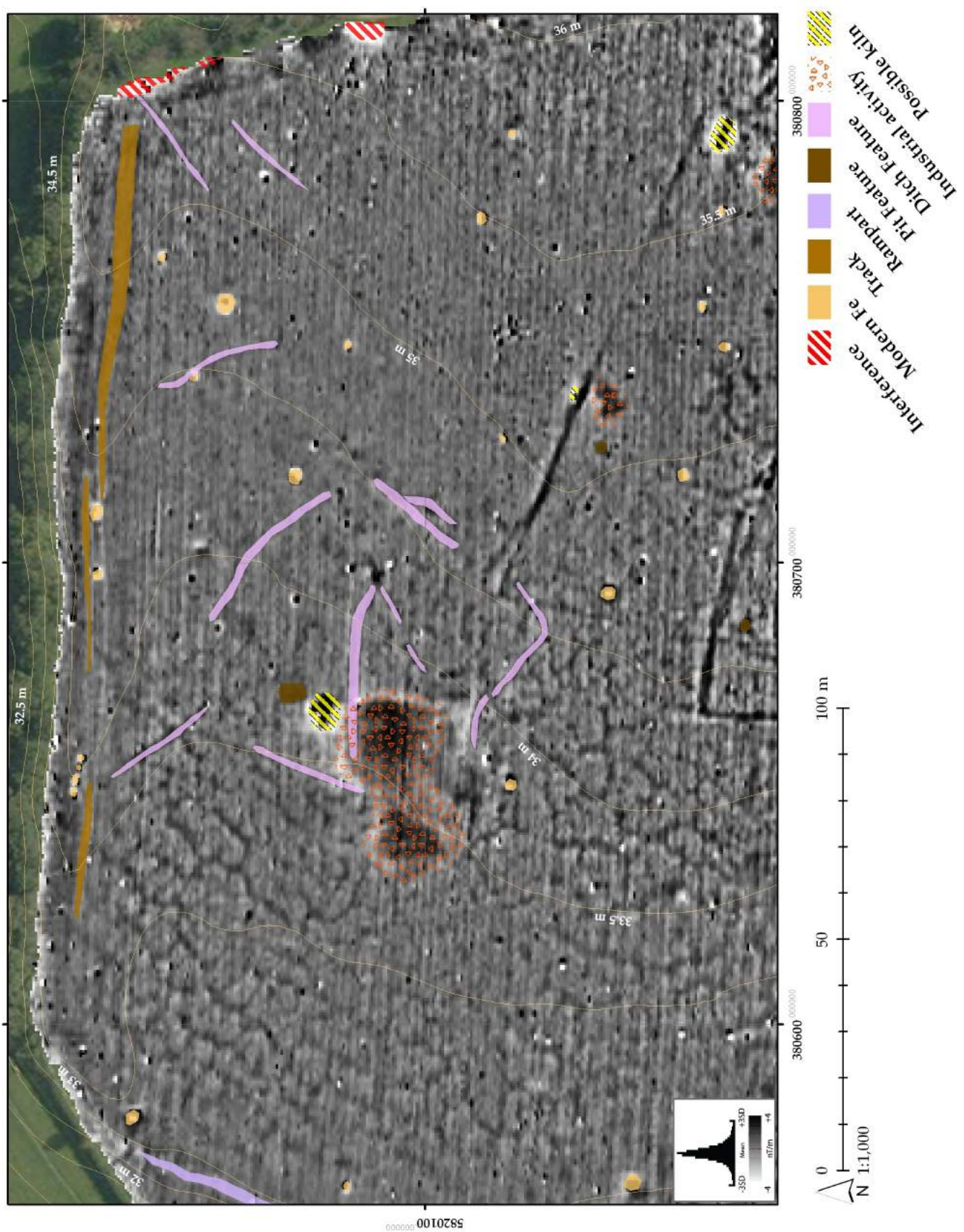


Figure 8: Industrial activity detected within the central portion of the surveyed area.

