The Great Grid Upgrade

Sea Link

Sea Link

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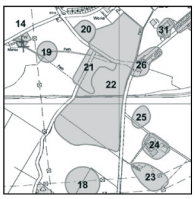





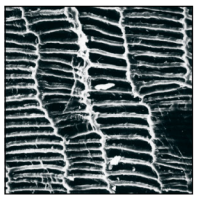


SEA LINK (SUFFOLK SECTION)

GEOPHYSICAL SURVEY REPORT

commissioned by AECOM
on behalf of National Grid Electricity Transmission

February 2025

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

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This report adheres to the quality standard of ISO 9001:2015

PROJECT INFO:

HA Project Code **SSK23** / HA Report No **2025-25** / NGR **Between NGR 638582 262160 & NGR 646117 258614** / Parish **Saxmundham, Sternfield, Knodishall with Buxlow, Aldeburgh with Hazelwood** / Local Authority **Suffolk County Council** / Fieldwork Date **18/09/2023 – 22/11/2023** / OASIS Ref. **headland1-527451**

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PROJECT SUMMARY

Headland Archaeology (UK) Ltd was commissioned by AECOM (the Consultant) on behalf of National Grid Electricity Transmission (the Client) to undertake a geophysical (magnetometer) survey on parcels of land amounting to approximately 198.5 hectares located between Saxmundham in the west and south-west of Thorpeness in the east, Suffolk, that lay within the proposed Sea Link Project Boundary (the Scheme), which forms part of the Sea Link Project (the Project).

The Sea Link Project is a proposal by National Grid Electricity Transmission plc (NG) to reinforce the transmission network in the South-East of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent. The Project is required to accommodate additional power flows generated from renewable and low carbon energy generation, as well as additional new interconnection with mainland Europe.

The results of the geophysical survey will be used to determine the requirement for further archaeological evaluation, the scope of which will be determined in consultation with the Planning Archaeologist for Suffolk County Council (SCC). The geophysical survey reported herein represents coverage of the key areas of works as understood at the DF2 stage, with the survey undertaken in areas where most disturbance was expected, as well as where access could be obtained. The DCO submission is based on the Order Limits of the DF4 design, which varies slightly from the DF2 Draft Order Limits.

The present survey has successfully evaluated 132.5 hectares. Survey was not undertaken in areas amounting to 31.1 hectares within the Scheme Boundary, these areas having previously been surveyed by Headland Archaeology for the East Anglia One North/Two Offshore Windfarm Scheme in 2020. These earlier surveys clearly demonstrated the suitability of magnetometry and applied methodology herein, for the identification of archaeological features over the prevailing geological and pedological conditions present within the Scheme Boundary. Changes to the Scheme Boundary and parcels unsuitable for survey amounting to approximately 33ha accounted for the remainder of the area within the Scheme Boundary, the locations of which are detailed in the illustrations.

The survey has recorded a wide range of magnetic anomalies interpreted as of archaeological and/or possible archaeological origin, the majority of which were previously unknown, in addition to various features with non-archaeological causes. Concentrations of archaeological activity in the form of ditches, enclosures, localised quarrying, pits, and possible sites of burning are recorded at the very eastern extent of the Scheme Boundary and within the large parcel of land at the western end south-east of Saxmundham. Outside of these areas archaeological findings include an isolated ring ditch, a rectilinear enclosure and a further four possible enclosures, as well as multiple ditch like features which cross the Scheme corridor at oblique angles to the present field boundaries and that are interpreted as belonging to possible field systems or trackways of possible archaeological origin. Interspersed amongst these in the central section of the corridor are multiple amorphous spreads of magnetic enhancement interpreted as deriving from localised quarrying.

In addition to those anomalies of clear archaeological potential the survey has mapped the location of several former field boundaries, ponds and former buildings that are all detailed on historic mapping. Four service pipes, patterns of field drains, and modern agricultural trends constitute the remainder of the findings.

The survey results largely corroborate, but also expand on, the current understanding of the archaeological potential of the landscape within which the Scheme is located, as contained within the Suffolk Historic Environment Record (SHER) and gleaned from previous developer led work. The survey results are assessed as providing a reliable indication of the extent of all the significant areas of archaeological potential within the Scheme and although the suspected archaeological remains extend throughout the Scheme there are still large areas where no anomalies of archaeological potential have been identified from the geophysical survey. As a result, the archaeological potential of the easternmost and central areas of the converter station area south-east of Saxmundham are considered very high and locally high elsewhere within the Scheme Boundary where clear features such as enclosures and a ring ditch have been identified. Outside of these locations the archaeological potential is considered low to moderate given the prevalence of isolated linear and discrete anomalies of possible archaeological origin.

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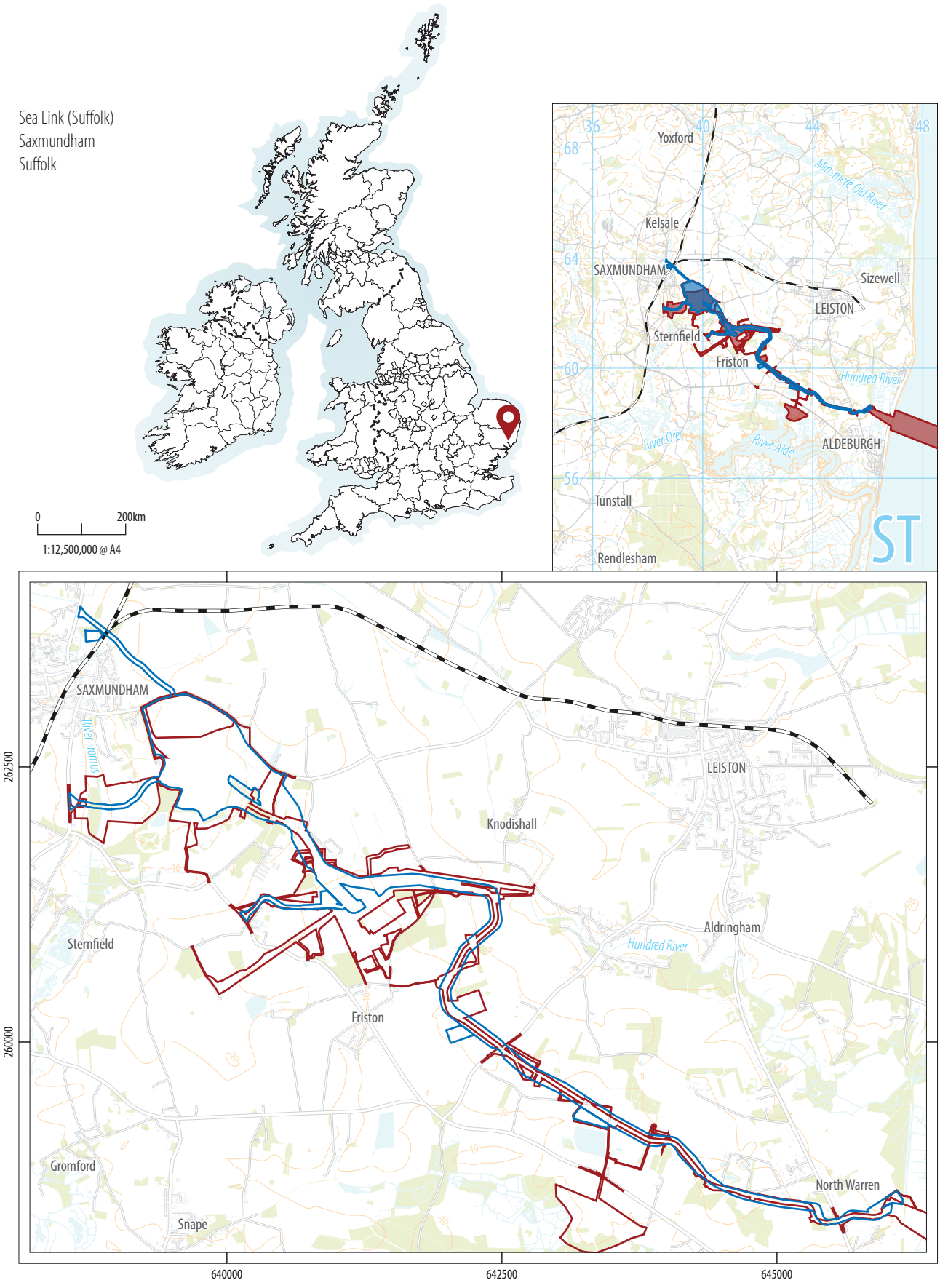
LIST OF ILLUSTRATIONS



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ILLUS 1 Site location

SEA LINK (SUFFOLK SECTION)

GEOPHYSICAL SURVEY REPORT

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by AECOM (the Consultant) on behalf of National Grid Electricity Transmission (the Client) to undertake a geophysical (magnetometer) survey on contiguous and separate parcels of land located between Saxmundham in the west and south-west of Thorpeness in the east, Suffolk (Illus 1), that lay within the proposed Sea Link Project Boundary (the Scheme), which forms part of the Sea Link Project (the Project).

The Sea Link Project is a proposal by National Grid Electricity Transmission plc (NG) to reinforce the transmission network in the South-East of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent. The Project is required to accommodate additional power flows generated from renewable and low carbon energy generation, as well as additional new interconnection with mainland Europe.

The results of the survey will be used to determine the requirement for further archaeological evaluation, the scope of which will be determined in consultation with the Planning Archaeologist for Suffolk County Council (SCC). The results of the survey from the Kent section of the Project are reported on separately (Headland Archaeology 2023a).

The scheme of work was undertaken in accordance with the requirements for Geophysical Survey set by Suffolk County Council Archaeological Service (SCCAS 2023) of the National Planning Policy Framework (DLUHC 2023), the Written Scheme of Investigation (WSI) for Geophysical Survey (AECOM 2023) and Method Statement (MS) for Geophysical Survey (Headland Archaeology 2023b).

The WSI and MS were produced to the standards laid down in the European Archaeological Council's guideline publication, EAC Guidelines for the Use of Geophysics in Archaeology (Europae Archaeologia Consilium 2016) and the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Archaeological Geophysical Survey (CIfA 2020). The survey was also carried out in line with the same best practice guidelines.

The survey was carried out between September 18th and November 11th, 2023.

1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The Scheme Boundary, known henceforward as the geophysical survey area (GSA), constitutes multiple contiguous and separate land parcels spanning an area approximately 10km in length across agricultural land located between Saxmundham in the west (NGR ST 638582 262160) and north of Adelburgh at the coast in the east (NGR ST 646117 258614, Illus 1). The route of the GSA corridor heads west-northwest inland from the coast, passing Friston reservoir to the north between the villages of Friston and Knodishall Common before reaching the largest parcel of land within the GSA measuring approximately 83 hectares on the outskirts of Saxmundham and continuing slightly further west until terminating at the B1121 south of Saxmundham. The GSA encompasses adjoining and separate parcels spread across as many as 60 individual predominantly agricultural fields (Illus 2 – Illus 6).

The total area within the Scheme boundary amounts to approximately 198.5 hectares. The total area surveyed amounts to approximately 132.5 hectares. Survey was not undertaken in areas within the Scheme Boundary previously surveyed and subsequently

ILLUS 2 F152.9, looking east-southeast

evaluated by Headland Archaeology as part of works associated with the East Anglia One North and East Anglia Two Offshore Windfarms (Headland Archaeology 2020, ScottishPower Renewables 2022 and 2023) which amounts to 31.1 hectares. These areas include parts of the corridor located between Friston and Knodishall Common (parcel numbers; 3.2, 3.3, 5.1, 13.1, 13.2, 13.3, 13.5, 13.7, 20.1, 28.12, 28.16, 28.7 and 89.5) and are marked on the overall illustrations (Illus 7 through Illus 9). The greyscale magnetometer data from this work that lies within and immediately adjacent the present Scheme boundary is shown in Illus 52. Comment on the archaeological potential of those areas within the GSA but previously surveyed and evaluated as part of the East Anglia One North and East Anglia Two Offshore Windfarms is made in the Archaeological Background and Results sections of this report where appropriate.

Multiple parcels along the scheme were unsuitable for survey due to the presence of crops. Parcels 28.7, 89.16 and 89.3 contained fir tree crops (Illus 6) and 58.31 sugar beet. Field 208.4 contained trees and parcels 1.1, 162.1 and 208.5 were overgrown and also unsuitable for survey. No access was permitted to fields 28.5 or 28.7. A section of corridor to the north-east of Saxmundham was not surveyed due to a planned design change. The total combined area of these unsuitable parcels amounted to approximately 33 hectares.

After rising steeply from the coast from approximately 2m Above Ordnance Datum (AOD) to 19m AOD at the eastern extent of the GSA next to the B1122, the topography of the majority of land within the corridor section of the GSA is relatively flat at roughly 20m AOD except for a low point of 12m AOD adjacent to Friston Reservoir. The land gradually rises again to the west across the largest parcel within the GSA east of Saxmundham to a high point of 31m AOD at the northwestern corner of the field adjacent to the B1119, before falling away to roughly 12m AOD at the western terminus of the corridor at the B1121 south of Saxmundham.

1.2 GEOLOGY AND SOILS

Two different underlying bedrock geologies are recorded across the GSA that are roughly defined by a north/south division on a line that passes close to the village of Friston. North of Friston, which includes the western half of the GSA but only a short section of corridor before the large parcel of land east of Saxmundham, is underlain by Crag Group sand. The remainder of the corridor section east of Friston is underlain by sand of the Chillesford Church Sand Member (BGS 2023).

The distribution of superficial deposits is slightly more complex with irregular shaped bands of sand and gravel, diamicton and to a lesser extent clay and silt all of the Lowestoft Formation mapped in the broader area between Saxmundham and Aldeburgh where the GSA is located. Despite this being the case, the vast majority of the surveyed parts of the GSA including the large parcel east of Saxmundham are overlain by diamicton (an undifferentiated mix of different sized sediments and rocks (BGS 2023).

The soils covering the GSA are varied but generally fall into one of three categories. Those to the east of Friston towards the coast are classified in Soilscape 10 Association as freely draining slightly acid

ILLUS 3 F58.34, looking south-east

sand soils. Between Friston Reservoir and Friston village the soils are categorised as freely draining slightly acid but base-rich soils in Soilscape 7 Association. The soils overlying the remainder of the GSA to the east of Saxmundham are classified as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils in Soilscape 18 Association (Cranfield University 2023).

Subsequent to the completion of the original phase of fieldwork, the Development Consent Order (DCO) red line boundary changed. The geophysical survey reported herein represents coverage of the key areas of works as understood at the DF2 stage, with the survey undertaken in areas where most disturbance was expected (ie main cable corridor and supporting compounds and access tracks etc), as well as where access could be obtained. The DCO submission is based on the Order Limits of the DF4 design (Illus 1), which varies slightly from the DF2 Draft Order Limits.

2 ARCHAEOLOGICAL BACKGROUND

The historical and archaeological background of the Scheme will be set out in detail in a cultural heritage baseline report (AECOM, forthcoming); however, a high-level summary taken from the scoping exercise is presented below. As such, the terminology used is in line with the terminology used in the scoping report, in which wider areas were examined as a final route option had not been selected at that point. The section of the Scheme in Suffolk is therefore referred to as the Suffolk Scoping Boundary. The scoping boundary encompasses a more extensive area than the red line Scheme Boundary indicated on Illus 1.

A number of designed assets have been recorded within the Suffolk Scoping Boundary including two scheduled monuments and seven Grade II listed buildings. The scheduled monuments are two bowl barrows on Aldringham Green (1011378) and the site of Leiston Abbey (1014520).

Grade II listed buildings recorded within the Suffolk Scoping Boundary include Aldringham Court (1393143), Billeaford Hall (1216081), and Gorsehill (1269753), Little Moor Farm (1215743), Elm Tree Farm (1215788), High House Farm (1216049), and Hill Farmhouse (1231296). The majority of the Grade II listed buildings are located within the settlements which surrounds the Scheme, with concentrations in Leiston, Aldeburgh, Thorpeness, Aldringham, Friston, Sternfield, and Saxmundham. Aldeburgh, Thorpeness, Leiston, and Saxmundaham.

A further two scheduled monuments have also been recorded in the wider 1 km study area. Both of these are prehistoric burial sites and consist of two bowl barrows in Square Plantation (1011376), and a bowl barrow on Aldringham Common, some 300m east of Stone House (1011440).

A review of non-designated assets recorded in the Suffolk Historic Environment Record (SHER) revealed a large number of heritage assets demonstrating evidence of human activity in the area from the early prehistoric period through to the modern period, with recent

ILLUS 4 F58.15, looking north-west

works undertaken as part of other interconnectors also identifying previously unrecorded remains (ScottishPower Renewables 2022 and 2023 and Headland Archaeology 2020).

Some of the earliest material identified includes microliths dating to the Mesolithic period recorded near the former Post Office in Aldringham (ARG061), although lithic scatters have also been recorded in a number of other areas of the Suffolk Scoping Boundary (LCS049 & LCS064). While early prehistoric settlement activity is limited, Bronze Age activity has been recorded with a number of assets relating to burial practices recorded.

The Iron Age is better represented with a number of cropmarks recorded through aerial photography suggesting extensive field systems and settlement activity dating from the Iron Age. Recent excavations undertaken as part of other infrastructure projects have also demonstrated extensive human activity throughout the Iron Age and Roman period. It is also possible that some of the undated cropmarks have earlier origins and date to the Bronze Age.

While early medieval sites are not well represented within the Suffolk Scoping Boundary, it is possible that many of the settlements that survive in the wider area have their origins in the early medieval period, and as a result remains dating to this period could lie buried beneath the more built-up areas. It is, however, also possible that some of the Iron Age/Roman sites could continue in use into the early medieval period, and recent works as part of the East Anglia projects (ScottishPower Renewables 2022 and 2023) have noted a number of sites which might date to this period.

The majority of assets dating to the medieval period are find spots or scatters of pottery which may represent waste material being spread on the agricultural fields. It is, however, also possible that some of the more focused scatters might represent settlement activity associated with abandoned or shrunken settlements. Most activity dating to the post-medieval period within the Suffolk Scoping Boundary is associated with the agricultural land through which the study area is focused.

The modern period is very well represented with a large number of non-designated assets dating to World War 2 recorded near the Scheme Boundary including pill boxes, anti-glider trenches, and other structures and features on the coast to repel enemy attack and invasion.

As mentioned, magnetometer survey and subsequent evaluations have previously been undertaken within and in areas immediately adjacent to parts of the Scheme Boundary located between Friston and Knodishall Common in advance of works associated with the East Anglia One North and East Anglia Two Offshore Windfarms (ScottishPower Renewables 2022 and 2023 and Headland Archaeology 2020). The results of these investigations (Illus 52), in addition to confirming the suitability of the technique in these conditions, also identified a range of archaeological sites and individual features in several locations where no assets had previously been recorded.

Within the current Scheme Boundary rectilinear enclosures measuring 62m x 72m and 42m x 62m with associated ditches

ILLUS 5 F422.1, looking north

were identified in parcels 28.12 and 28.16/20.1 respectively. Trench evaluations overlapping parcel 28.16 were not located over the enclosure but prehistoric pottery, a single lithic, a post-medieval ditch and multiple undated features were recorded in trenches in the immediate vicinity. Within 250m east of parcel 28.16 but outside the GSA Neolithic pits with substantial assemblages were recorded in evaluations and approximately 450m to the west a previous magnetometer survey identified a rectilinear enclosure and linear ditches adjacent to Grove Road where subsequent evaluations recorded prehistoric, Roman, medieval, and undated features (ScottishPower Renewables 2023).

No evaluations were previously undertaken east of Grove Road in the location of parcel 28.12 containing an enclosure. However, undated, post-medieval and modern dated pit and ditch features were recorded by evaluations in nearby parcels 13.2 and 16.1 west of Grove Road where the previous magnetometer survey identified a further possible rectilinear enclosure 175m north of the GSA.

Further linear, curvilinear, and more ephemeral ditch like anomalies likely identified a further area of enclosure and activity north-west of Saxmundham Road centred in parcel 13.1 but also partly within adjacent parcels 13.7, 3.2, 3.3 and 5.1. Evaluations subsequently identified various ditches and pits with some evidence of possible early medieval structures in the form of sunken featured buildings in parcel 13.1. The pits and ditches are dated variously as prehistoric and Roman, with some dated more closely to the Neolithic period. Immediately to the north, in 3.3, the findings were characterised by drainage or boundary ditches with a few associated pits though most features were undated except for two ditches yielding Roman and Saxon or medieval pottery.

An evaluation trench located towards the centre of parcel 89.5 contained Bronze Age, Early Iron Age, Roman and medieval finds in the location of magnetically enhanced geophysics anomalies (ScottishPower Renewables 2023).

Further notable evidence attesting to widespread human activity in the vicinity of the GSA identified by previous investigations includes two separate ring ditches and further enclosures located in the adjacent fields to the east and south-east of parcel 28.5 The ring ditch located 150m east of the GSA in parcel 28.4 measures 23m in diameter and was previously known from cropmarks (KND030) but also recorded as a clear magnetic anomaly (Headland Archaeology 2020). A further enclosure is located roughly 220m east of Bull's Hall and 450m north of 58.27 and an extended area of settlement activity, consisting of a series of enclosures, discrete pit-like anomalies and trackway was identified 450m to the south of parcel 89.5 between Saxmundham Road and Redbarn Lane with features subsequently dated to the Neolithic, prehistoric and medieval periods (ScottishPower Renewables 2023).

ILLUS 6 F89.3 unsuitable for survey, looking north-west

3 AIMS, METHODOLOGY & PRESENTATION

3.1 AIMS AND OBJECTIVES

The principal aim of the geophysical survey was to gather information to establish the presence/absence, character, and extent of any archaeological remains within the Scheme Boundary/ GSA. This will enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains if present, and thereby inform any further investigation strategies, as appropriate.

The specific archaeological objectives of the geophysical survey were:

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

3.2 METHODOLOGY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations detailed plans of sites can be obtained, as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 2.

Magnetometry is the most widely used geophysical survey technique in archaeology as it can quickly evaluate large areas and, under favourable conditions, identify a wide range of archaeological features including infilled cut features such as large pits, gullies and ditches, hearths, and areas of burning, and kilns and brick structures. It is therefore good at locating settlements of all periods, prehistoric field systems and enclosures, and areas of industrial or modern activity, amongst others. It is less successful in identifying smaller features such as post-holes and small pits (except when using a non-standard sampling interval), unenclosed (prehistoric) settlement sites and graves/burial grounds. However, magnetometry is by far the single most useful technique and was assessed as the best non-intrusive evaluation tool for this site.

Given the geological conditions and success of the earlier survey (Headland Archaeology 2020; Illus 52 and Illus 53) magnetometry was identified as the most appropriate non-intrusive geophysical technique for evaluating the GSA, taking account of the limitations noted in this section and identified during subsequent

evaluations from previously surveyed areas with the same applied methodology (ScottishPower Renewables 2023).

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart (Illus 7). These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v.3.28.5 software was used to process and present the data respectively.

3.3 DATA PRESENTATION & TECHNICAL DETAIL

A general site location plan is shown in Illus 1 at a scale of 1:50,000. Illus 2 to Illus 6 inclusive are site condition photographs. The survey GPS swaths, and the location and direction of the site condition photographs, are shown on Illus 7 at 1:30,000. Illus 8 and Illus 9 show the overall greyscale magnetometer data and interpretation respectively, in addition to the location of overview illustrations and areas either unsuitable for survey or previously surveyed by Headland Archaeology as part of the East Anglia One North and East Anglia Two Offshore Windfarms, Onshore Substation Sites and Cable Corridor schemes, also at a scale of 1:30,000. Illus 10 through Illus 15 show processed greyscale data and interpretations for each of the three overview areas in addition to the location of the Sector boundaries and Suffolk HER data at a scale of 1:7,500. Fully processed (greyscale) data, minimally processed (XY trace plot) data and interpretative plans are presented by Sector, at 1:2,500, in Illus 16 to Illus 51 inclusive.

Raw data greyscale plots without filtering or smoothing as required by Suffolk County Council (SCCAS 2023) for the entire scheme are contained within Appendix 1. Technical information on soil magnetism and interpretation categories used within the report are provided in Appendix 2. Appendix 3 details the survey location information and Appendix 4 describes the composition and location of the site archive. Data processing details are presented in Appendix 5. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 6.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (AECOM 2023), Method Statement (Headland Archaeology 2023b), guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (CIfA 2020). All illustrations from Ordnance Survey (OS) mapping are reproduced with the permission of the controller of His Majesty's Stationery Office (© Crown copyright).

The Illustrations in this report have been produced following analysis of the data in 'raw' (minimally processed) and processed formats and over a range of different display levels. All illustrations are presented to display and interpret the data to best effect. The interpretations are based on the experience and knowledge of Headland Archaeology management and reporting staff.

4 RESULTS & DISCUSSION

4.1 SITE CONDITIONS

Magnetometer survey is generally recommended over any sedimentary bedrock although results can be variable depending on the magnetic susceptibility of the parent rock and the presence of any overlying superficial deposits, as are present here with sand and gravel and diamicton deposits recorded across the GSA (English Heritage 2008; Table 4).