magnetic responses. The exception here is the portion labelled '1' in Fig. 9, which is defined by a much stronger response. This might be due to the close proximity of a small hearth or kiln type feature with associated magnetic materials infilling this section of ditch. No such enhancement is observed at location '2' in Fig. 9, which also shows a section of the enclosing ditch running close to a suspected kiln structure, suggesting this kiln belongs to a later period. The enclosure itself measures c. 110 m by 46 m and is fairly typical of those relating to Iron Age settlement activity in Norfolk (S. Tremlett, per. comm.) - see also Bryant (2000) [7]. The enclosure also seems to be align towards the proposed entrance to the hillfort, thought to align with the modern road approaching from the SE which follows the topographical ridge of the spur [6].

5.4 Settlement remains

The densest collection of magnetic anomalies occurs along the southern border of the surveyed area, to the north of the parish church and Church Hill land, characterised by the remains of several large ditches - see Fig. 10. The observed magnetic response from these features is large, in contrast to those discussed above, due to their infilling with magnetically enhanced materials derived from settlement activity nearby - the habitation effect described by Gaffney and Gater [8]. The most prominent ditch, labelled '1' in Fig 10, measures c. 2 m across with the vaguely E-W orientation following a curving course paralleling Church Hill lane. There is an apparent break along its length, possibly providing access to the north. At either end, the ditch turns southwards, forming a rectangular enclosed area (with Church Hill as the southern boundary) of c. 0.6 ha.

A further large, well defined ditch can be seen to the east, labelled '2' in Fig. 10 which appears to continue into the interior area defined by ditch '1' and therefore likely to be of a different phase of activity. Stretching either side of the eastern most portion of this ditch a substantial area of magnetic enhancement can be seen, characterised by several poorly defined, high amplitude magnetic anomalies. This sort of patterning can be indicative of the fragmentary remains of structures with more substantial footings, although in this case the close proximity to Grove Lane and modern building might point to a recent source of disturbance. A very well defined linear response, labelled '3' in Fig. 10 can be seen to the west of the main enclosure, apparently adjoining it and running a further c. 30 m to the west before turning to the south and likely to be broadly contemporary.

The interior of the enclosed area contains a number of smaller linear responses from infilled ditches and gulleys that might relate to sub-divisions or boundary

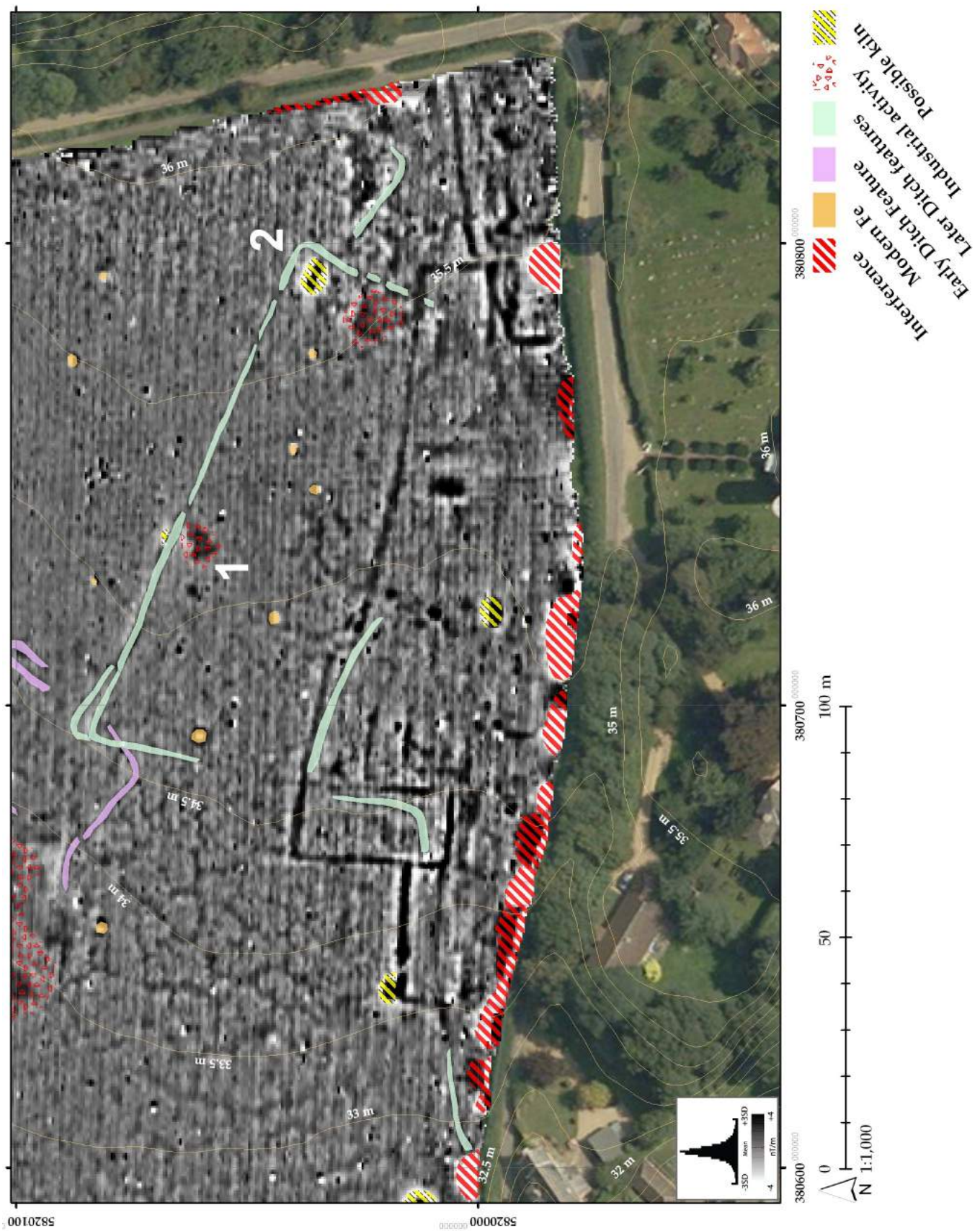


Figure 9: Large rectangular enclosure of possible IA origin, orientated towards the hypothesised south-eastern entrance to the Hillfort.