The previous magnetometer survey undertaken within and in areas immediately adjacent to parts of the Scheme Boundary located between Friston and Knodishall Common demonstrated the suitability of magnetometry and the applied methodology herein, for the identification of archaeological anomalies, particularly linear ditch features, over the prevailing geological and pedological conditions present within the Scheme Boundary. This earlier survey identified a range of archaeological sites and individual features in several previously unrecorded locations. Subsequent evaluations demonstrated a good correlation between magnetic anomalies and archaeological features except where anomalies were difficult to differentiate against a variable magnetic background and/or where features were too ephemeral/shallow and fills too sterile to be expected to produce a response at a survey resolution of 1m (ScottishPower Renewables 2022 and 2023).

As a result and notwithstanding the limitations of magnetometer survey to identify the types, sizes, and period of archaeological features as described in Section 3.2 it is argued the results of the survey likely provide a reasonably good indication of the extent of sub-surface archaeological features within the GSA.

Surface conditions at the time of survey were generally good (Illus 2, Illus 4 and Illus 5), with the exception of some arable fields after heavy rainfall (Illus 3). Data quality was also good with only minimal post-processing required.

The anomalies recorded by the survey are discussed below according to their interpreted origin and sequentially from east to west.

4.2 FERROUS AND MODERN ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is

common on most sites, often being introduced into the topsoil during manuring or tipping/infilling.

A broadly rectilinear area of magnetic disturbance at the northwestern corner of F421–F422 adjacent to the B1119 (FS1; Illus 14–15 and Illus 49–51) records the location of a former structure detailed on the OS Six Inch Map 1888–1913.

Four very high magnitude linear anomalies denoting the location of buried services pipes are recorded in F152 north of Aldeburgh Golf Club (SP1 and SP2; Illus 10–11 and Illus 19–21), in F86.3 immediately north of Broom's Covert (SP3; Illus 1–11 and Illus 22–24) and at the western edge of F421–422 north of Wood Farm (SP4; Illus 14–15, Illus 40–42 and Illus 49–51).

Eight former ponds, identified on historic OS mapping, are recorded within the large field F421–F422 east of Saxmundham as concentrated areas of magnetic disturbance (FP1-FP8; Illus Illus 10–11 and Illus 40–48) resulting from the magnetic material used to infill the features. A further infilled pond (FP9; Illus 10–11 and Illus 43–45) is recorded in F208.1 south-west of Wood Farm.

An area of magnetic disturbance (MD1; Illus 10–11 and Illus 43–45) also in F208.1 corresponds to a small copse and possible former pit also recorded on historic OS mapping.

Bands or small areas of magnetic disturbance recorded along the field edges are likely to be due to the accumulation of ferrous debris around field margins or to ferrous material in the boundary itself.

4.3 AGRICULTURAL ANOMALIES

Magnetic anomalies with an agricultural origin are prevalent across the GSA. Former field boundaries (FB1 – FB11; Illus 10-15) recorded on historic OS mapping are identified often as faint linear trend anomalies in multiple fields across the GSA but particularly within the large western parcel east of Saxmundham (F421–422) which was previously sub-divided into as many as twenty-five separate parcels.

Systematic patterns of field drains identified by regular configurations of faint, parallel linear trend anomalies are evident in three fields (F3.3, F3.4 and F91.19; Illus 14-15 and Illus 34–39) but also more sporadically in isolated parcels within the GSA.

Other faint linear trends aligned parallel to the present field boundaries are a result of modern ploughing. Some of these are particularly prominent, as in field F58.34 which contained crop ridges at the time of survey (Illus 3).

4.4 ANOMALIES OF GEOLOGICAL ORIGIN

Outside of the moderately variable magnetic background constituting widespread lowly enhanced discrete anomalies, very few anomalies of clear geological/natural origin are recorded across the GSA.

Irregular shaped low magnitude anomalies (ME6; Illus 10–11 and Illus 22–4), within the smallest parcel at the western end of F152, are of a shape and strength indicative of a natural cause. Their proximity however to more regular, linear, ditch-like anomalies of likely archaeological origin (D5 - D7) and restricted extent of the survey area precludes a more confident interpretation, and these anomalies therefore remain of uncertain origin.

A broad, sinuous, and weakly enhanced spread of faint anomalies extending across F91.22 are likely natural in origin.

4.5 ANOMALIES OF UNCERTAIN ORIGIN

Strongly magnetically enhanced discrete anomalies, recorded at the western end of F152.9 and within F152.1 (ME4 and ME5; Illus 10–11 and Illus 19–21) and separated by an area of magnetic disturbance containing service pipes (SP1 and SP2) are likely anthropogenic in origin and might relate to a WW2 'Diver' HAA battery (ADB 039) recorded in this location in the Suffolk HER.

4.6 ANOMALIES OF POSSIBLE OR PROBABLE ARCHAEOLOGICAL ORIGIN

At the eastern end of the Scheme, east of Leiston Road (F193.1 and F193.2), the survey has identified a concentration of various magnetic anomalies of clear archaeological potential co-located with numerous heritage assets recorded in the Suffolk HER. These range from pottery scatters to soilmarks of ditches and enclosures dating from the Roman, medieval and modern (WW2) periods. A series of adjoining parallel and perpendicular ditches likely identify a system of enclosure at E1 and E2 spanning the boundary between F193.1 and F193.2 (Illus 10–11 and Illus 16–18). Located within the ditches at E1 are a row of four discrete very high magnitude responses (B?2 – B?5) which potentially identify localised burning. Further very high magnitude discrete responses, immediately to the east (B?1 and ME3), could also be indicative of burning, though the anomaly response at ME1 adjacent to an area of overgrown ground, is more likely to identify an area of magnetic disturbance or a feature with a ferrous component. In addition to the likely enclosure ditches and possible sites of burning is a broad area of amorphous magnetic enhancement (ME1 and ME2) of possible archaeological origin and two more clearly defined perpendicular ditch anomalies (D1 and D2) aligned north-east/south-west and north-west/south-east respectively.

A clear rectangular enclosure (E3) measuring 24m x 32m is recorded in parcel 58.30. The feature appears to enclose an amorphous area of possible extraction and lies in close proximity to another less clear possible enclosure (E?3) immediately to the south and curving ditch anomaly approximately 55m in length located roughly 130m to the east, also in 58.30. The cluster of features in this parcel all lie within 650m of archaeological deposits, identified by earlier surveys and corroborated by subsequent evaluation trenching, of Neolithic, prehistoric and medieval date further to the north within, and east of, parcel 28.16.

Two possible rectilinear enclosures, measuring 80m and 18.5m in diameter respectively (E?1 and E?2; Illus 25–30) are recorded as faint linear anomalies in adjoining parcels F58.26 and F58.15. An interesting linear arrangement of three low magnitude discrete anomalies adjacent to a short linear anomaly within the suspected rectilinear enclosure (E?2), may indicate some other anthropogenic activity. However, the interpretation is clouded by the effects of likely extraction within and surrounding this feature. The south-west corner of another possible enclosure (E?4; Illus 37–39) is recorded in the north-east corner of parcel 91.21, though the angular ditch-like response is bisected by the GSA/field boundary therefore precluding a more confident interpretation. Another possible rectilinear enclosure also bisected by the GSA/field boundary is recorded as a linear low magnitude anomaly enclosing discrete possible pit-like responses (E?5; Illus 40–42) at the very south-west corner of 421.3.

Further to the west along the northern edge and extending south towards the centre of the large survey parcel south-east of Saxmundham, are multiple square and/or rectilinear enclosures (E4-E9; Illus 40–42 and Illus 46–48) joined by curvilinear ditch anomalies (D13) interpreted as trackways between the enclosures. These features, alongside neighbouring discrete pit-like and enhanced anomalies indicative of burning (B?6-B?8) and quarrying (Q?8; Illus 40–42 and Illus 46–48) likely identify an extended area of settlement activity across parts of parcels 421.3 and 422.1.

A single ring ditch (RD1; Illus 40–42) roughly 20m in diameter is recorded very close to the southern boundary of the GSA in parcel 422.1. This feature sits in isolation with the nearest anomalies of archaeological potential recorded approximately 400m to the north (E4) and separately to the north-east (E?4).

Amorphous spreads of low magnitude magnetic enhancement (Q?1 – Q?8; Illus 25–33 and 46–48) indicative of extraction/quarrying are prevalent within the GSA but particularly so within the corridor section located on the Lowestoft sand and gravel to the east and west of Snape Road where some correlation with other anomalies of likely archaeological potential including ditches (D9-D12) and enclosures (E3 and E?1-E?2) is recorded.

A series of single and parallel sporadic faint linear ditch-like anomalies (D3 – D12; Illus 10–13 and Illus 19–33), not aligned to present or former field boundaries, are recorded on various alignments across the GSA corridor within Sectors 2 through 6 between Leiston Road (F162.1) and west of Snape Road (F58.28). In many instances the anomalies are isolated with little context and are interpreted as possibly identifying field systems and in some instances possible trackways (D7 and D9; Illus 22–24 and Illus 25–27).

5 CONCLUSION

The survey has successfully evaluated approximately 132.5 hectares out of the total area of 198.5 hectares within the Geophysical Survey Area (GSA)/Scheme Boundary that was understood at the DF2 stage. A further 31.1 hectares was previously surveyed as part of evaluation works associated with the East Anglia One North and East Anglia Two Offshore Windfarms Project (Headland Archaeology 2020) a combined coverage of approximately 82% of the DF2 stage Scheme Boundary. The remaining 18% was either unsuitable or inaccessible for survey.

Similar to the findings of the earlier geophysical survey which crossed the route of the GSA, the present survey has demonstrated that the prevailing geological and pedological conditions are favourable for the detection of sub-surface remains with a wide range of archaeological and non-archaeological features clearly mapped. Consequently, it is assessed that the results provide a reliable indication of the extent of all the previously known significant areas of archaeological potential within the GSA. The low magnitude exhibited by some of the anomalies and the partial and discontinuous nature of others however, suggests that in certain instances, the archaeological remains may be more extensive than revealed by the survey, either due to partial truncation by modern agricultural techniques and/or a lack of magnetic contrast on a variable geological substrate.

Nevertheless, the survey has identified two concentrations of archaeological activity in the form of ditches, enclosures, localised quarrying, pits and possible sites of burning at the very eastern extent of the Scheme Boundary east of Leiston Road in the location of numerous heritage assets in the Suffolk HER ranging from pottery scatters to soilmarks of ditches and enclosures dating from the Roman, medieval and modern (WW2) time periods and also within the large parcel of land at the western end south-east of Saxmundham which were previously unknown.

Findings elsewhere within the DF2 stage Scheme Boundary include an isolated ring ditch, a rectilinear enclosure and a further four possible enclosures. Multiple ditch-like features which cross the Scheme Boundary at angles oblique to the present field boundaries are interpreted as forming part/s of possible field systems or trackways of possible archaeological origin. Interspersed amongst these in the central section of the Scheme Boundary are multiple amorphous spreads of magnetic enhancement interpreted as deriving from localised quarrying/extraction.

In addition to those anomalies of clear archaeological potential the survey has mapped the location of several former field boundaries, ponds and former buildings that are all detailed on historic mapping. Four service pipes, patterns of field drains and modern agricultural trends constitute the remainder of the findings.

The survey results largely corroborate, but also expand the current understanding of the archaeological potential of the GSA, as contained within the Suffolk Historic Environment Record (SHER) and gleaned from previous developer led work which when combined attest to widespread archaeological activity across multiple time periods within the wider landscape.

Although there are broadly relatively few parcels within the corridor section of the GSA which do not contain at least some magnetic anomalies that likely have an anthropogenic cause, there are still large areas where no anomalies of archaeological potential are identified in the data, including the western half of the large parcel for the converter station south-east of Saxmundham. As a result, the archaeological potential of the easternmost parcels of the GSA and central areas of the converter station area south-east of

Saxmundham are considered very high and locally high elsewhere within the Scheme Boundary where clear features such as enclosures and a ring ditch have been identified. Outside of these locations the archaeological potential is considered low to moderate given the prevalence of isolated linear and discrete anomalies of possible archaeological origin.

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N

264000
261000
258000
639000
642000
645000

5
6
4
3
2

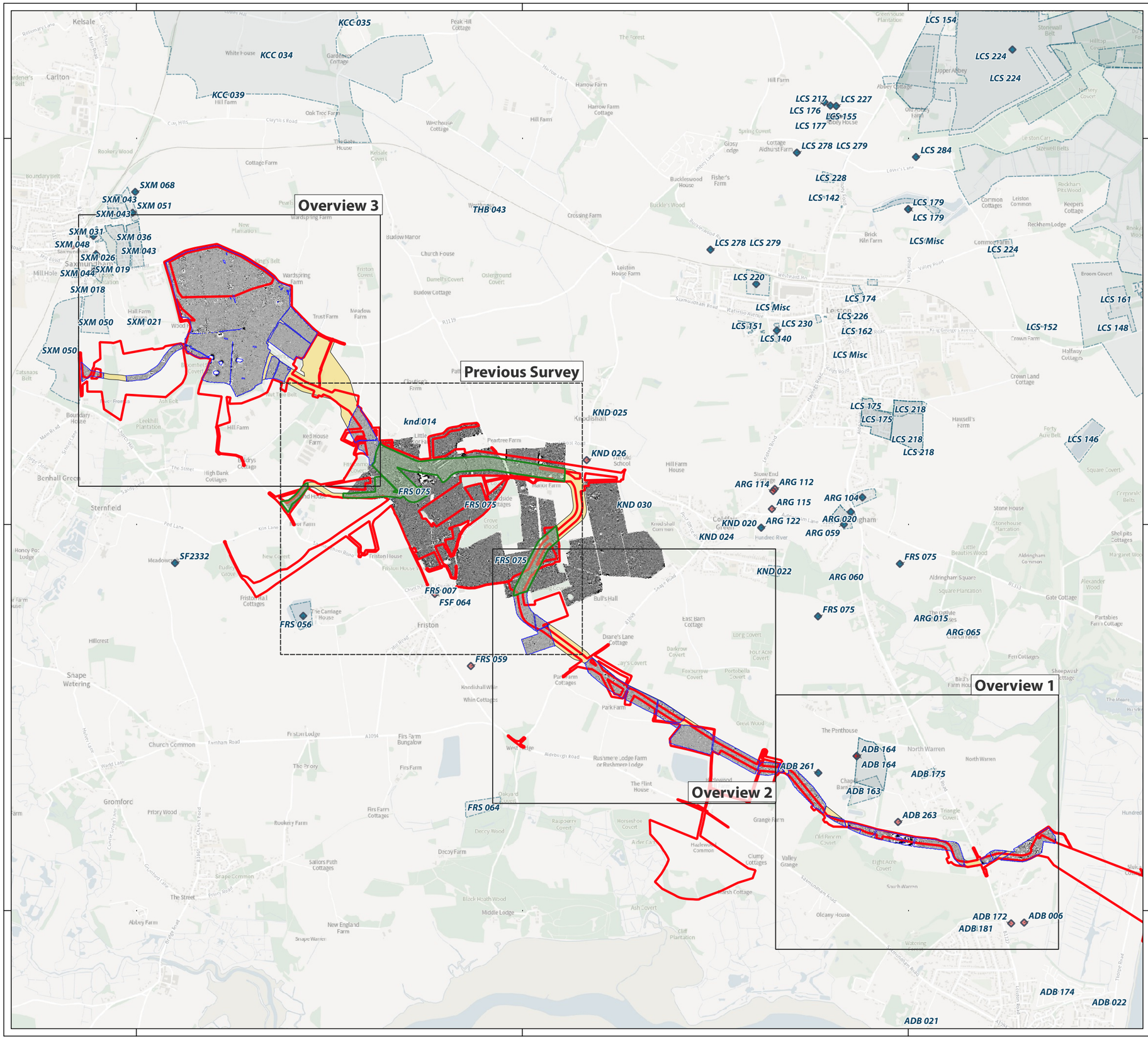
Key

- Geophysical Survey Area
- Survey Extent
- Location and Direction of Illus 02-06
- Headland Survey 2020
- GPS Swaths
- Unsuitable Survey Area

0 500 1,000 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:30,000 @ A3

Illus 07 - Survey location showing GPS swaths and photograph locations



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Key

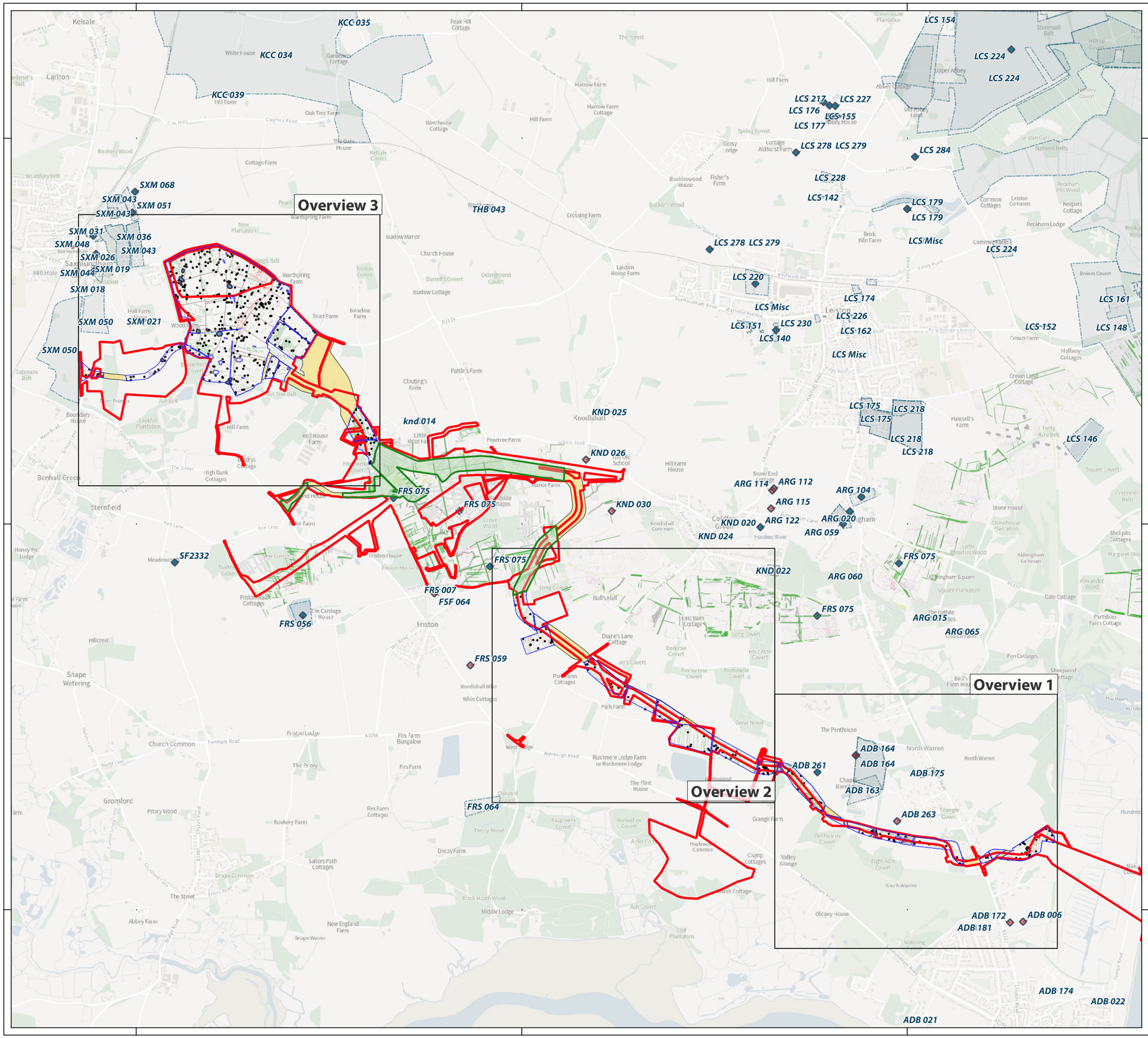
- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Overview
- Area for Illus 52 - Previous Survey
- HER Events
- HER Events
- HER Schefuled Monuments

+2nT
-1nT

0 500 1,000 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:30,000 @ A3

Illus 08 - Overall greyscale plot of processed magnetometer data



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Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Overview
- HER Events
- HER Events
- HER Schefuled Monuments
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Service
- Uncertain
- Possible Archaeology
- Trackway (modern)
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry
- Uncertain
- Burning?
- Former Pond
- Former Structure

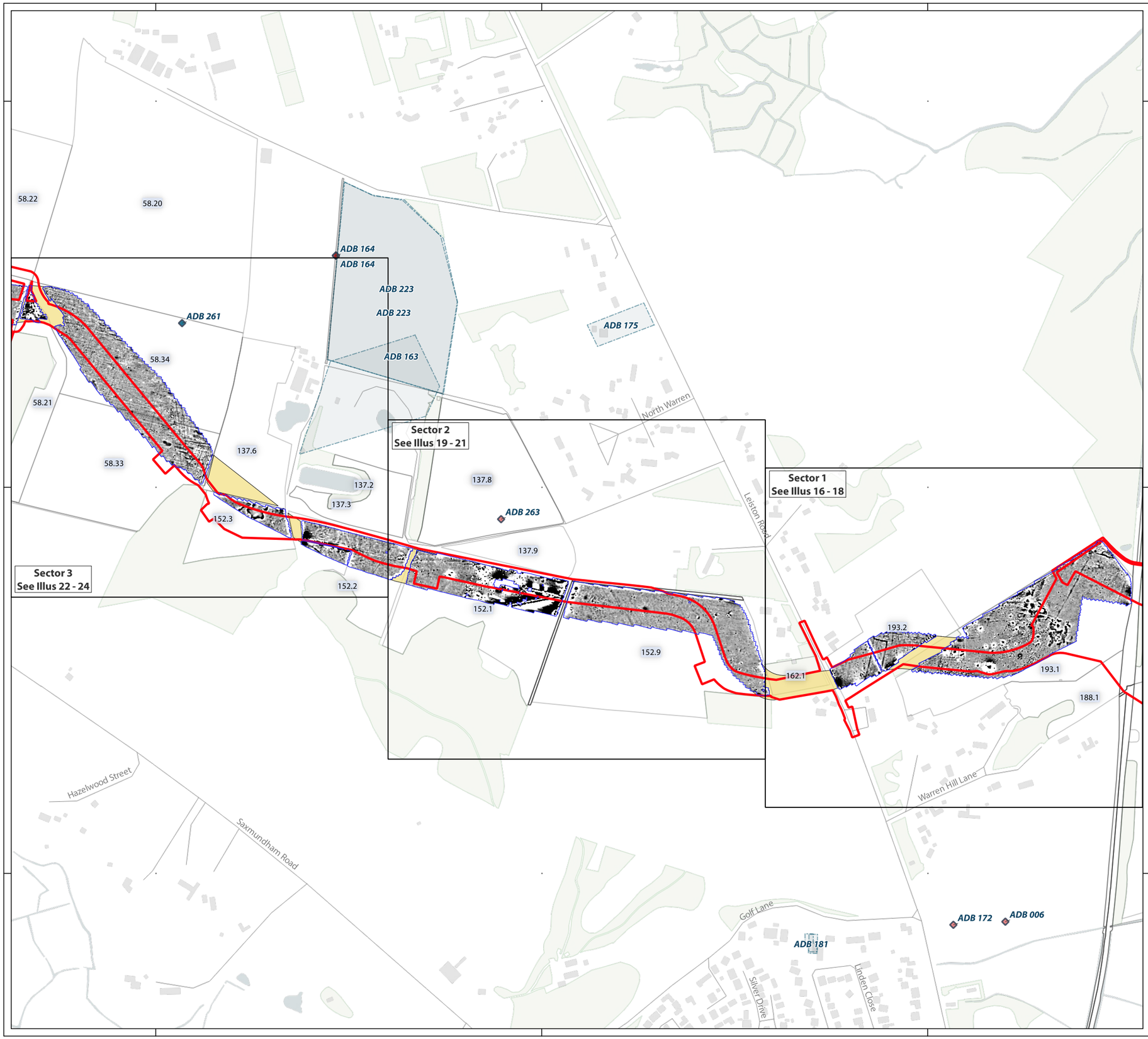
Headland Survey Interprettaion 2020

- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- PIPE
- Archaeology
- Magnetic Disturbance
- Natural
- Overhead
- Possible Archaeology
- Quarry

0 500 1,000 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:30,000 @ A3

Illus 09 - Overall interpretation of magnetometer data



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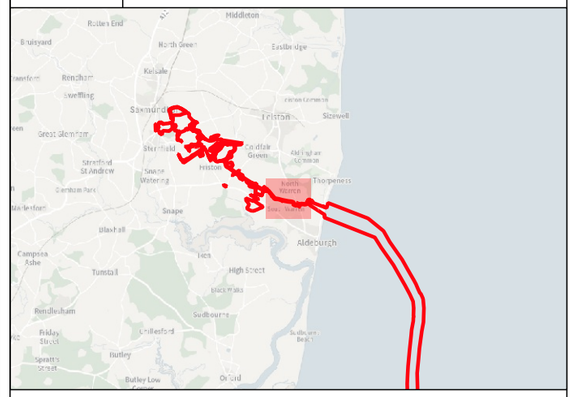