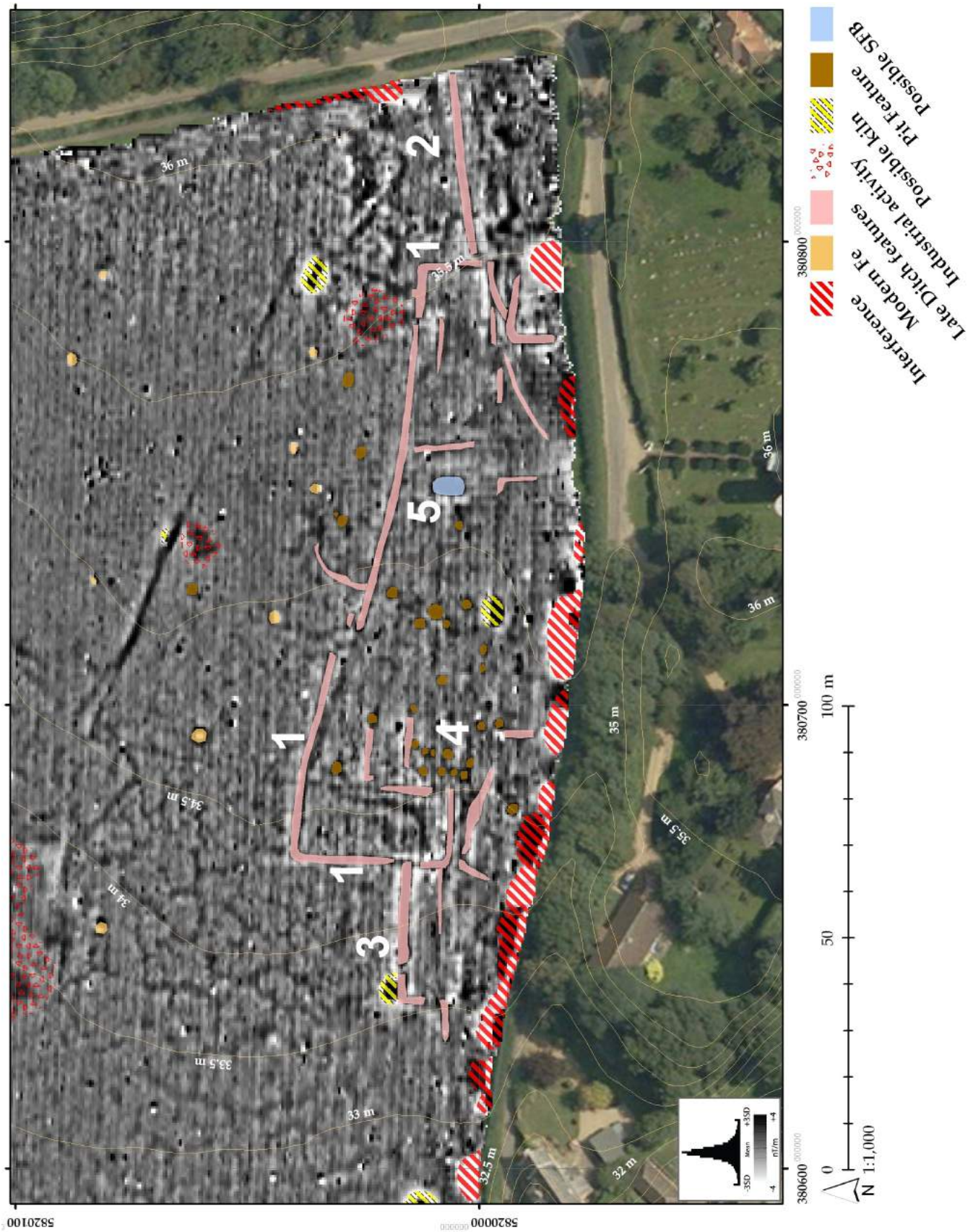


Figure 10: Area of settlement to the north of the church.

markers. The effects of later ploughing can be strongly seen within this area of more intense activity, which has led to several short E-W orientated responses resulting from underlying deposits being dragged by the plough. A large number of magnetic responses relating to discrete pit type features can also be seen, the largest of which measuring c. 2 m across. Perhaps one of the most interesting features detected consists of eight pit features forming two parallel lines, labelled ‘4’ in Fig. 10, which may relate to a former post-build structure, measuring c. 10 m in length and c. 4 m wide. This is of comparable size to the trench-based structure excavated in 1980 to the east of the current graveyard.

A further pit feature whose size and magnetic profile matches that to be expected from the infilled remains of a Sunken Featured Building (SFB) was also recorded, labelled ‘5’ in Fig. 10 - see Bescoby and Bowden [9]. The building measures c. 7 m by 4 m and is orientated N-S along its long axis. Two possible small hearths or even kilns were also identified within the enclosed area, although the main industrial activity seems to be taking place to the north, described above.

6 Conclusion

The geophysical survey undertaken at Tasburgh Hillfort proved effective in revealing a large number of surviving sub-surface elements relating to probable multiple periods of former settlement and land use. From the interpretation outlined above, the following conclusions might be drawn:

- The survey was successful in mapping the western portion of the bank and ditch, the latter measuring c. 10 m across, along with the clay rampart and/or associated paved pathway, identified in the 1948 excavations. An apparent break in the rampart might relate to an entranceway into the enclosure along this section of the defences. The survey also identified the likely location of the 1948 trench, some 55 m to the south of its presumed position.
- There is some limited evidence from the centre of the surveyed area for a network of ditches that pre-date the mid-late Saxon settlement evidence revealed during excavations to the south of Church Hill.
- An elongated, sub-rectangular enclosure orientated towards a hypothesised SW entrance into the hillfort is not inconsistent with Iron Age/Romano British examples seen in Norfolk and appears separate from the strongly defined network of enclosing ditches to the south, enclosing the later Saxon settlement.