Key

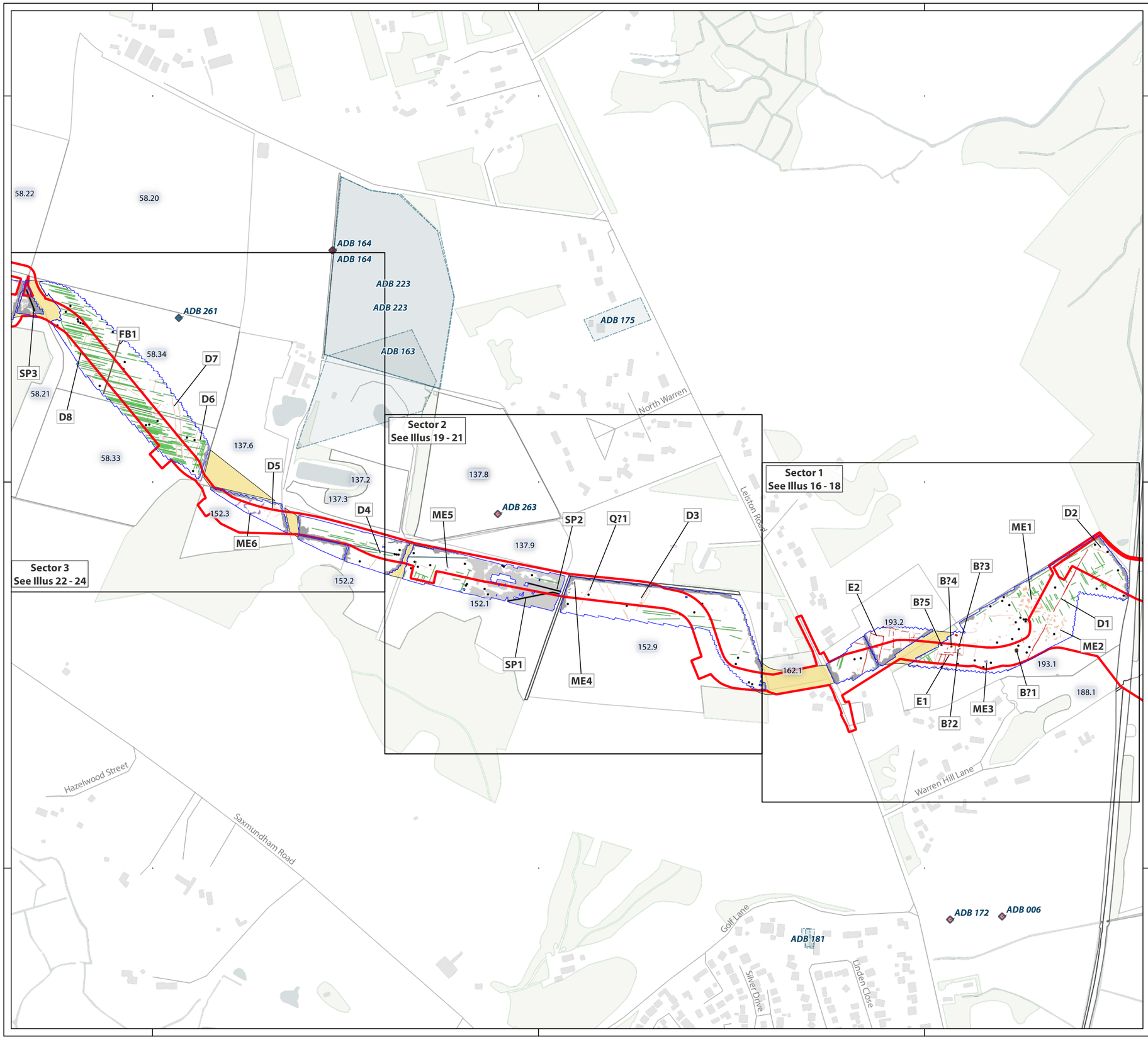
- Geophysical Survey Area
- Survey Extent
- Unsuitable Survey Area
- Area for Sector
- HER Events
- HER Events
- HER Schefuled Monuments

+2nT
-1nT

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:7,500 @ A3

Illus - 10 Greyscale plot of processed magnetometer data; Overview 01



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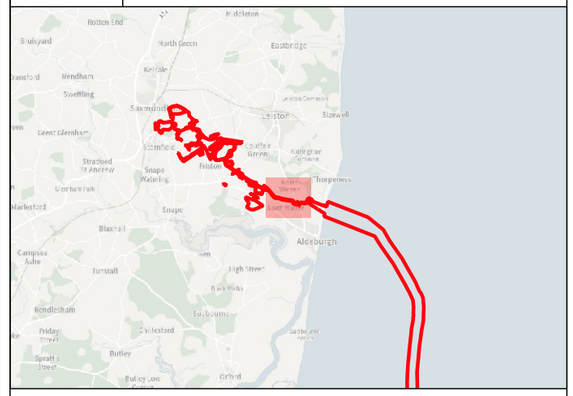


Key

- Geophysical Survey Area
- Survey Extent
- Unsuitable Survey Area
- Area for Sector
- HER Events
- HER Events
- HER Schefuled Monuments
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Service
- Trackway (modern)
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry
- Uncertain
- Burning?

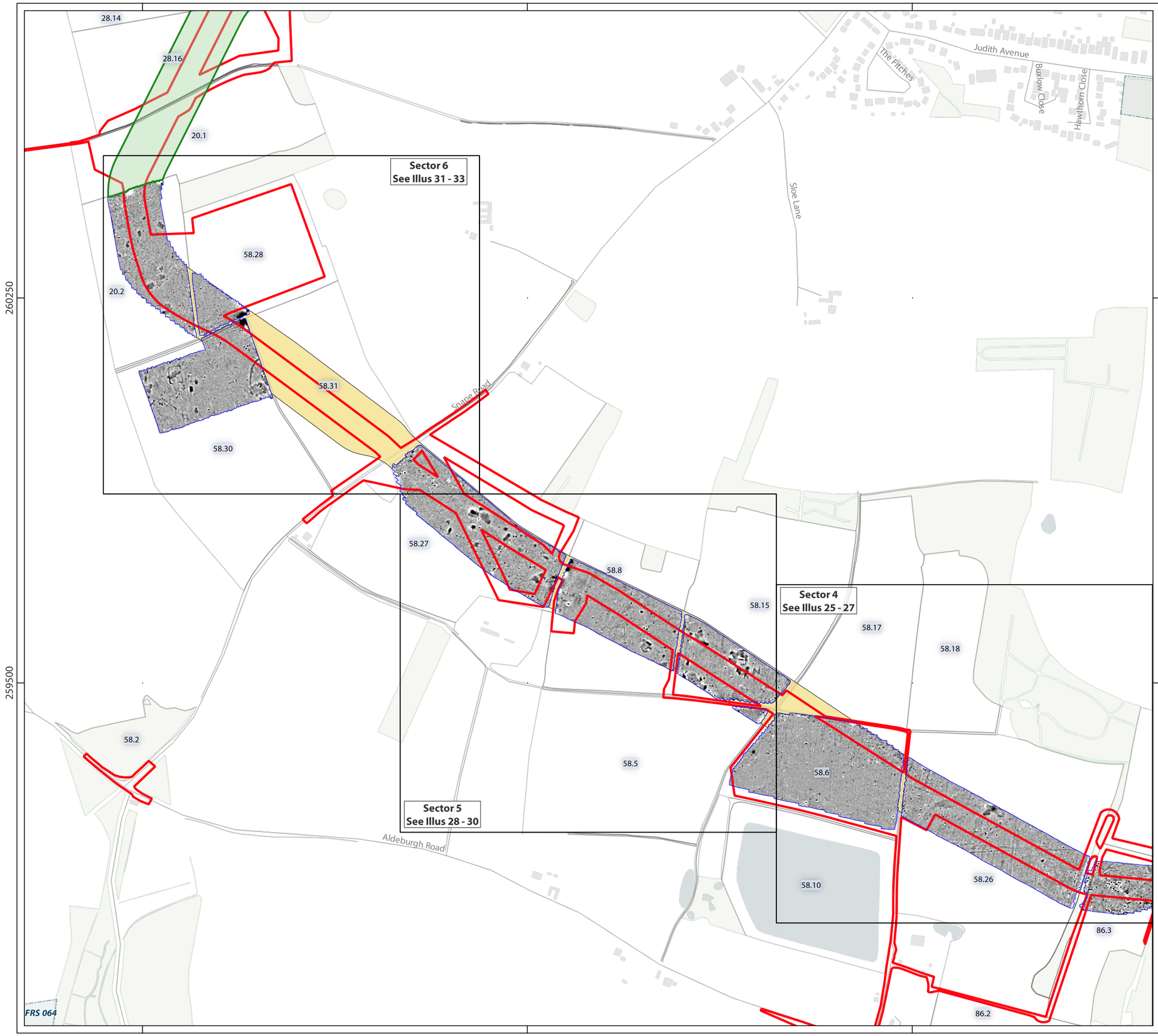
Abbreviations

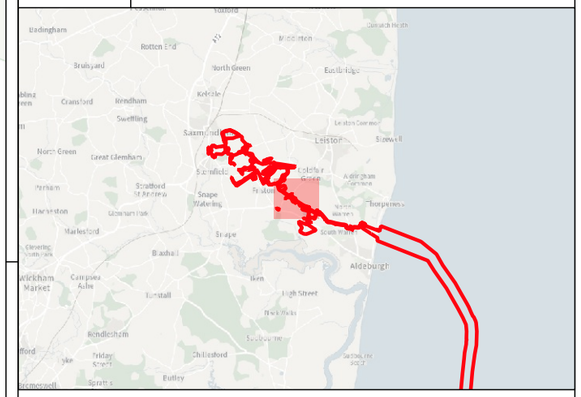
B?	Burning?
D	Ditch
E	Enslosure
Q?	Quarrying?
FB	Former Boundary
ME	Magnetic Enhancement
SP	Service Pipe

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:7,500 @ A3

Illus - 11 Interpretation of processed magnetometer data; Overview 01





Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Sector
- HER Events

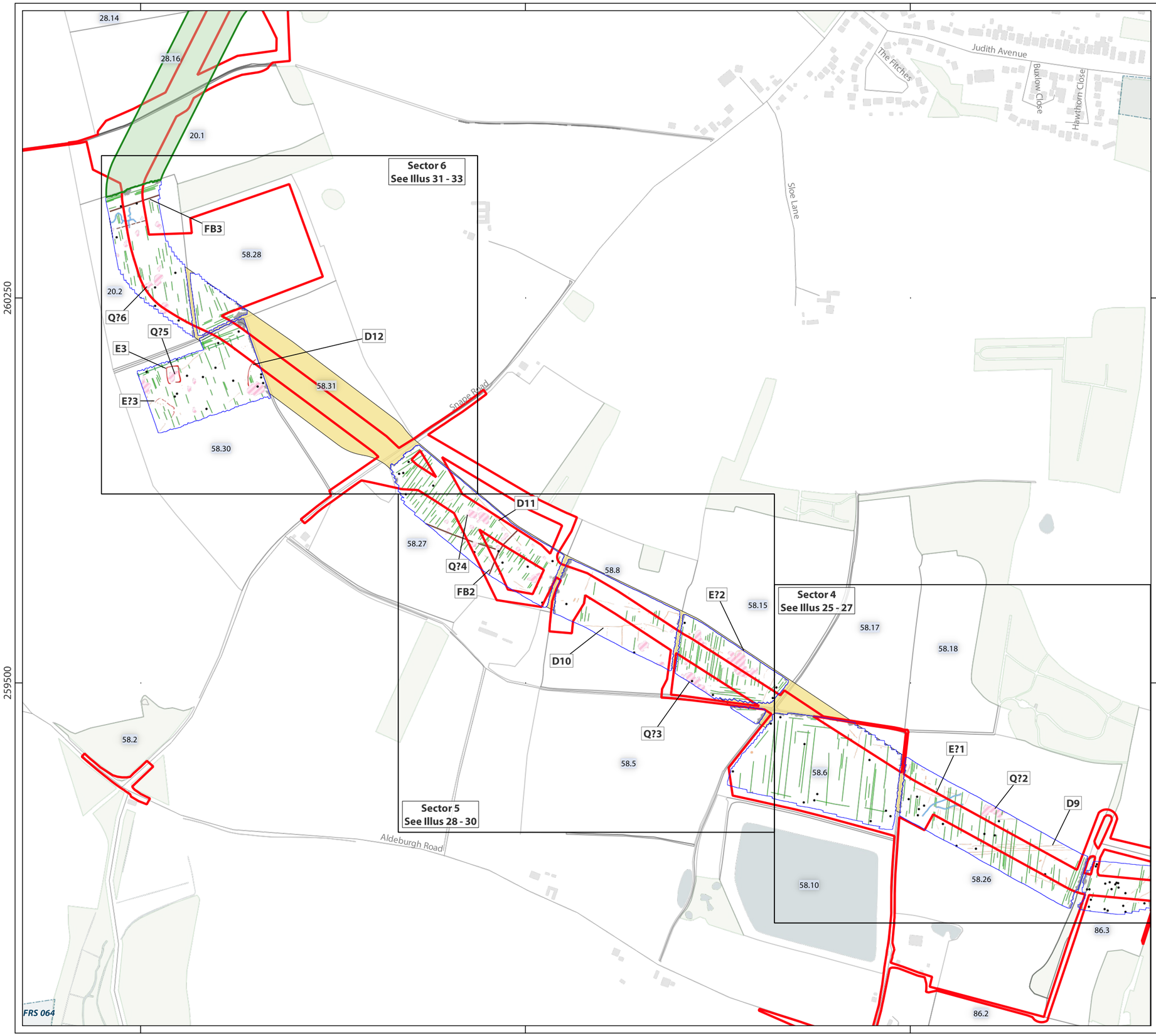
+2nT

-1nT

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:7,500 @ A3

Illus - 12 Greyscale plot of processed magnetometer data; Overview 02



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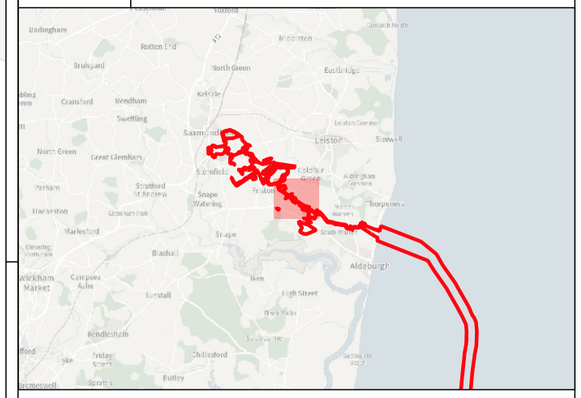


Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Sector
- HER Events
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

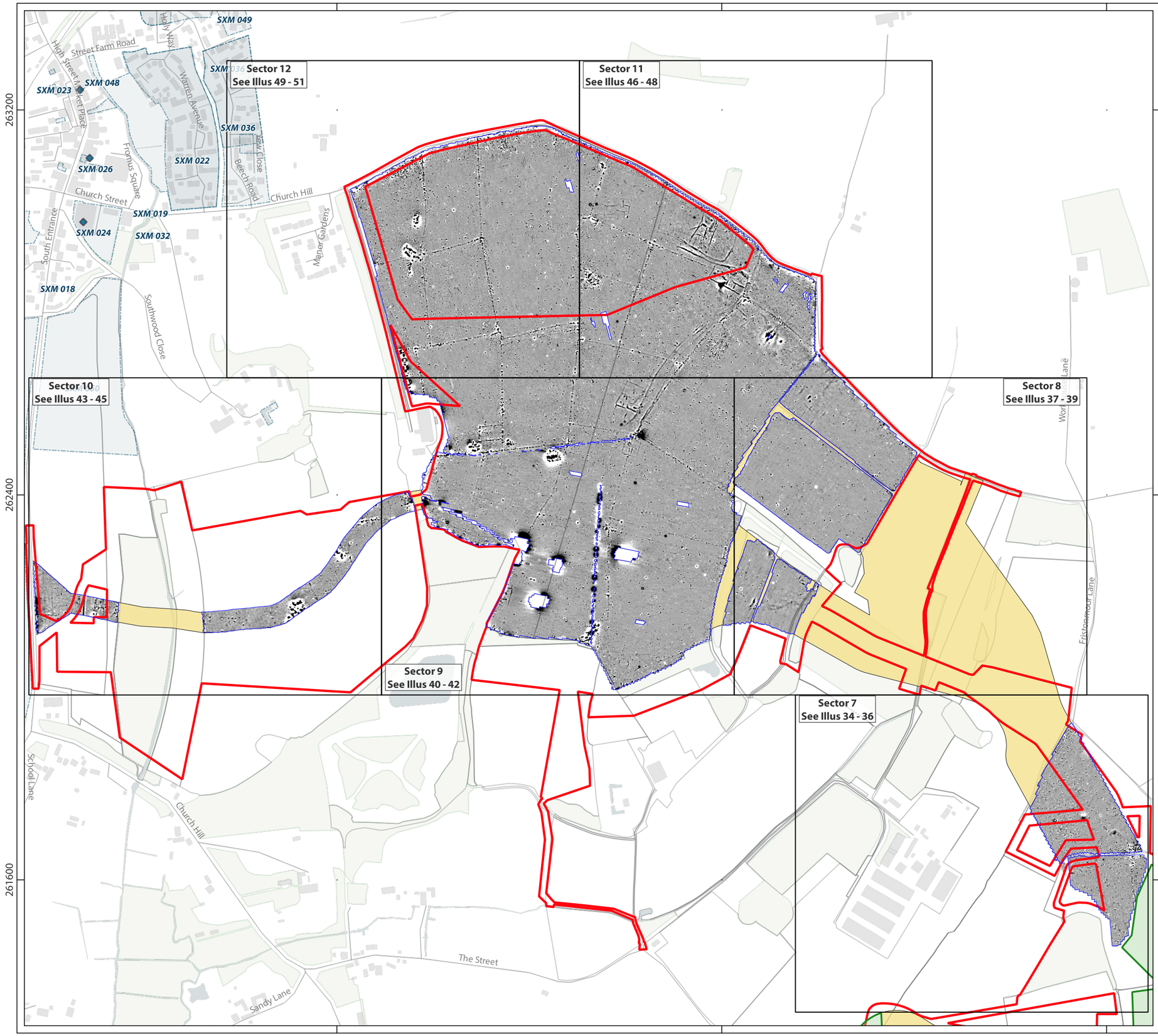
Abbreviations

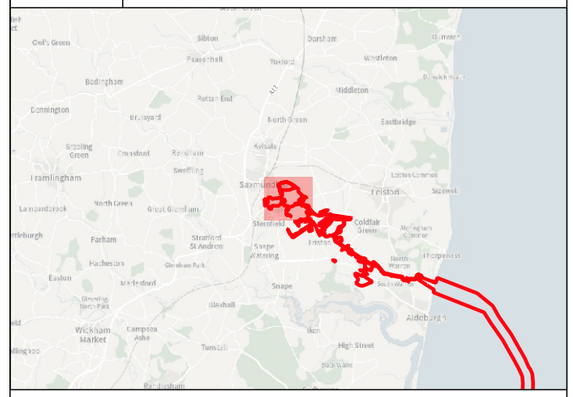
D	Ditch
E	Enslosure
E?	Enclosure?
Q?	Quarrying?
FB	Former Boundary

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:7,500 @ A3

Illus - 13 Interpretation of processed magnetometer data; Overview 02





Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Sector
- HER Events
- HER Events

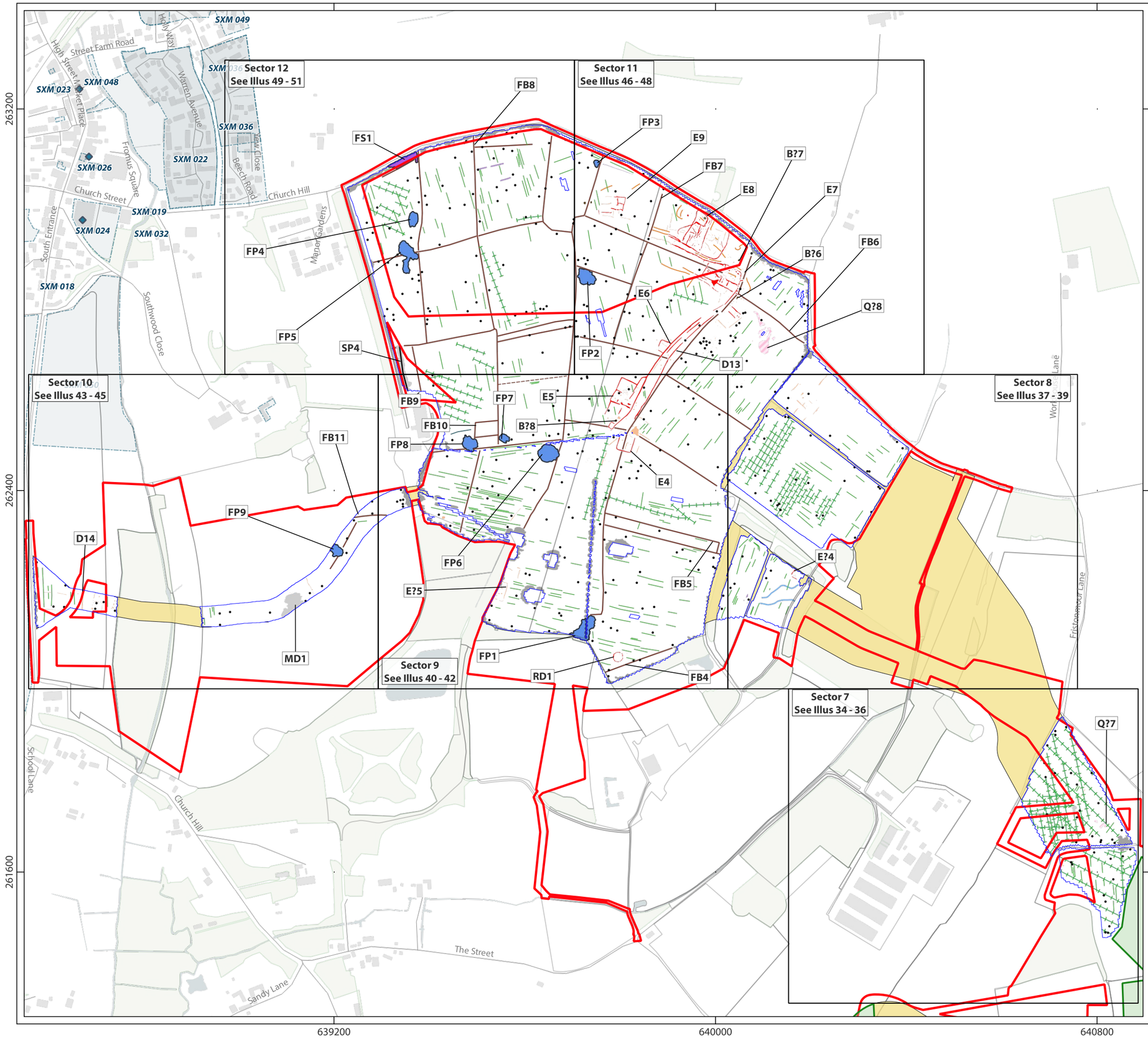
+2nT

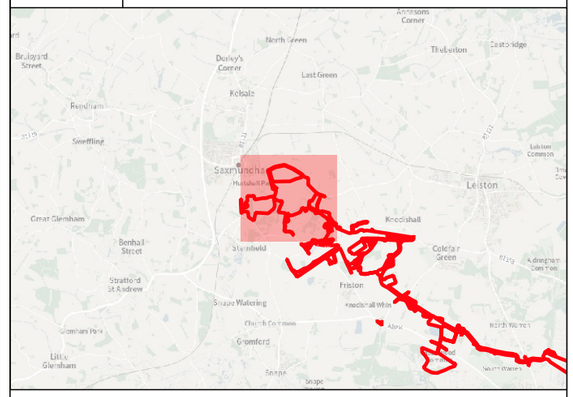
-1nT

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:8,000 @ A3

Illus - 14 Greyscale plot of processed magnetometer data; Overview 03





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Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- Area for Sector
- HER Events
- HER Events
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Service
- Uncertain
- Possible Archaeology
- Trackway (modern)
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry
- Uncertain
- Burning?
- Former Pond
- Former Structure

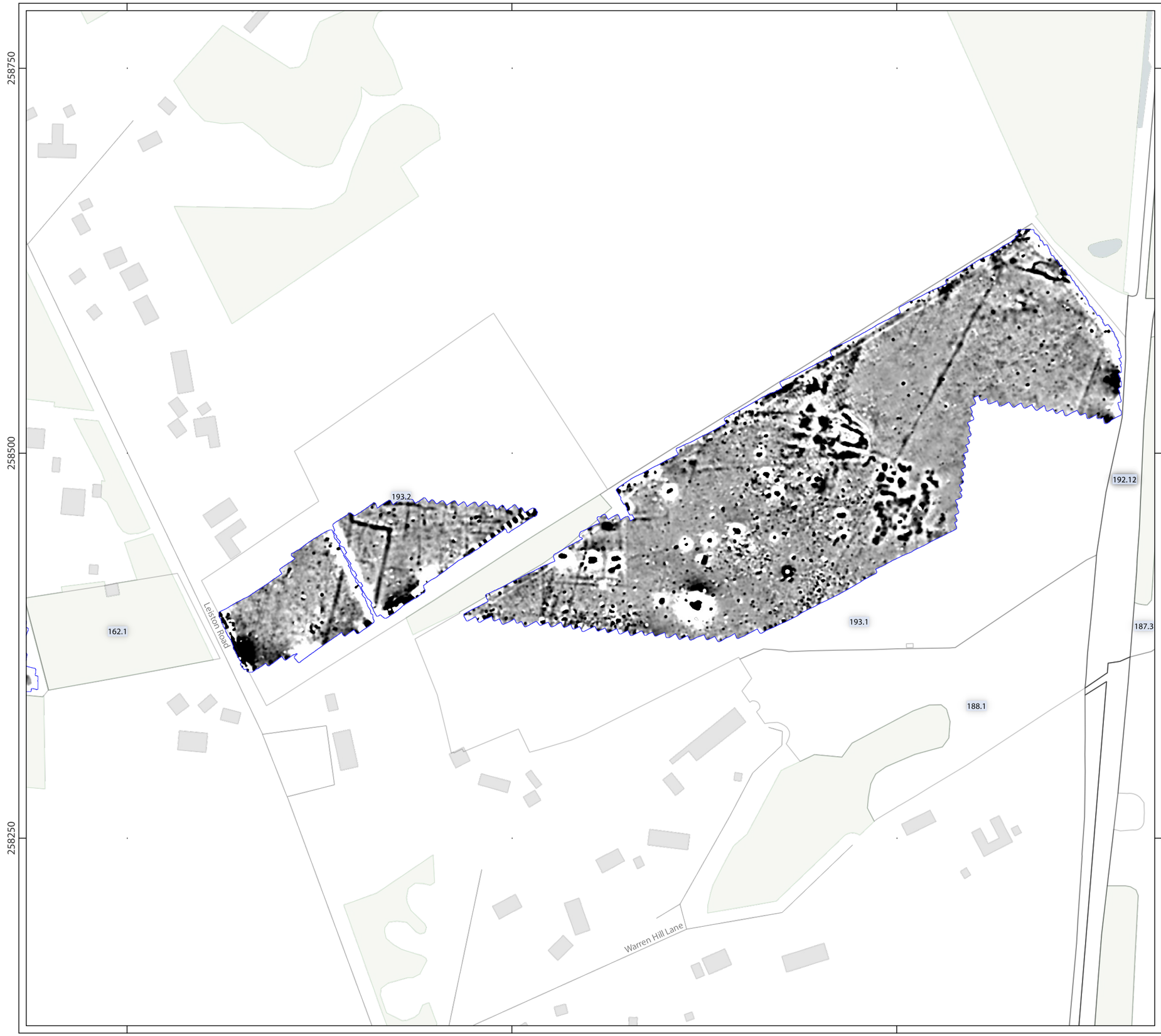
Abbreviations

B?	Burning?
D	Ditch
E	Enslosure
E?	Enclosure?
FB	Former Boundary
FP	Former Pond

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:8,000 @ A3

Illus - 15 Interpretation of processed magnetometer data; Overview 03



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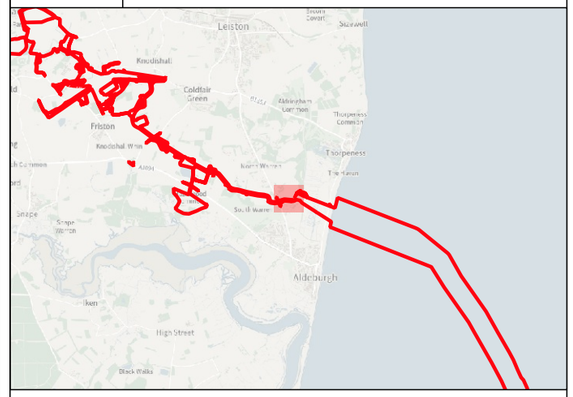


Key

Survey Extent

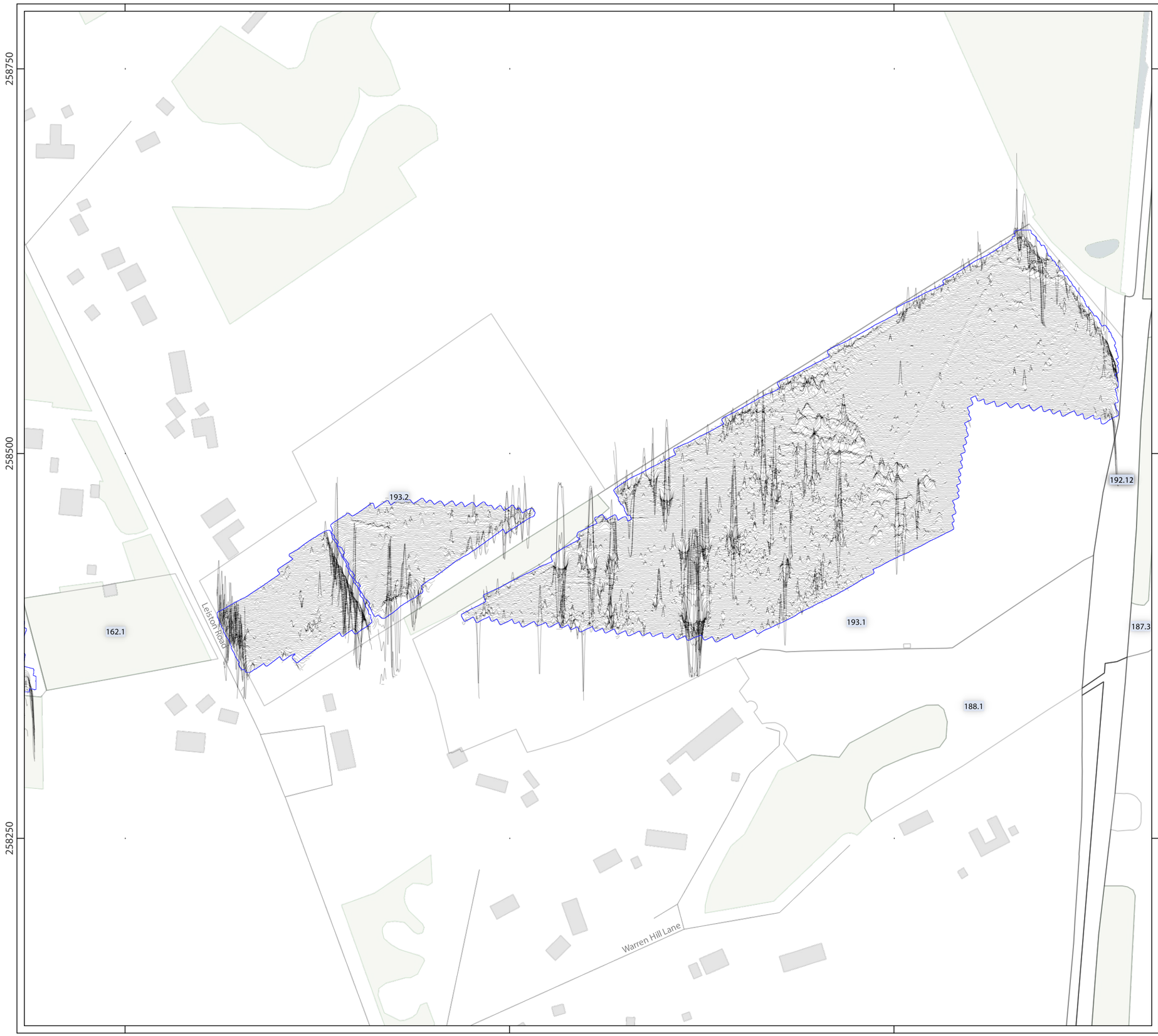
+2nT

-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 16 Processed greyscale magnetometer data; Sector 1



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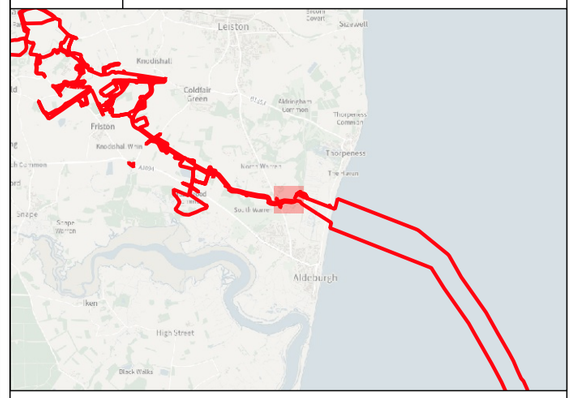


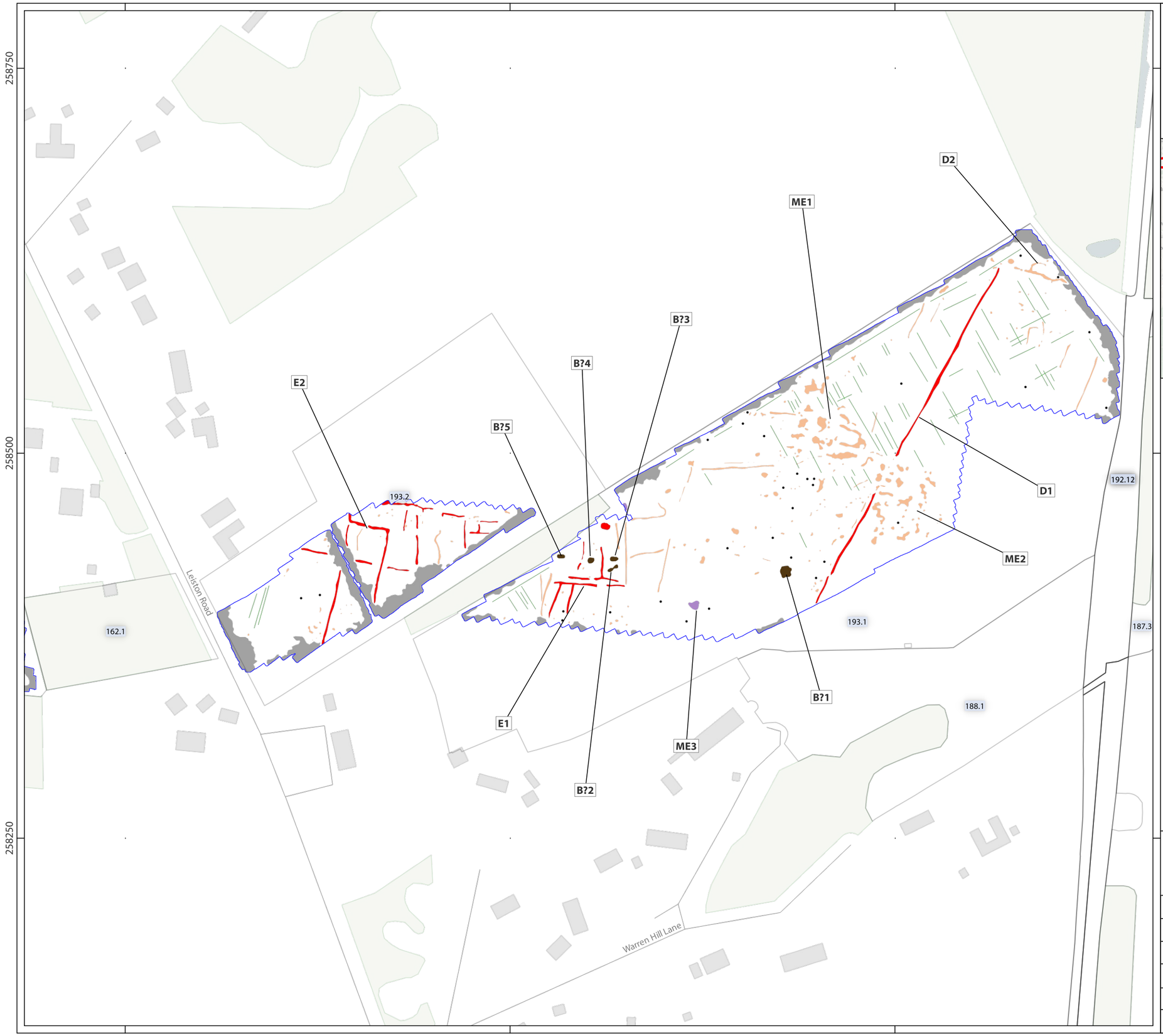
Key

- Survey Extent
- XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 17 XY trace plot of minimally processed magnetometer data; Sector 1



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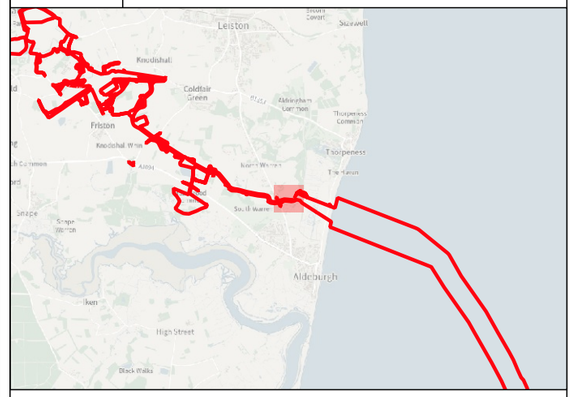


Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Archaeology
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Uncertain
- Burning?

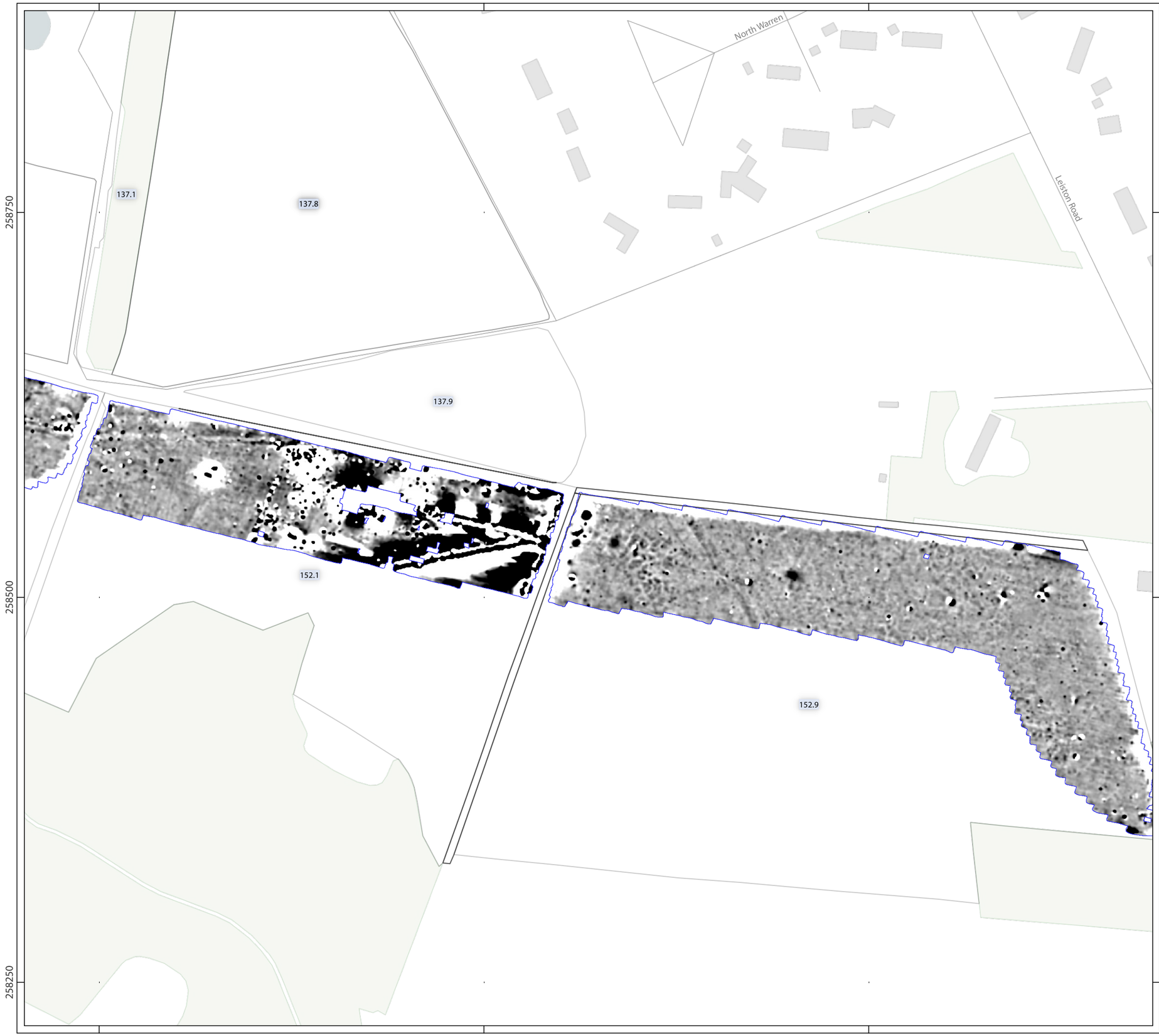
Abbreviations

B?	Burning?
D	Ditch
E	Enslosure
ME	Magnetic Enhancement

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 18 Interpretation of magnetometer data; Sector 1



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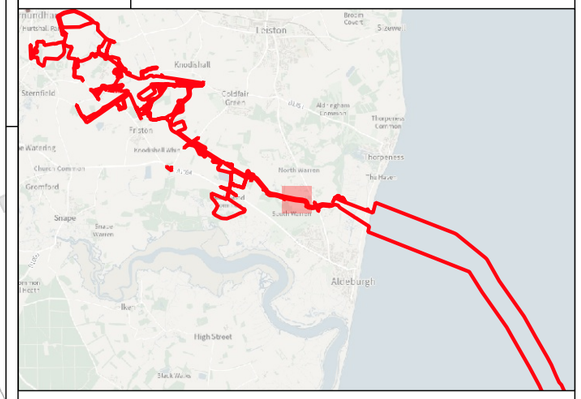


Key

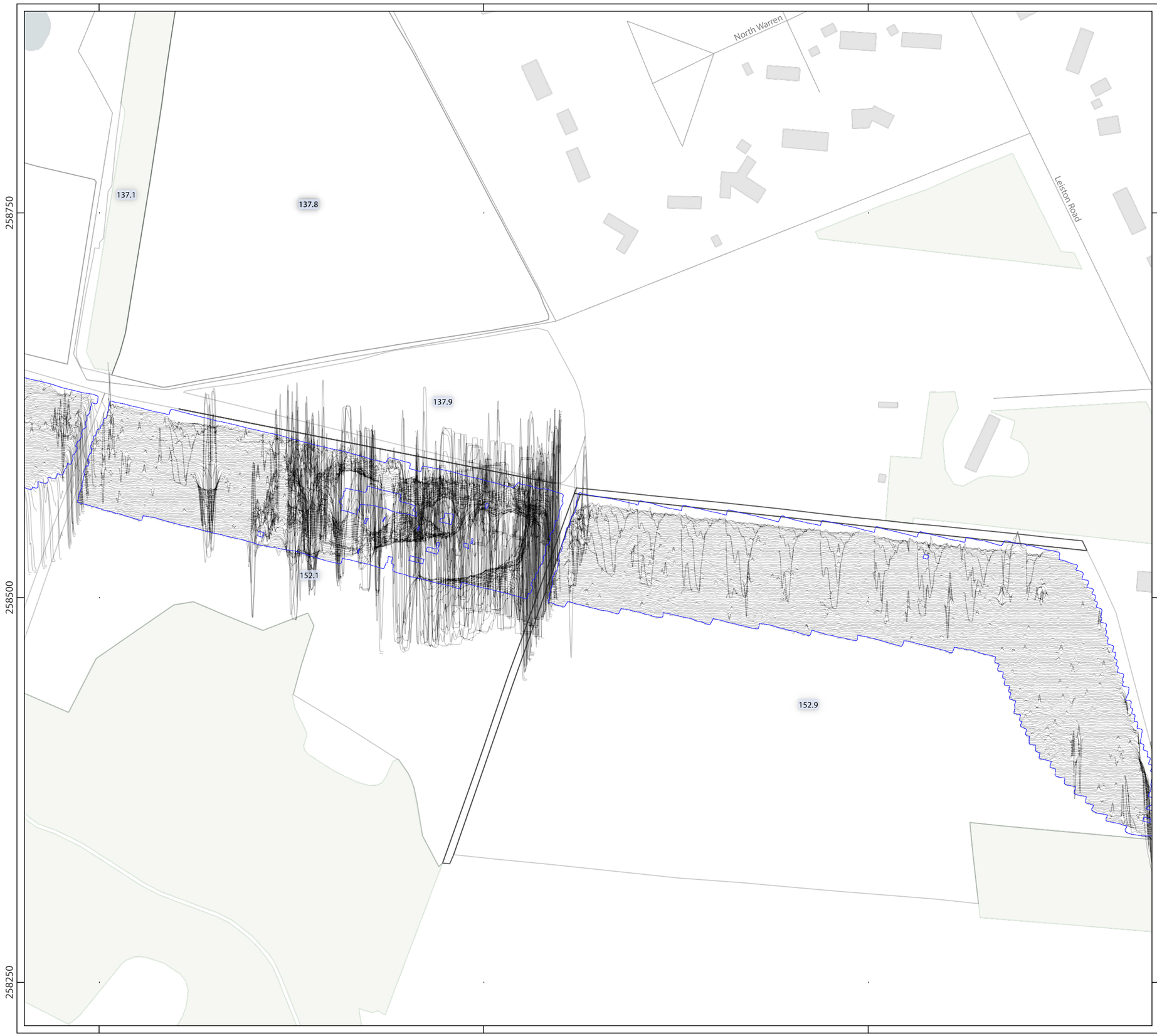
Survey Extent

+2nT
-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 19 Processed greyscale magnetometer data; Sector 2



N

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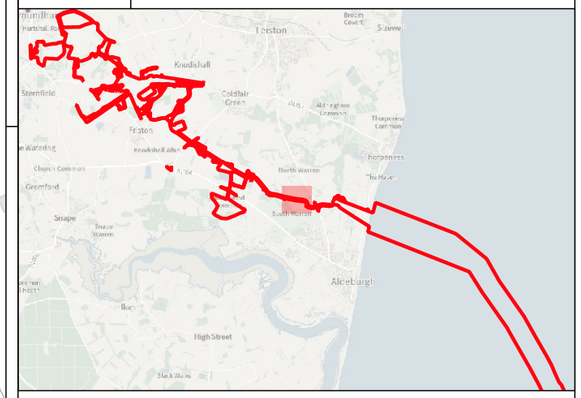


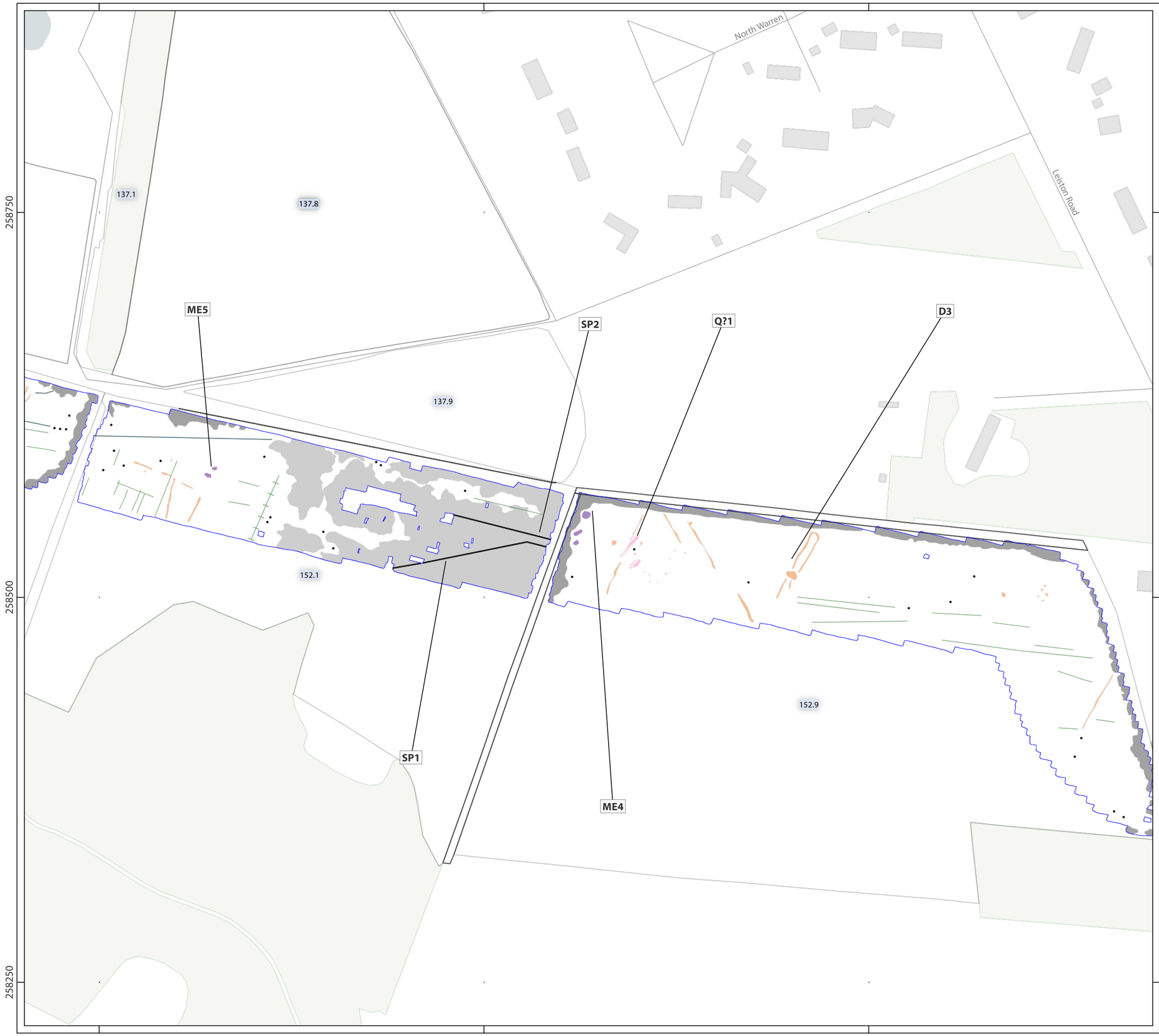
Key

- Survey Extent
- XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 20 XY trace plot of minimally processed magnetometer data; Sector 2