- A well defined enclosure ditch defines an area of c. 0.6 ha, with Church Hill lane forming a southern boundary. Within, a large number of features relate to numerous pits, internal sub-divisions, two small hearths, a possible post-build structure and Sunken Feature Building. This area of activity no doubt represents an extension of the Mid- to Late-Saxon settlement in the vicinity of the parish church, effectively divided by Church Hill lane, which might well have originated from this time. The possible SFB is interesting as this building form is generally more a feature of early Saxon settlement.
- Within the central area surveyed a large area of industrial activity was identified, most likely associated with a kiln and in all probability with the nearby Saxon settlement to the south.

7 Acknowledgements

The geophysical survey at Tasburgh Hillfort was made possible through a Heritage Lottery Fund (HLF) grant (Imagined Land: Discovering and Celebrating the History on our Doorstep), awarded to the Norfolk Archaeological Trust. Special thanks go to Caroline Davison (Director of the Norfolk Archaeological Trust) and Simon Floyd (Project Manager), for their logistical support. Thanks also go to Sophie Tremlett (Norfolk Country Council Historic Environment Service) and Andrew Crowson (Northern Archaeological Associates) for comments made on aspects of survey interpretation. Any errors in the resulting work remain the responsibility of the author.

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A Field methods

A 40 x 40 m grid was established over the study area, orientated N-S. The position of the grid was recorded in each of the corner points using a Topcon HyperPro GPS with real-time kinematic (RTK) corrections. Field conditions allowed for the partial use of a cart-based magnetometer system.

A.1 Magnetometer survey

Measurements of vertical geomagnetic field gradient were determined using a Bartington Grad601 fluxgate gradiometer and Geomatrix G-858 Cs magnetometer with an instrument sensitivity of c. 0.01 nT/m. A zig-zag traverse scheme was employed and data were logged in discrete 40 m grid units. The measurement sample interval was 0.25 m along each traverse and the traverse interval was 0.5 m, thus providing 12,800 measurements per 40 m grid square.

A.2 Data processing

Data processing was undertaken using the author's own software. The following data processing routines were applied:

- Zero mean traverse correction, to remove striping caused by instrument heading errors.
- Gaussian low-pass filter.

A.3 Data Visualisation

Geophysical data were analysed and displayed using a Geographic Information System (GIS) database (ERSI ArchMap 9.3).