N

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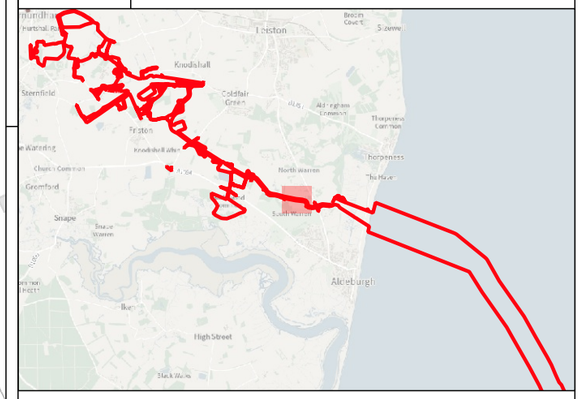
part of the RSK Group



Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Drain
- Service
- Trackway (modern)
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry
- Uncertain

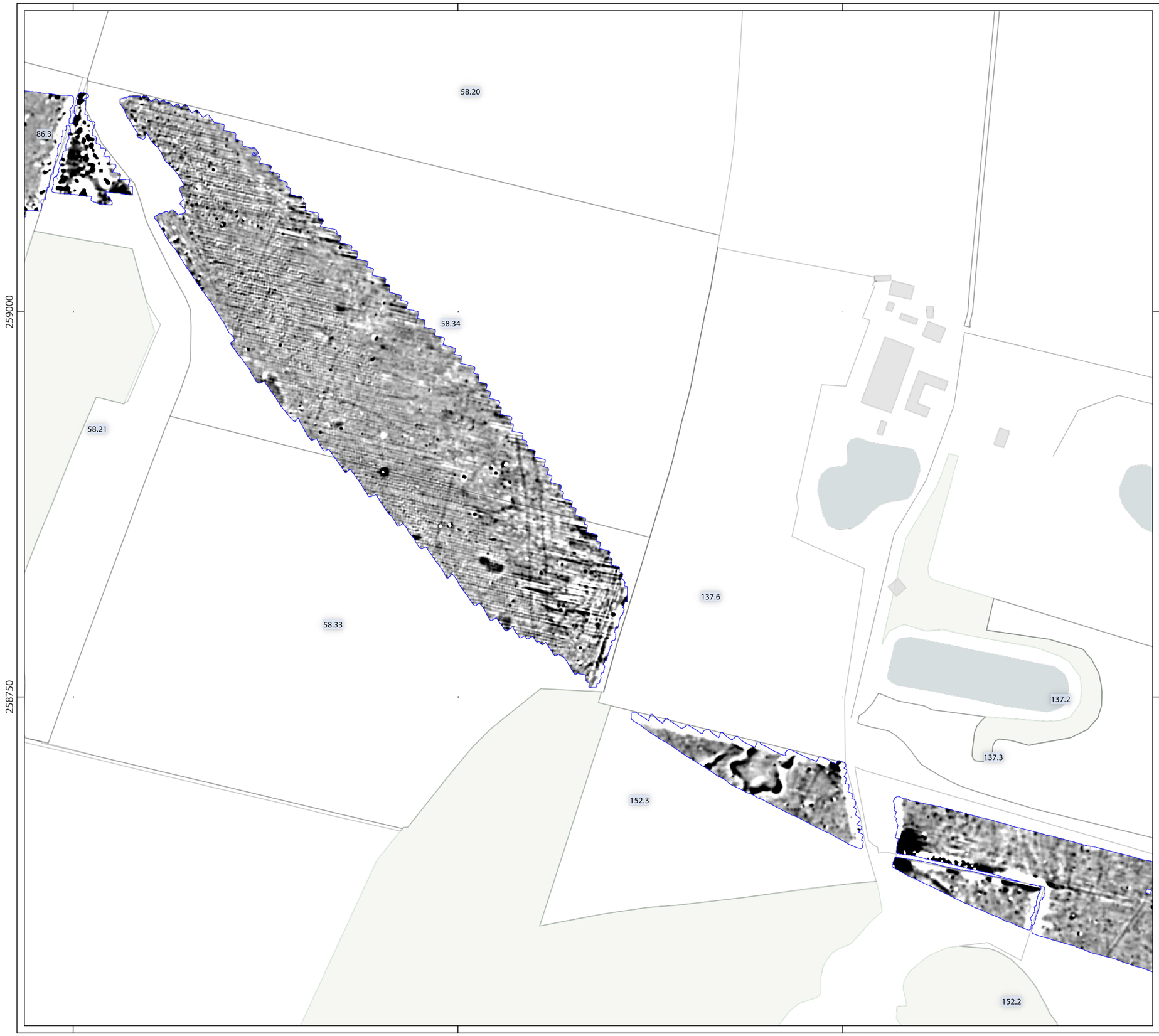
Abbreviations

D	Ditch
Q?	Quarrying?
ME	Magnetic Enhancement
SP	Service Pipe

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 21 Interpretation of magnetometer data; Sector 2



N

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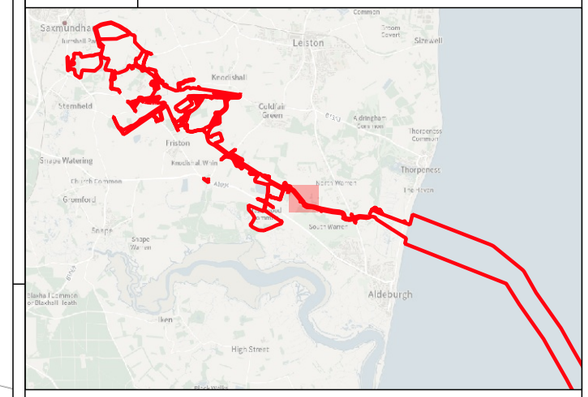
part of the RSK Group



Key

Survey Extent

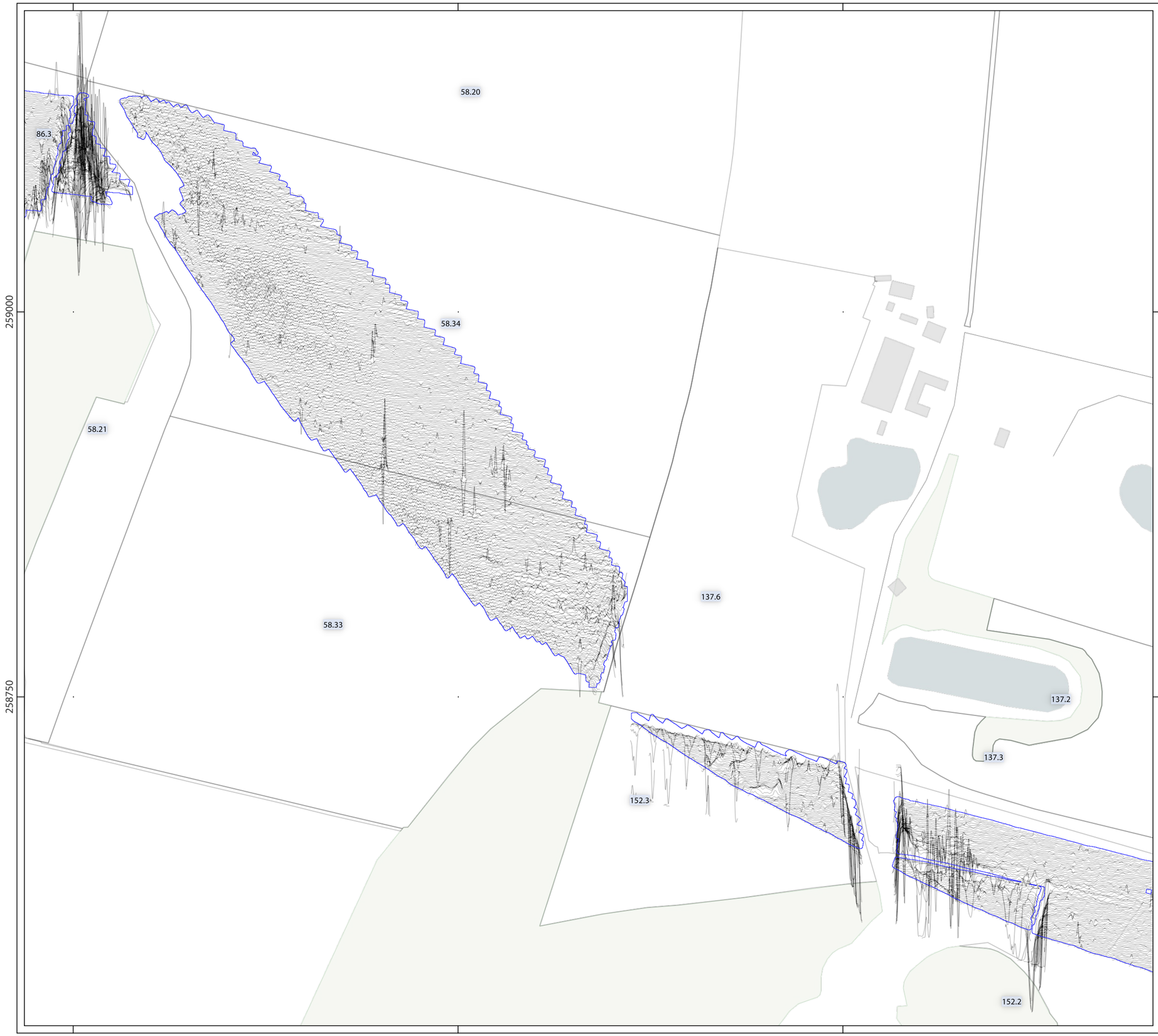
+2nT

-1nT

0 40 80 m

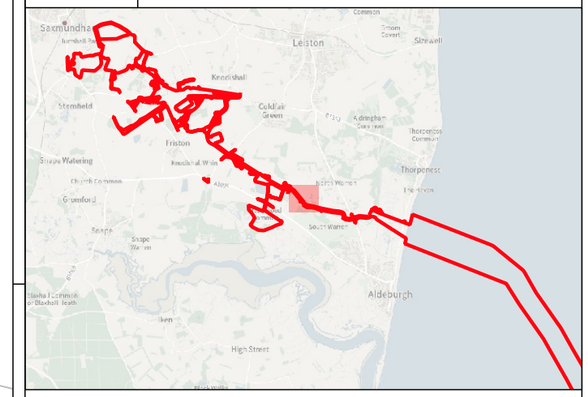
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 22 Processed greyscale magnetometer data; Sector 3



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

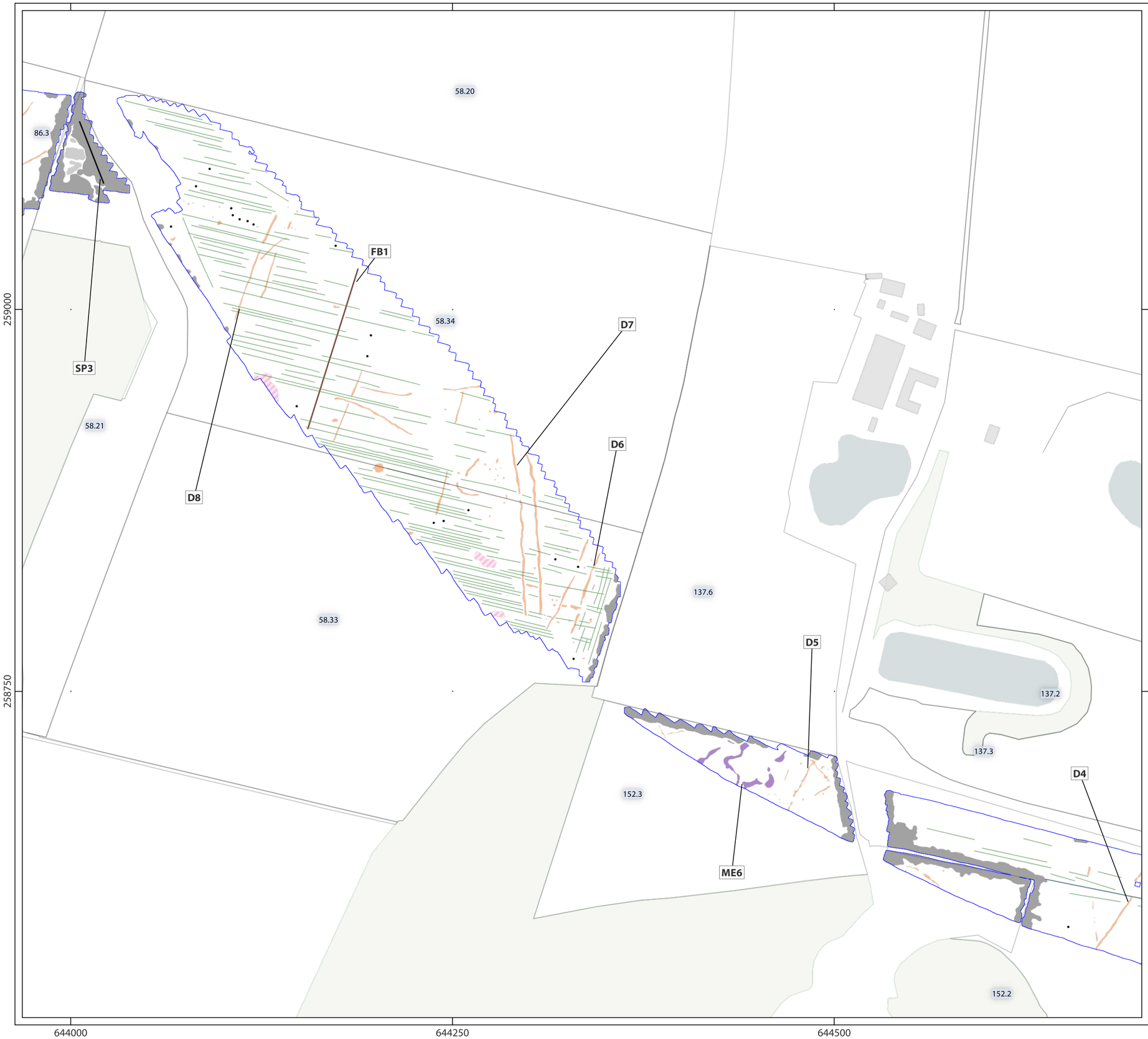
Survey Extent

XY Trace (25nT/cm)

0 40 80 m

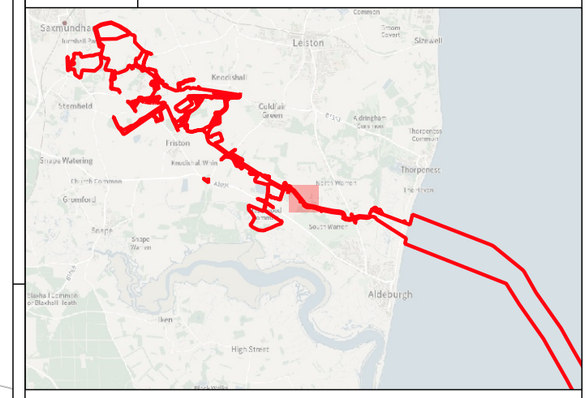
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 23 XY trace plot of minimally processed magnetometer data; Sector 3



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Service
- Trackway (modern)
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry
- Uncertain

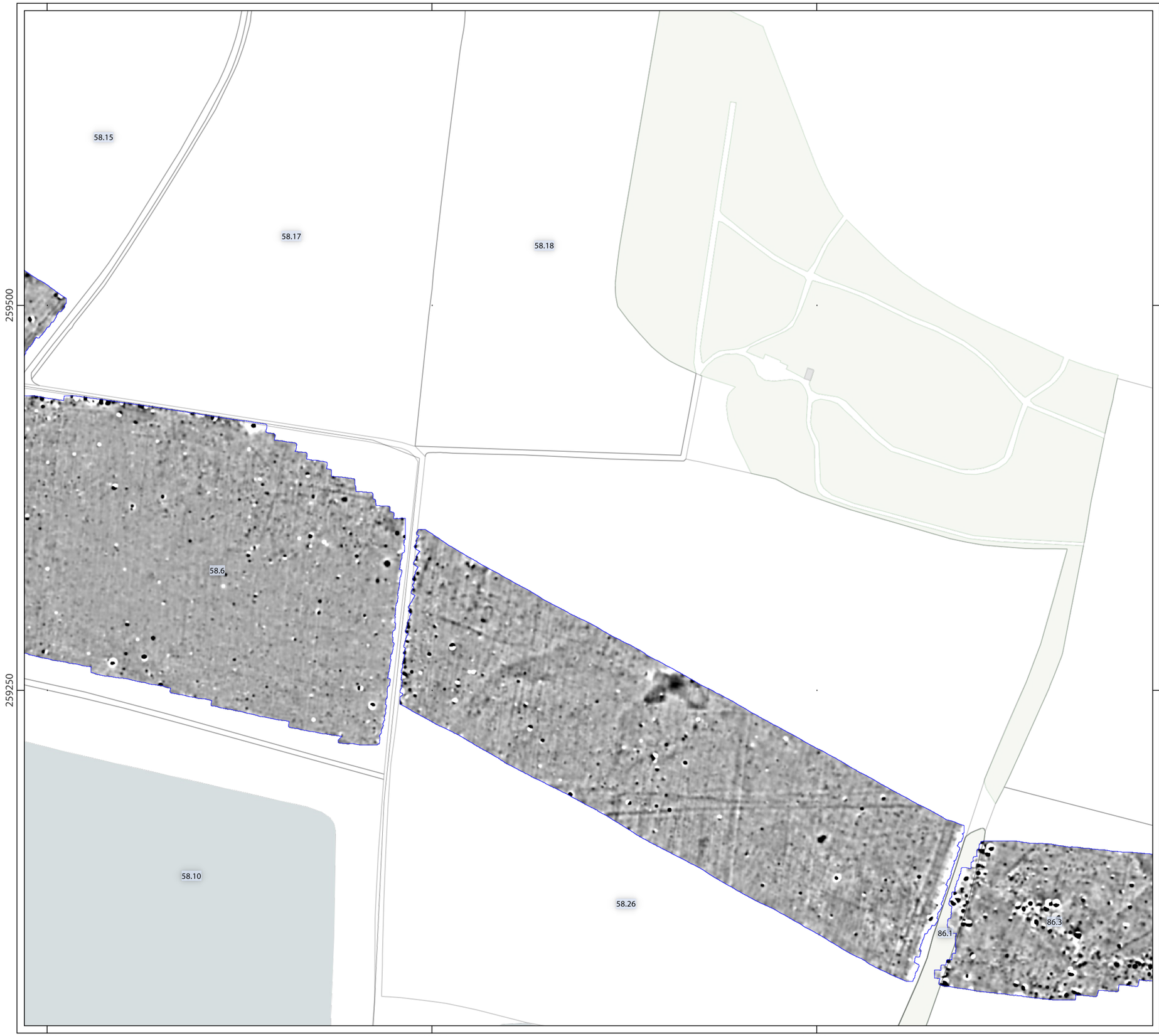
Abbreviations

D	Ditch
FB	Former Boundary
ME	Magnetic Enhancement
SP	Service Pipe

0 40 80 m

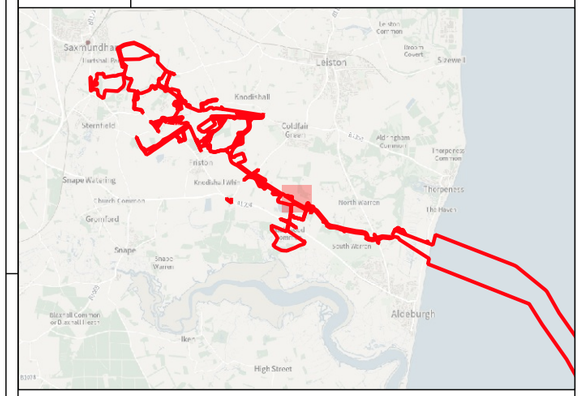
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 24 Interpretation of magnetometer data; Sector 3



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

Survey Extent

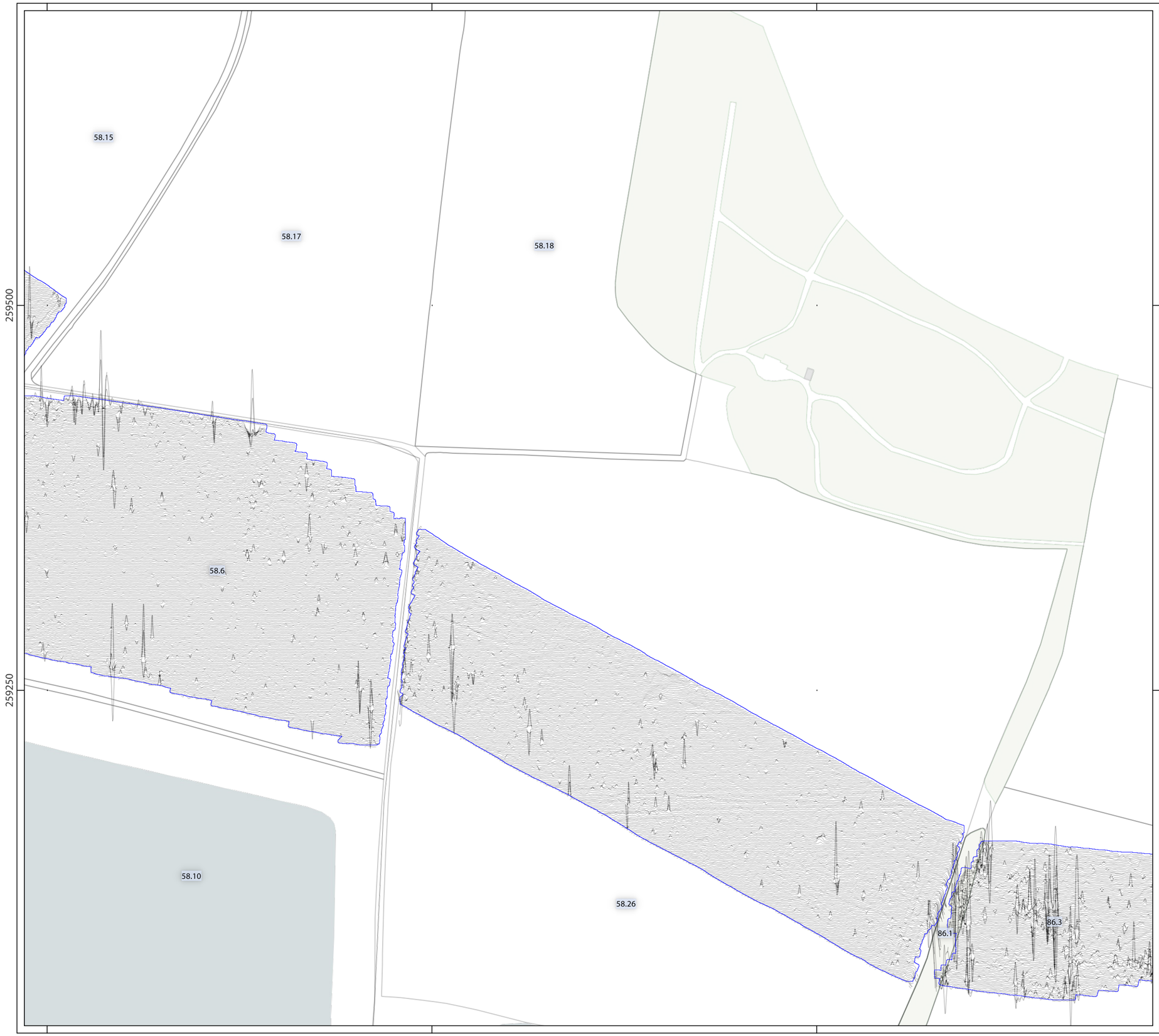
+2nT

-1nT

0 40 80 m

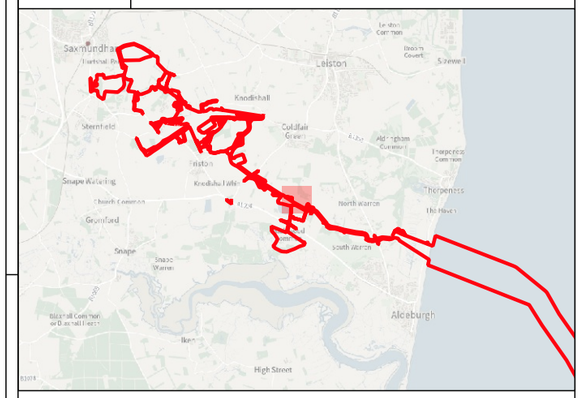
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 25 Processed greyscale magnetometer data; Sector 4



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

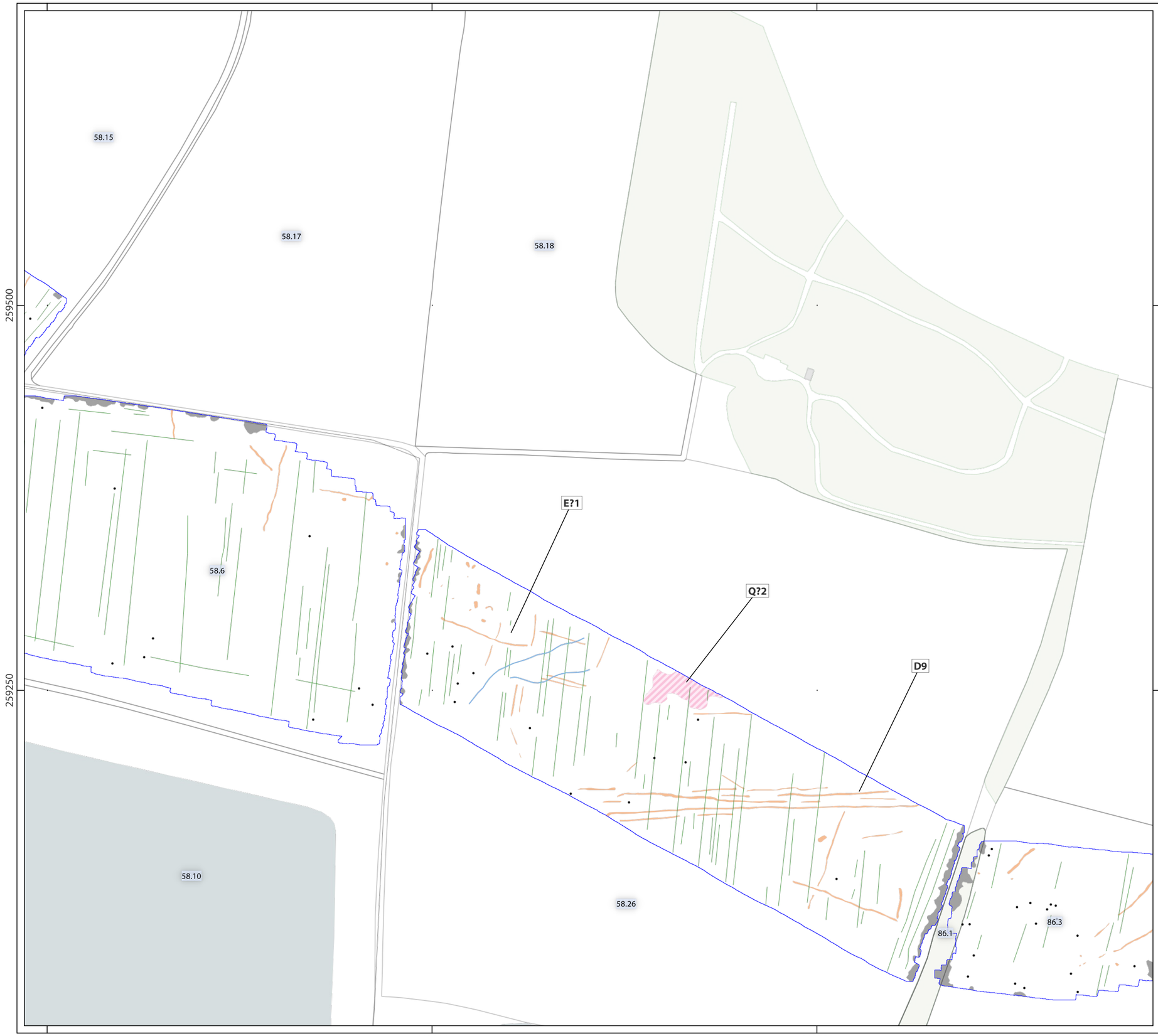
Survey Extent

XY Trace (25nT/cm)

0 40 80 m

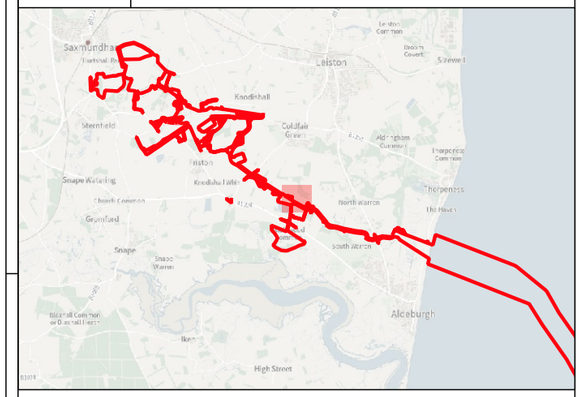
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 26 XY trace plot of minimally processed magnetometer data; Sector 4



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Natural
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Quarry

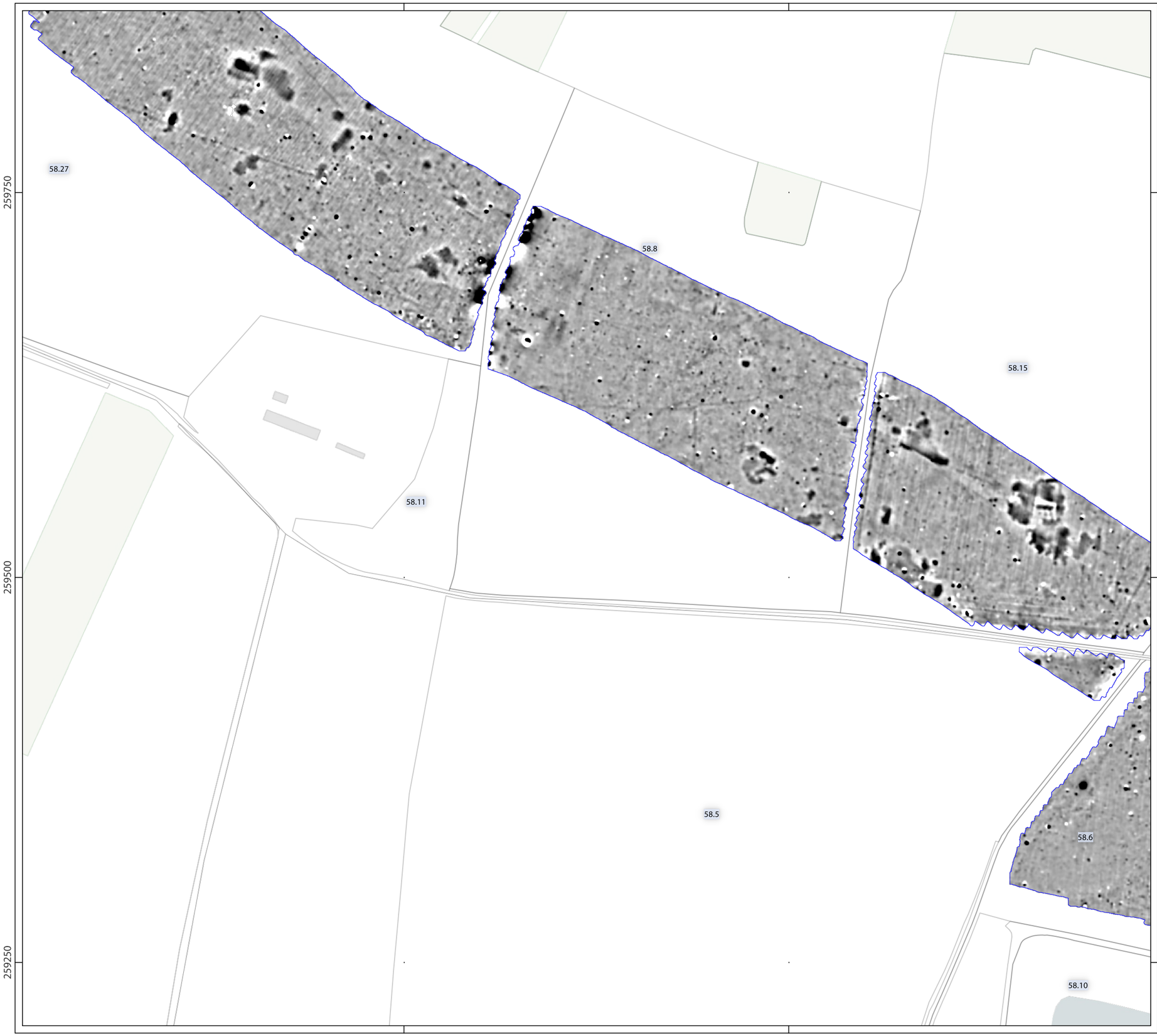
Abbreviations

D	Ditch
E?	Enclosure?
Q?	Quarrying?

0 40 80 m

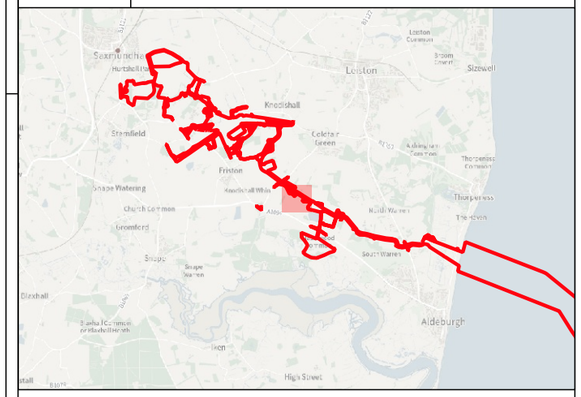
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 27 Interpretation of magnetometer data; Sector 4



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

Survey Extent

+2nT
-1nT

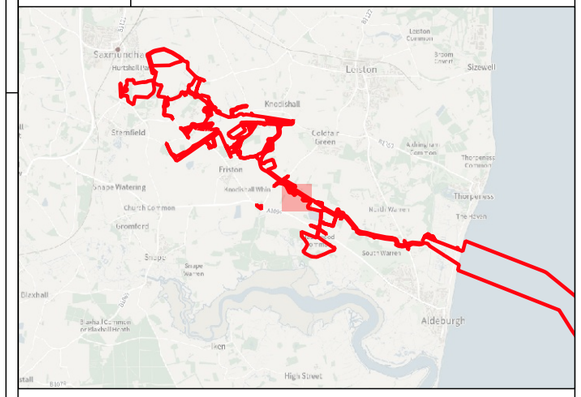
0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 28 Processed greyscale magnetometer data; Sector 5

N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

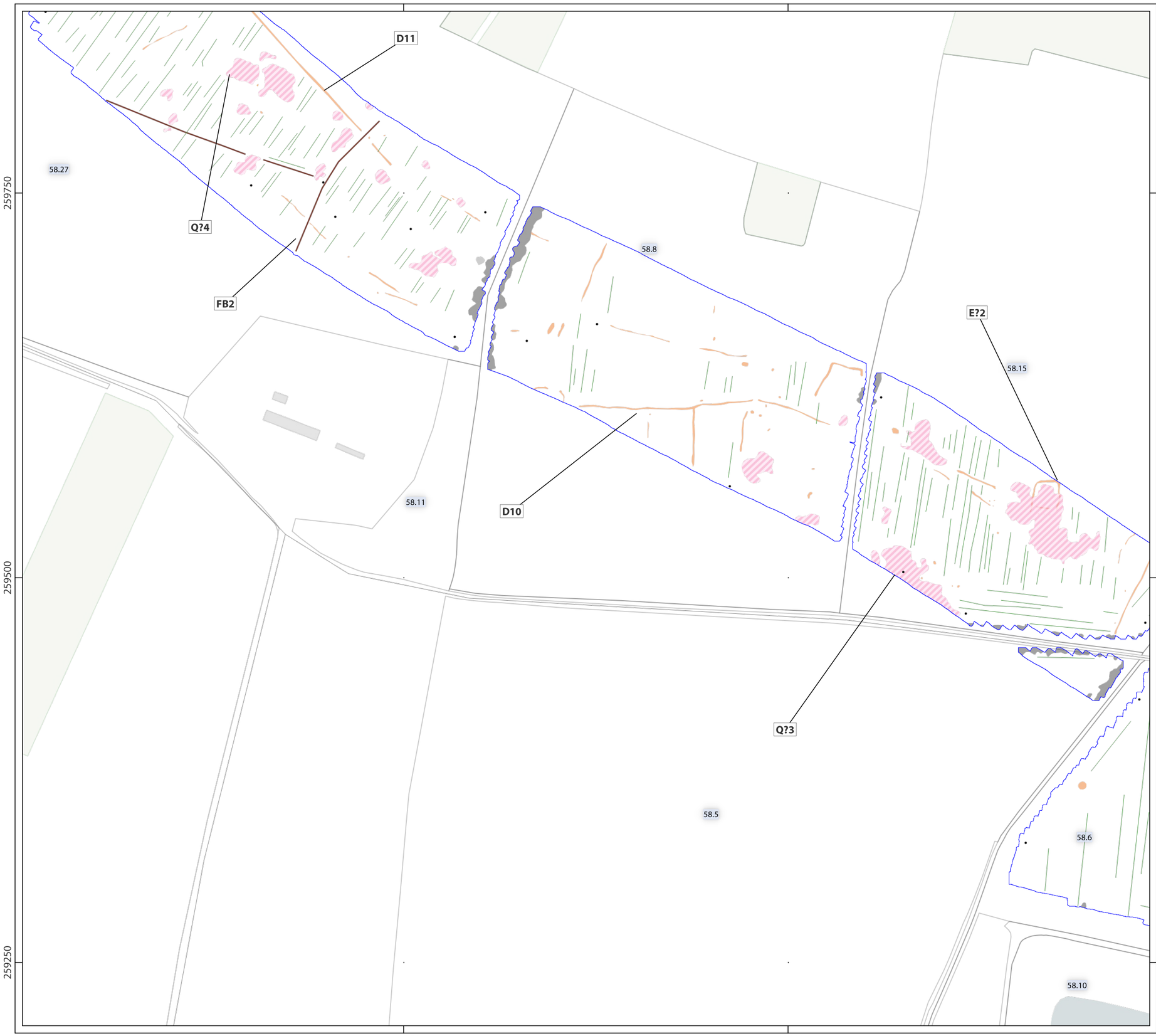
Survey Extent

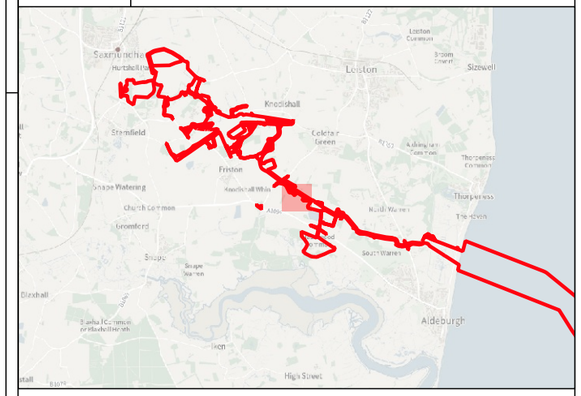
XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 29 XY trace plot of minimally processed magnetometer data; Sector 5





Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

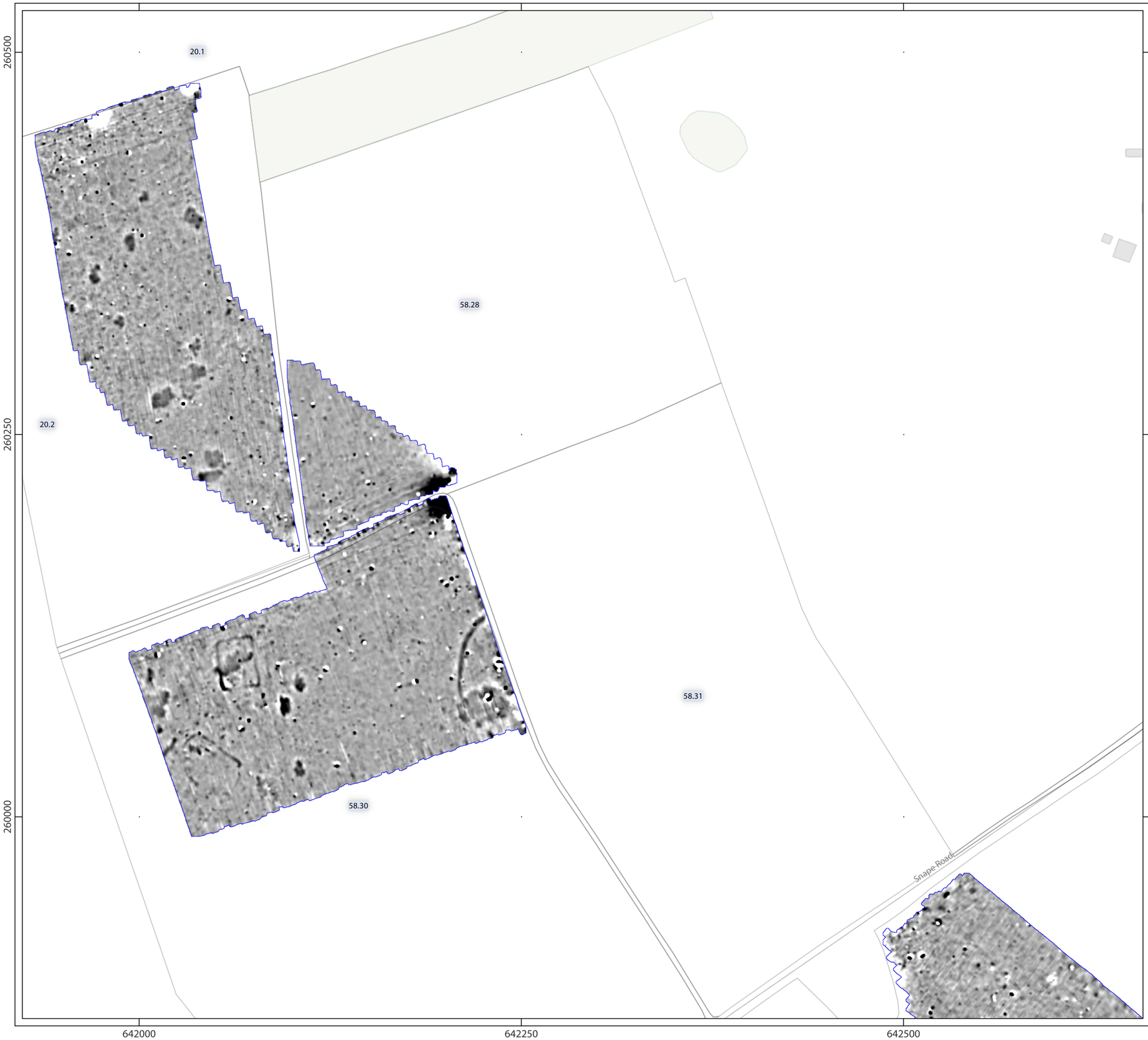
Abbreviations

D	Ditch
E?	Enclosure?
Q?	Quarrying?
FB	Former Boundary

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 30 Interpretation of magnetometer data; Sector 5



N

HEADLAND ARCHAEOLOGY
part of the RSK Group

Key

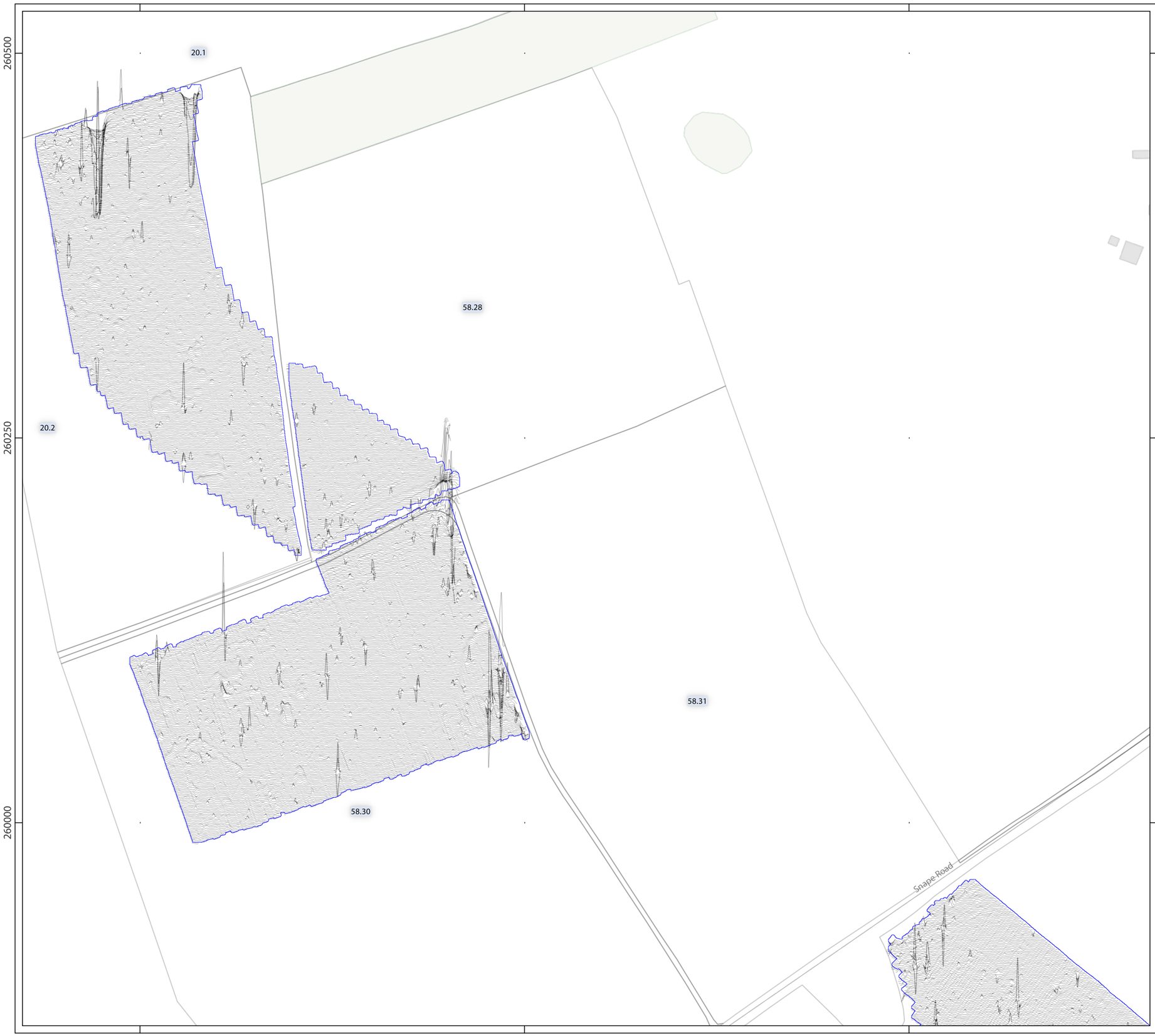
Survey Extent

+2nT
-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 31 Processed greyscale magnetometer data; Sector 6



N

HEADLAND ARCHAEOLOGY
part of the RSK Group

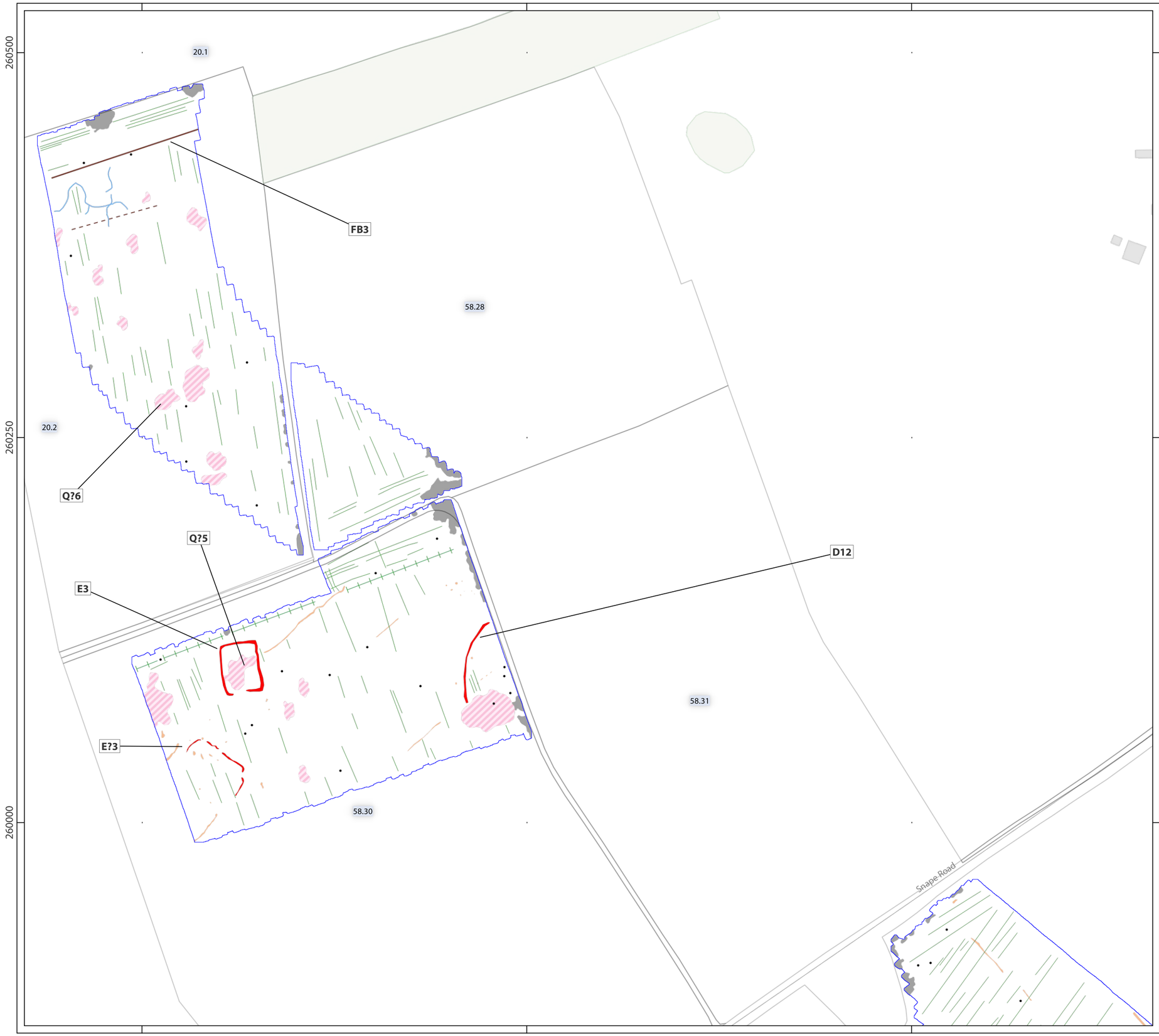
Key

- Survey Extent
- XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 32 XY trace plot of minimally processed magnetometer data; Sector 6