B Raw data

The following x-y trace plot shows the unprocessed data from Tasburgh Hillfort

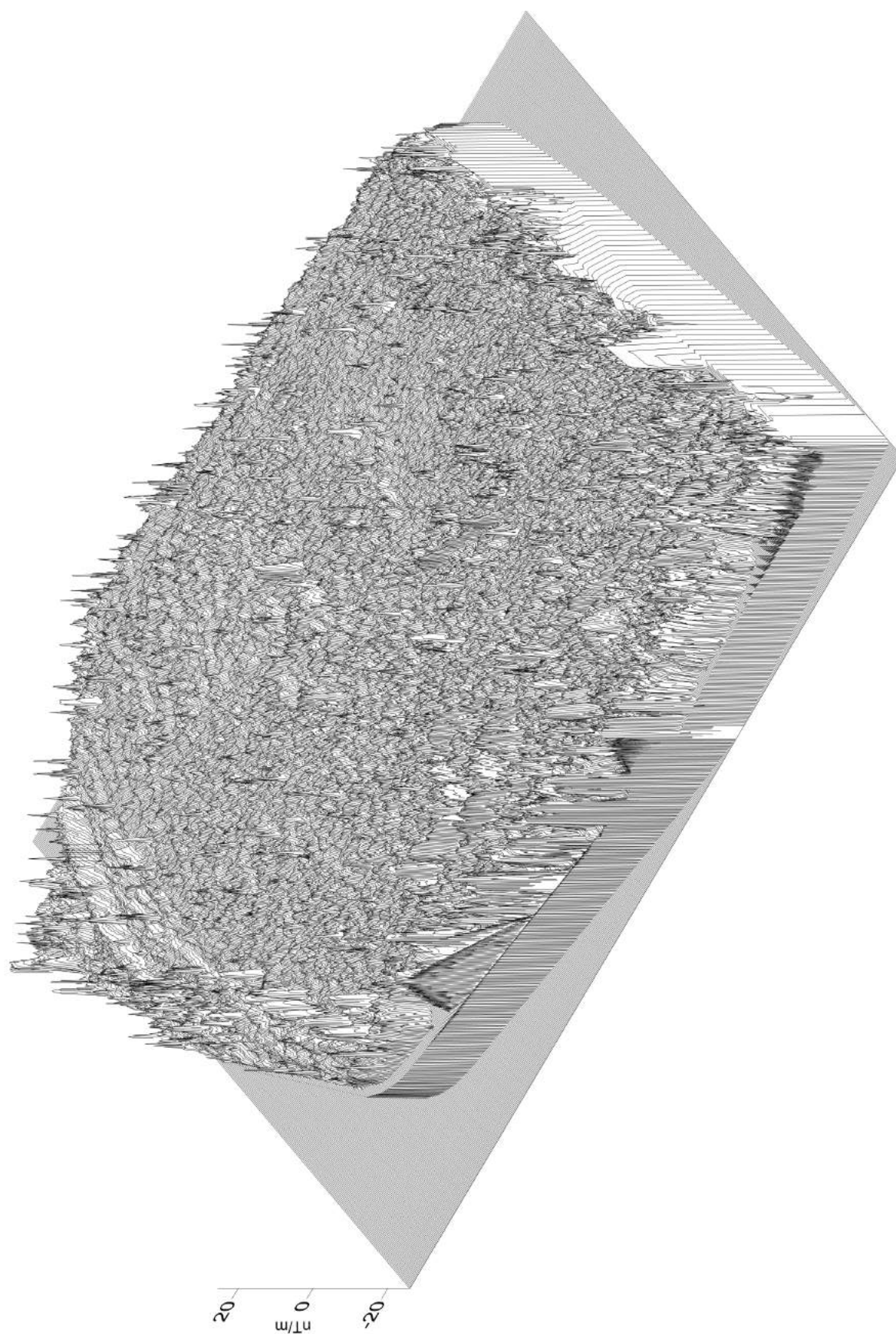


Figure 11: x-y trace plot of unprocessed data from Field 1.

C OASIS data

4/5/2017

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Project details

Project name	Imagined Land: Tasburgh Hillfort geophysical survey
Short description of the project	Geophysical investigation of Tasburgh Hillfort, Norfolk (NHER 2258)
Project dates	Start: 01-02-2017 End: 15-04-2017
Previous/future work	Yes / No
Type of project	Research project
Site status	Scheduled Monument (SM)
Current Land use	Grassland Heathland 2 - Undisturbed Grassland
Monument type	?FORTIFICATION Iron Age
Monument type	SETTLEMENT Early Medieval
Significant Finds	NONE None
Significant Finds	NONE None
Investigation type	"Geophysical Survey"
Prompt	Research
Solid geology	CHALK (INCLUDING RED CHALK)
Drift geology	GLACIAL SAND AND GRAVEL
Techniques	Magnetometry

Project location

Country	England
Site location	NORFOLK SOUTH NORFOLK TASBURGH Tasburgh Hillfort
Study area	7 Hectares
Site coordinates	TM 20 96 52.516899210692 1.24288318262 52 31 00 N 001 14 34 E Point

Project creators

Name of Organisation	D Bescoby Freelance
Project brief originator	Norfolk Archaeological Trust
Project design originator	Caroline Davison
Project director/manager	David Bescoby
Project supervisor	David Bescoby
Type of sponsor/funding body	Other Charitable Trust
Name of sponsor/funding body	HLF

4/5/2017

OASIS FORM - Print view

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Norfolk Archaeological Trust
Digital Contents	"Survey"
Digital Media available	"Text"
Paper Archive Exists?	No
Entered by	David Bescoby (dbescoby@gmail.com)
Entered on	5 April 2017

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