N

HEADLAND ARCHAEOLOGY
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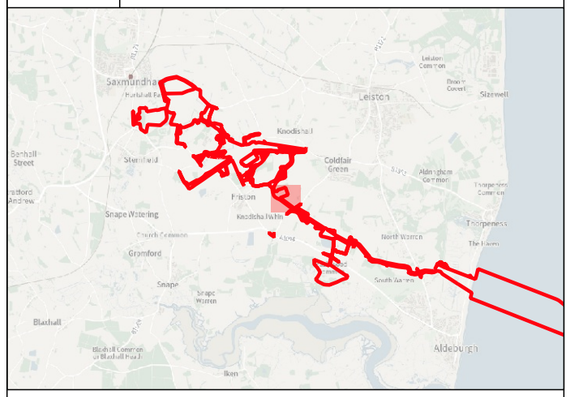


Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Quarry

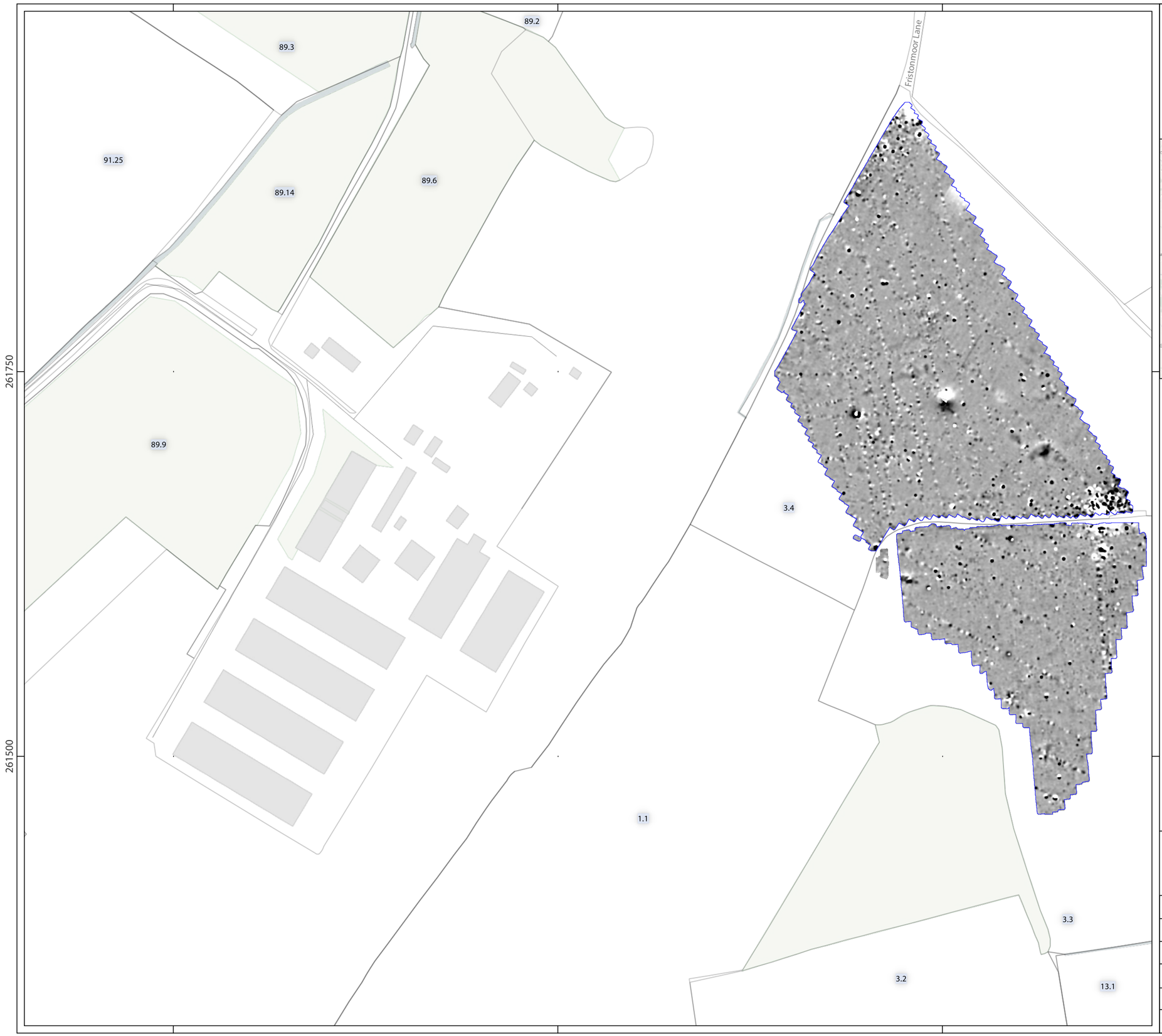
Abbreviations

D	Ditch
E	Enslosure
E?	Enclosure?
Q?	Quarrying?
FB	Former Boundary

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 33 Interpretation of magnetometer data; Sector 6



N

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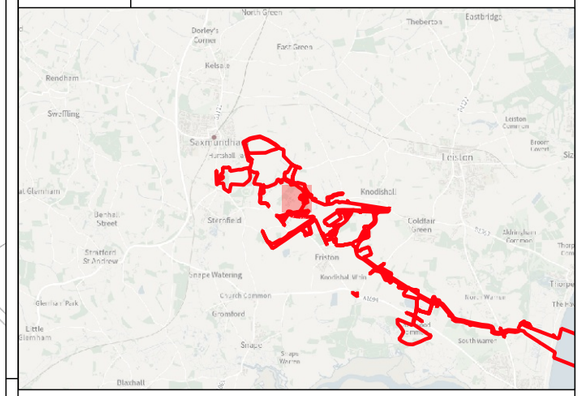


Key

Survey Extent

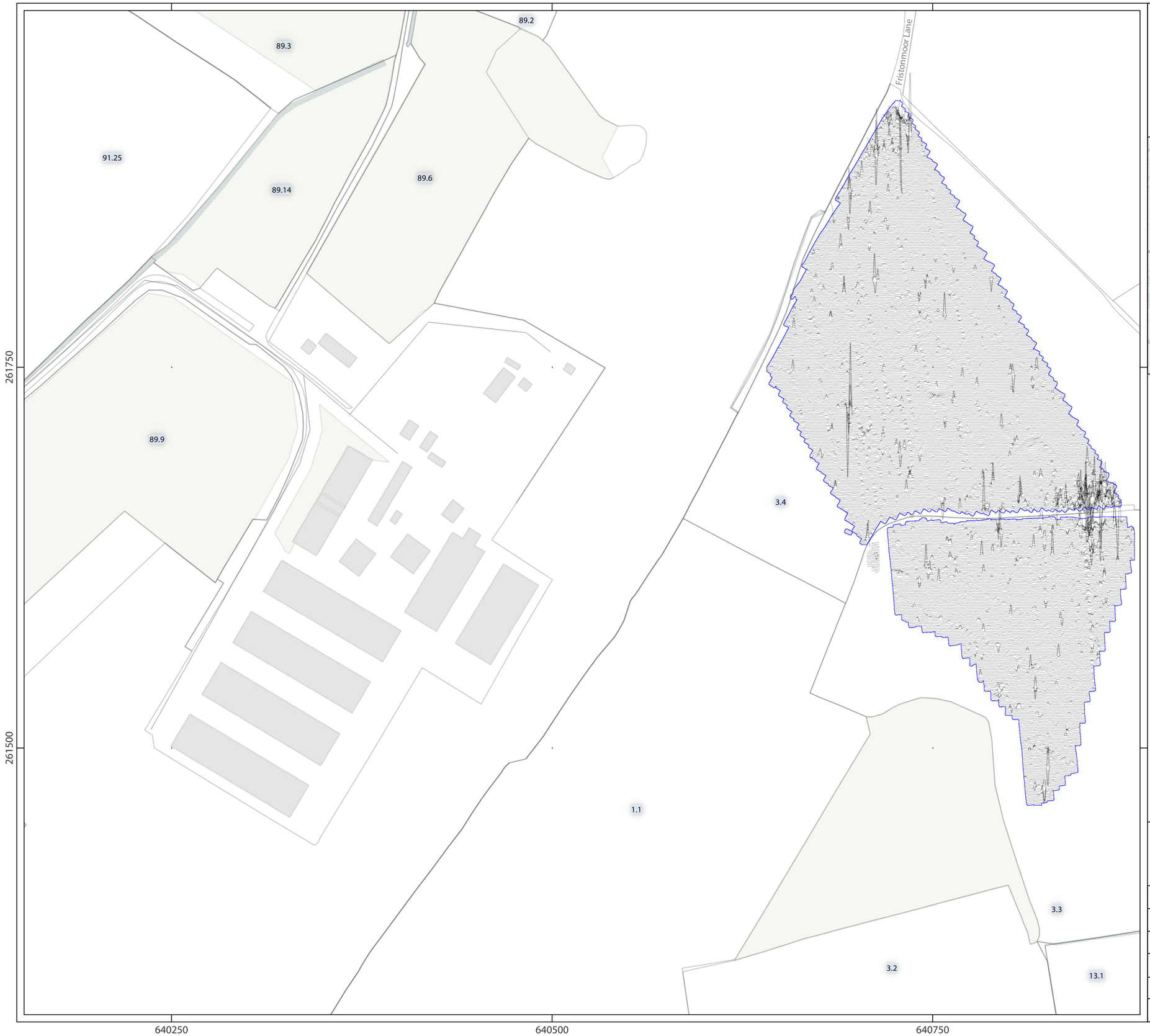
+2nT

-1nT

0 40 80 m

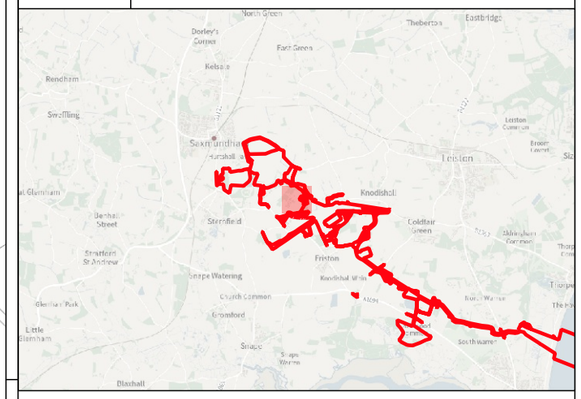
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 34 Processed greyscale magnetometer data; Sector 7



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

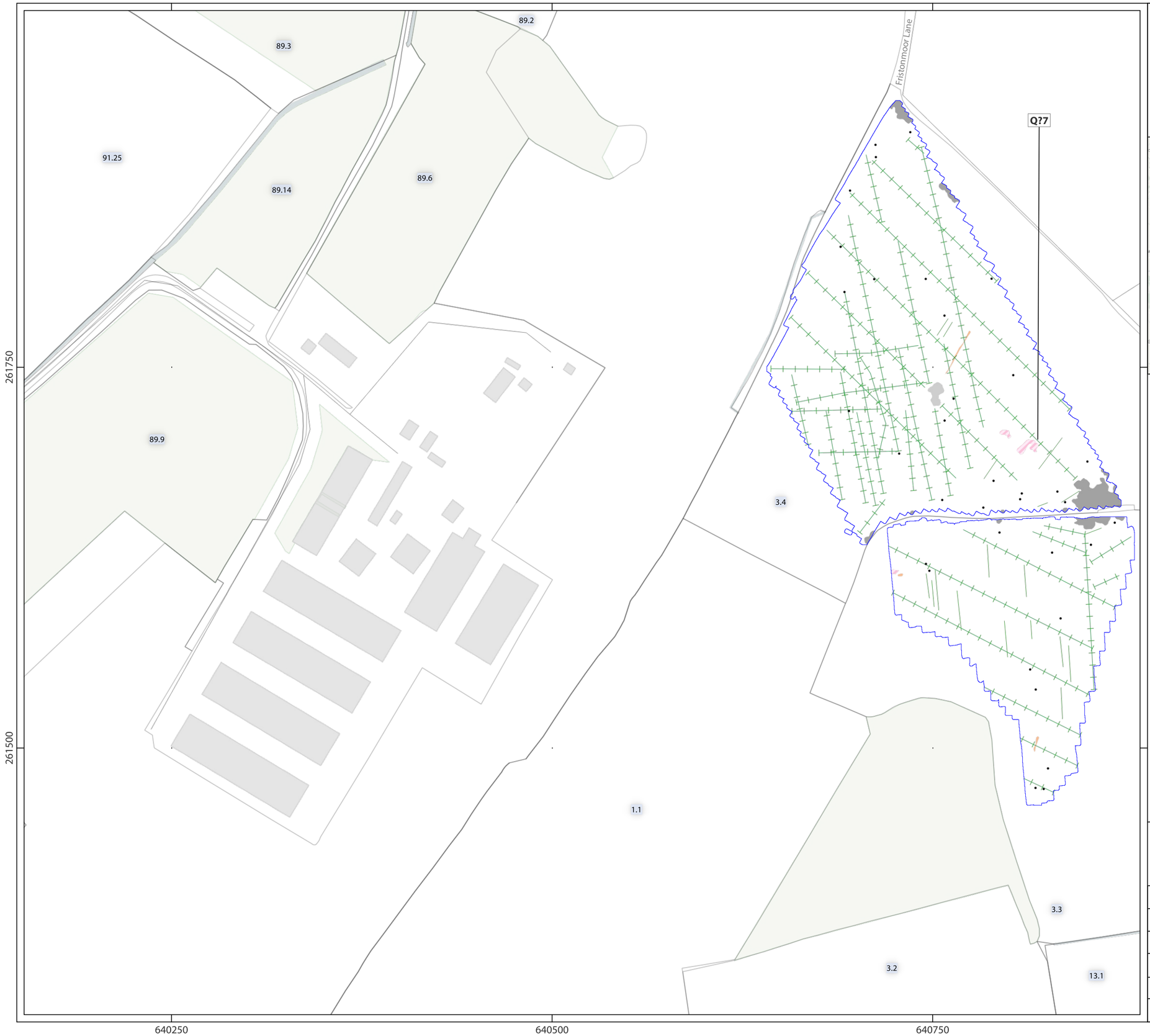
Survey Extent

XY Trace (25nT/cm)

0 40 80 m

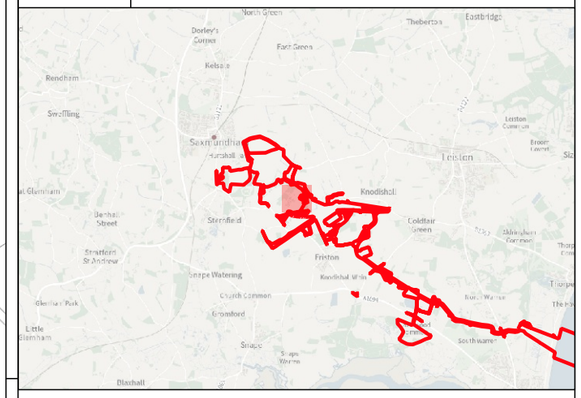
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 35 XY trace plot of minimally processed magnetometer data; Sector 7



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Drain
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

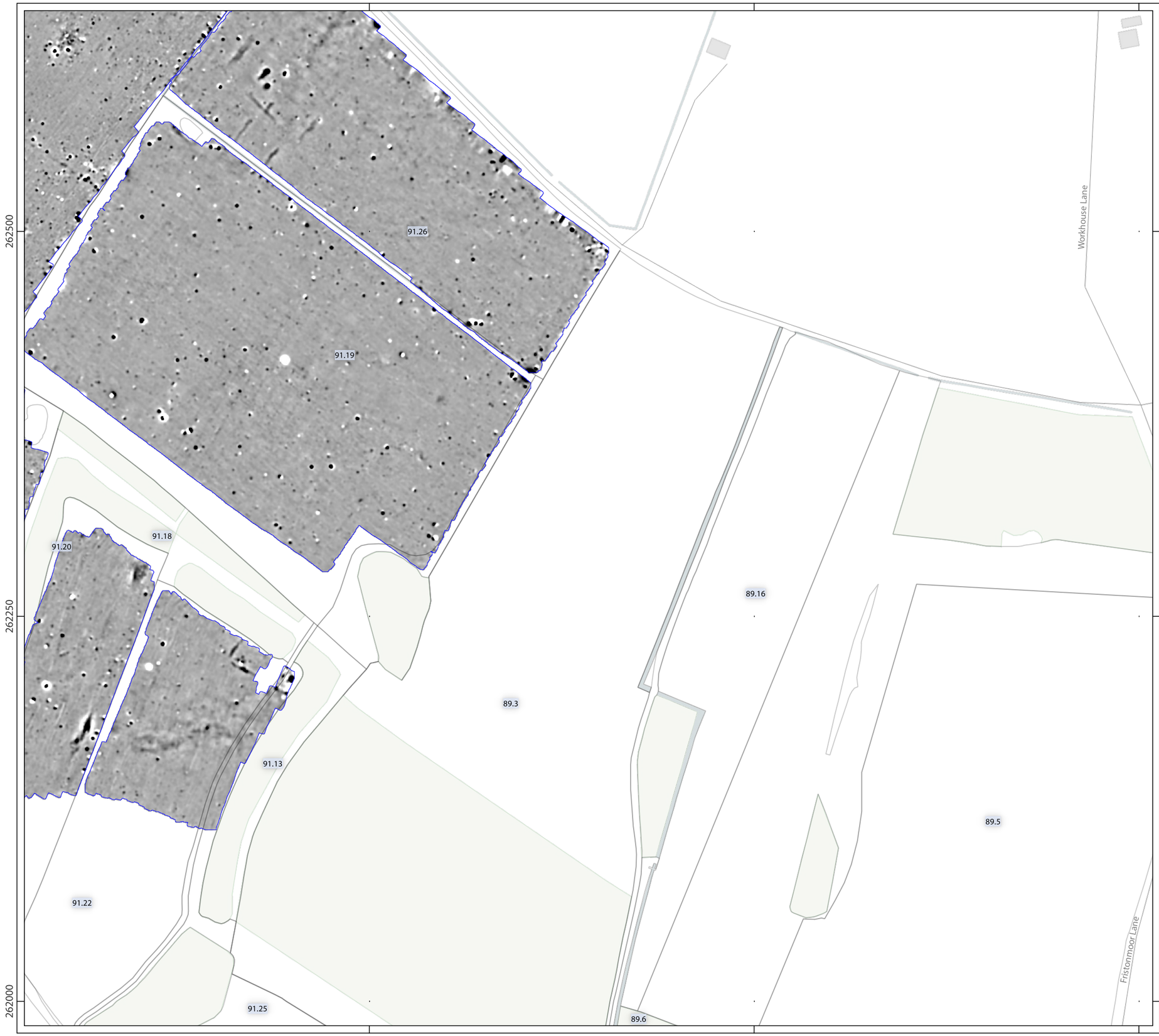
Abbreviations

Q?	Quarrying?

0 40 80 m

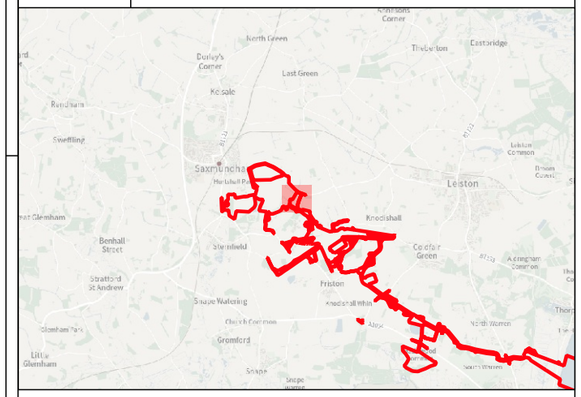
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 36 Interpretation of magnetometer data; Sector 7



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

Survey Extent

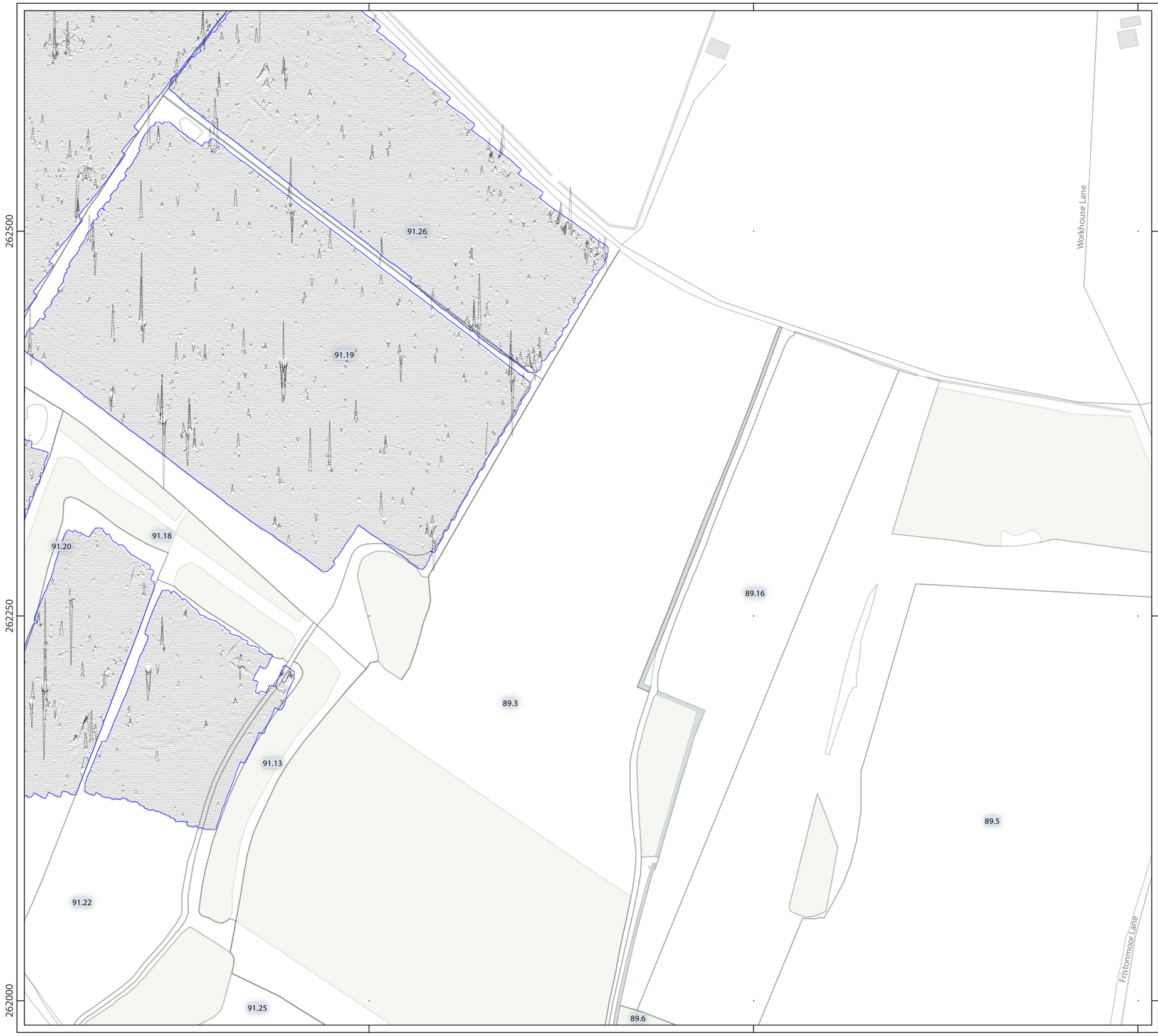
+2nT

-1nT

0 40 80 m

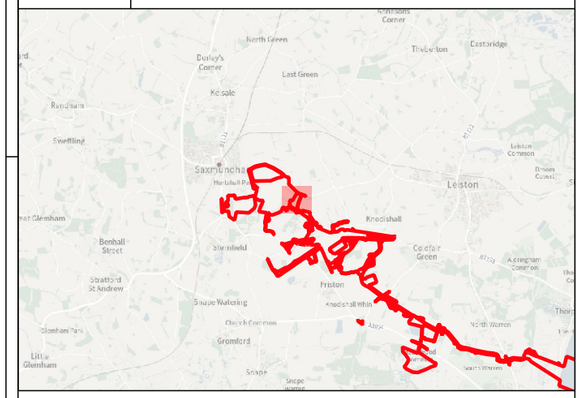
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 37 Processed greyscale magnetometer data; Sector 8



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

Survey Extent

XY Trace (25nT/cm)

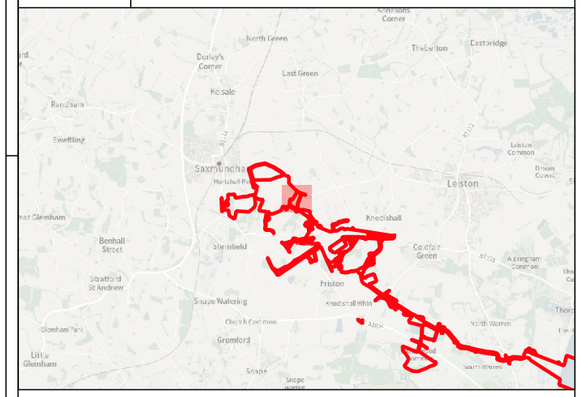
0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 38 XY trace plot of minimally processed magnetometer data; Sector 8

N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Uncertain

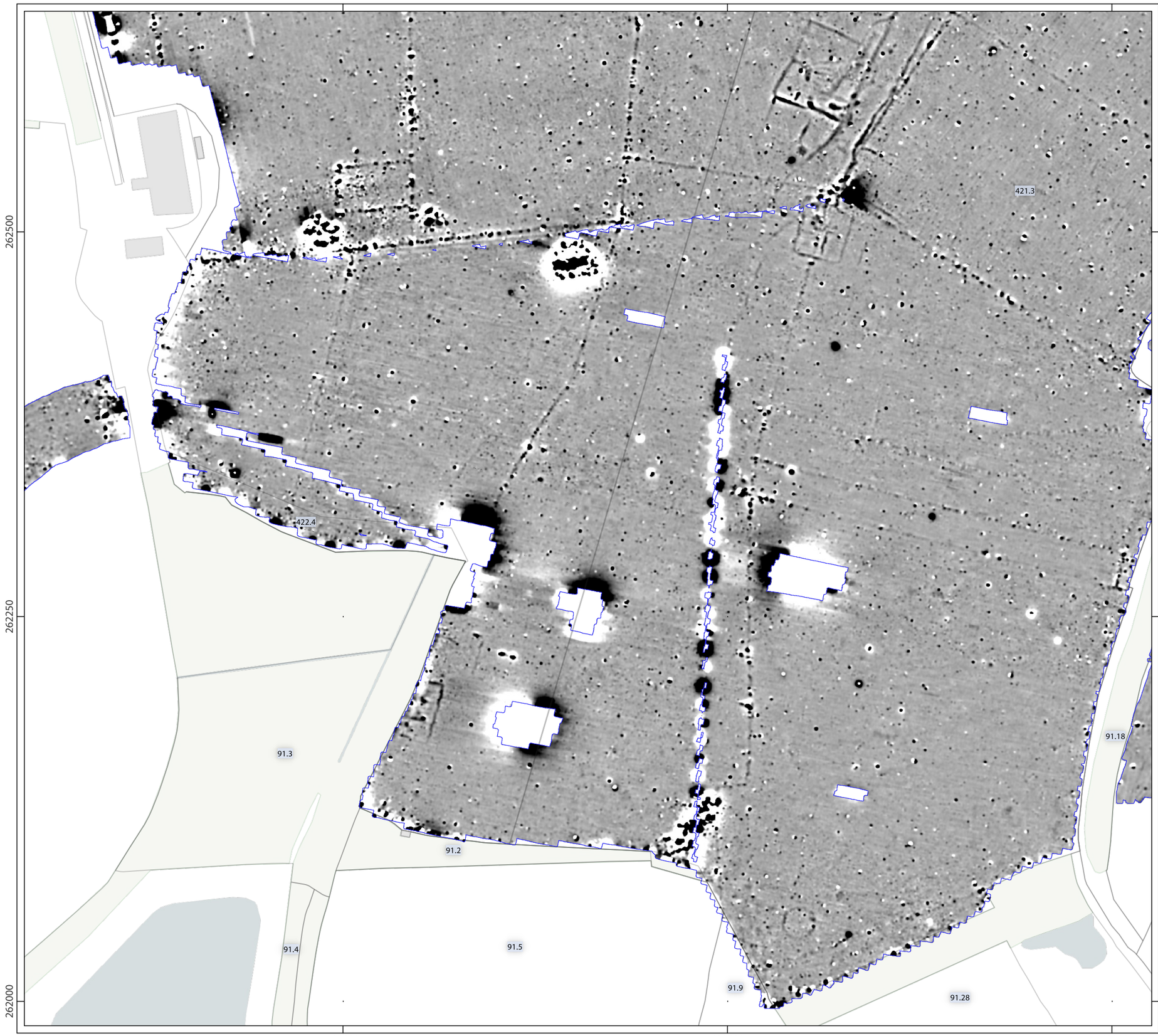
Abbreviations

E? Enclosure?

0 40 80 m

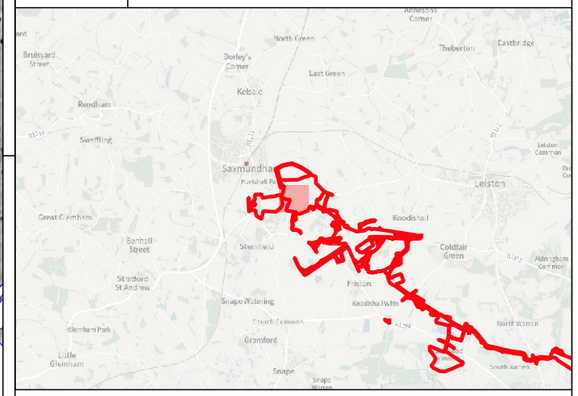
Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 39 Interpretation of magnetometer data; Sector 8



N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

Survey Extent

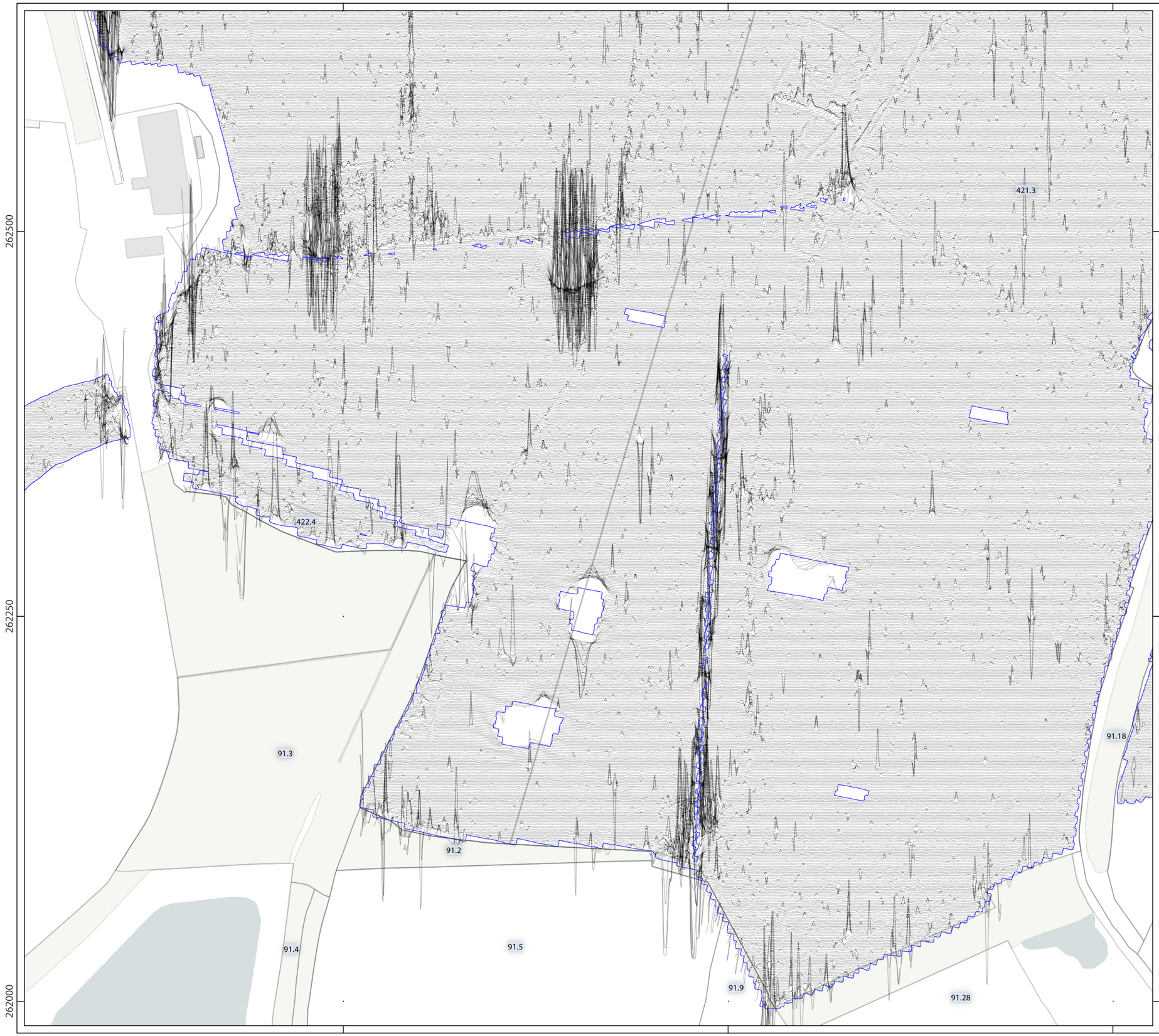
+2nT

-1nT

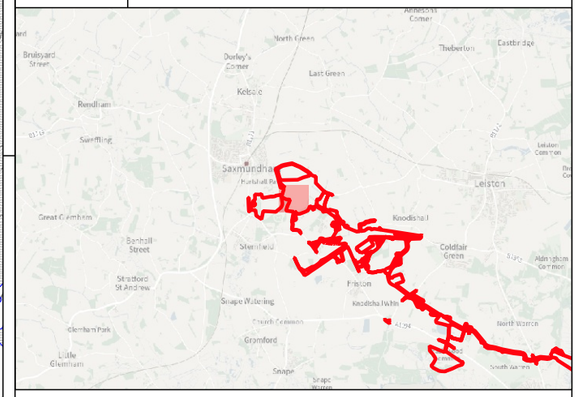
0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 40 Processed greyscale magnetometer data; Sector 9



HEADLAND ARCHAEOLOGY
part of the RSK Group



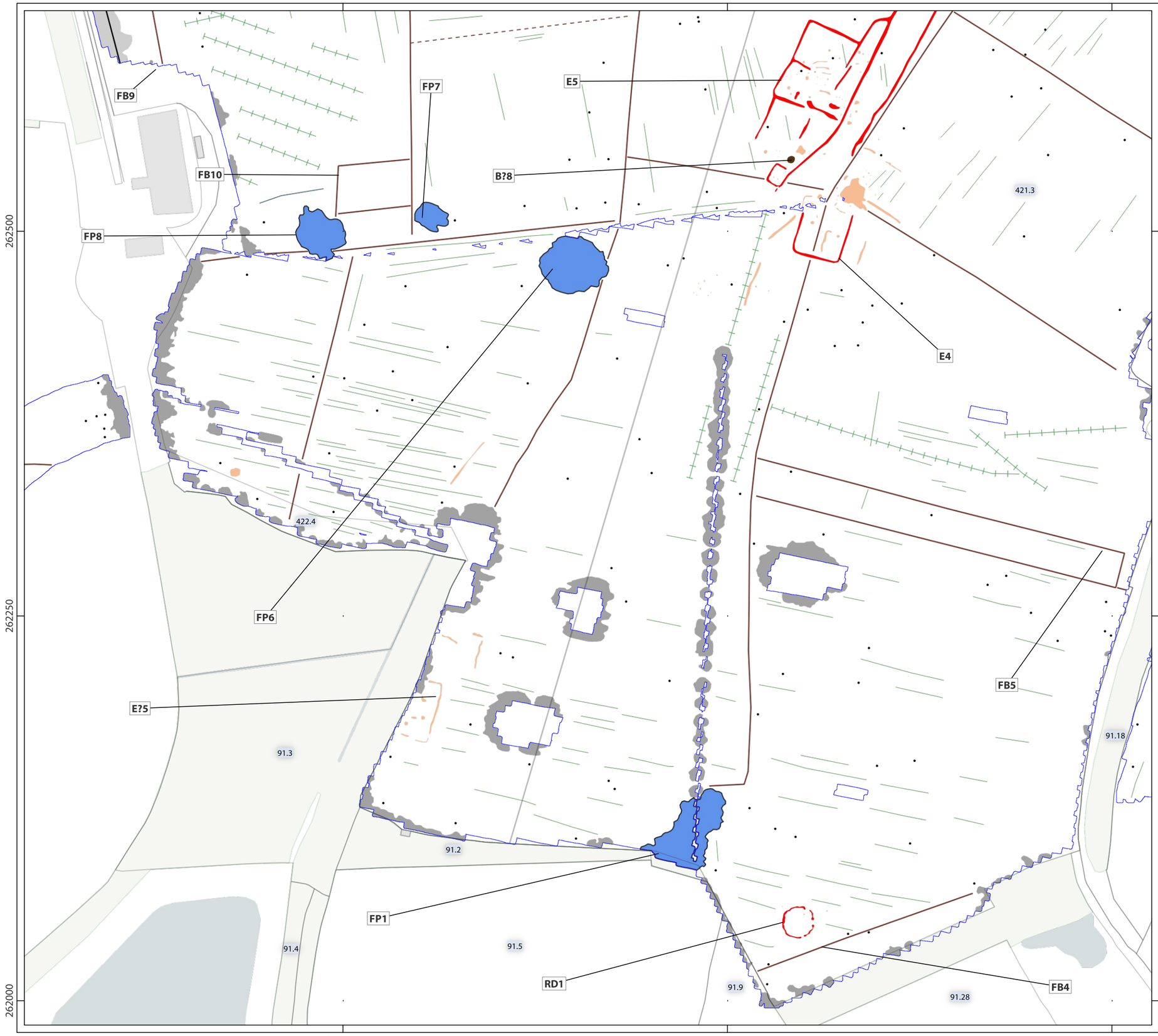
Key

- Survey Extent
- XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 41 XY trace plot of minimally processed magnetometer data; Sector 9



N

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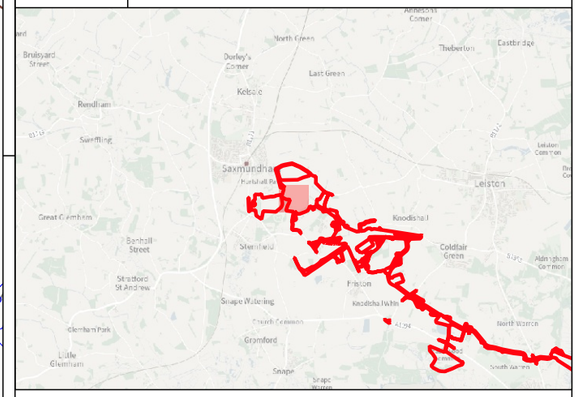

Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Service
- Trackway (modern)
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Burning?
- Former Pond

Abbreviations

B?	Burning?
E	Enslosure
E?	Enclosure?
FB	Former Boundary
FP	Former Pond
RD	Ring Ditch

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 42 Interpretation of magnetometer data; Sector 9

N

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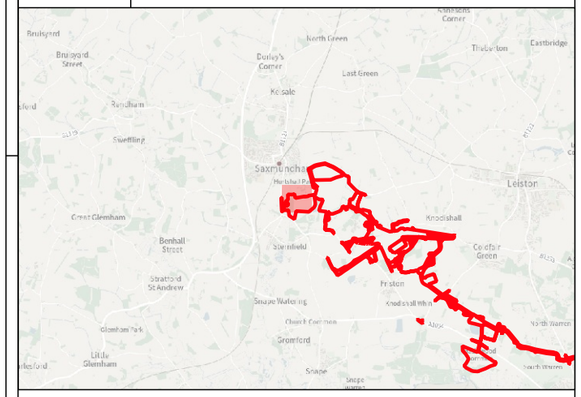


Key

Survey Extent

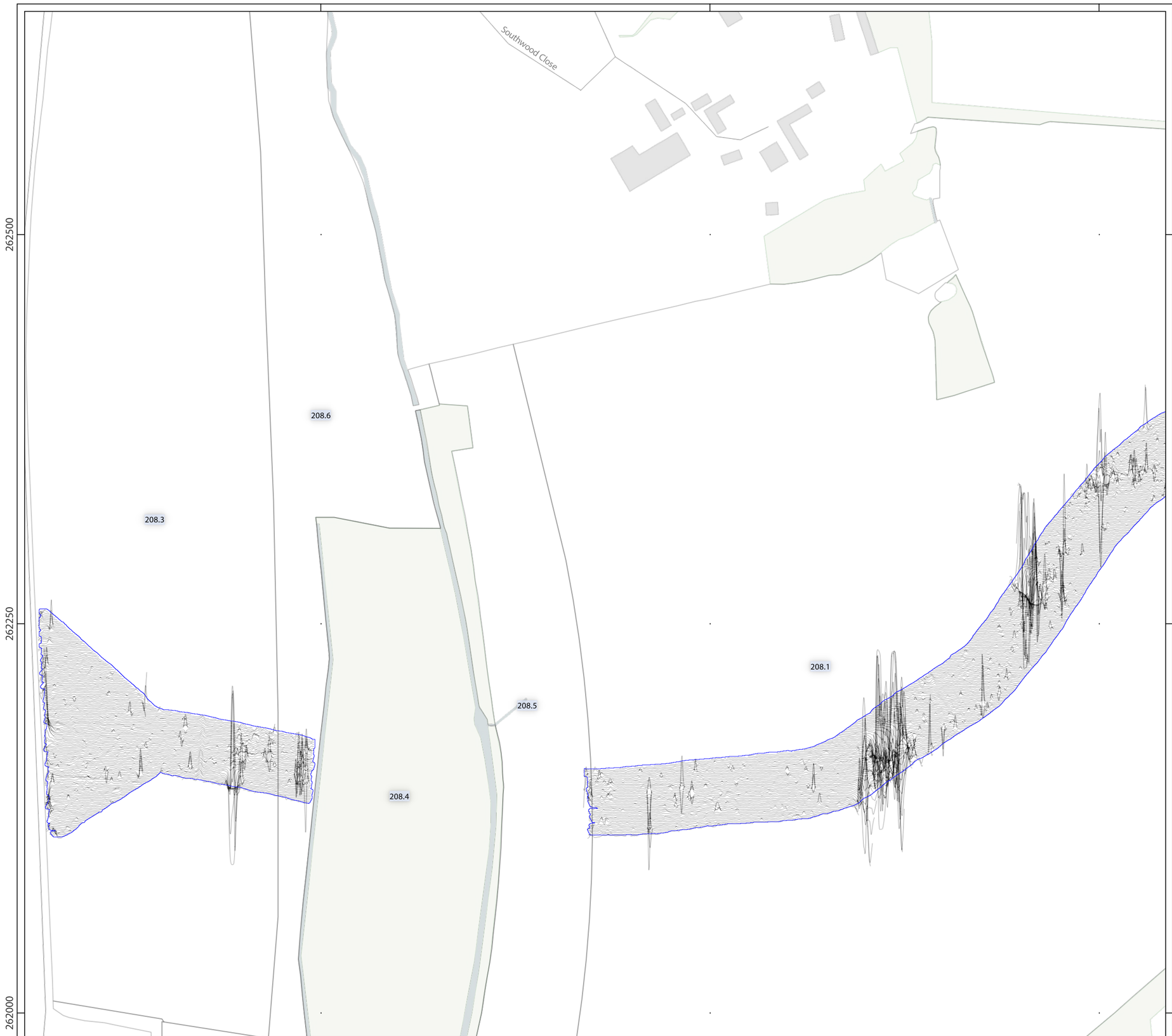
+2nT

-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 43 Processed greyscale magnetometer data; Sector 10



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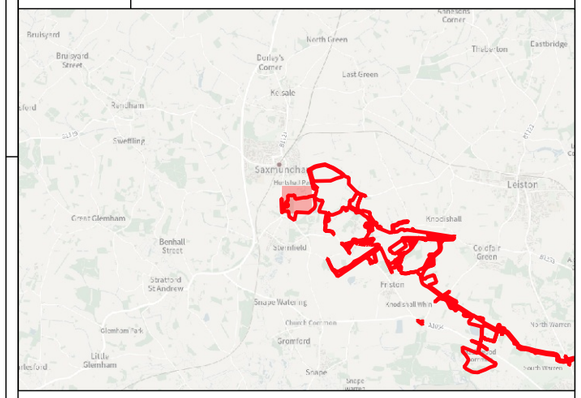


Key

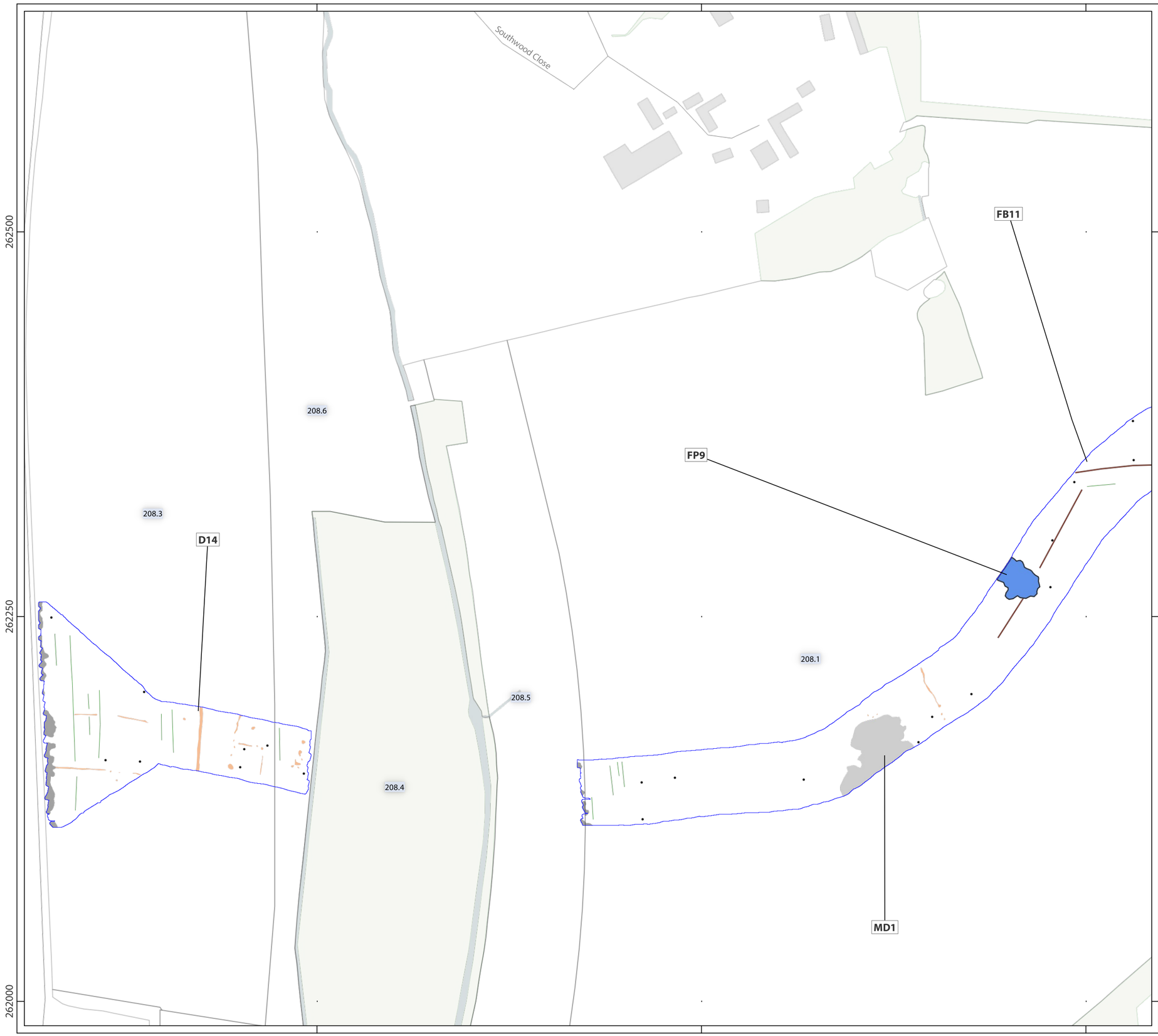
Survey Extent

XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 44 XY trace plot of minimally processed magnetometer data; Sector 10



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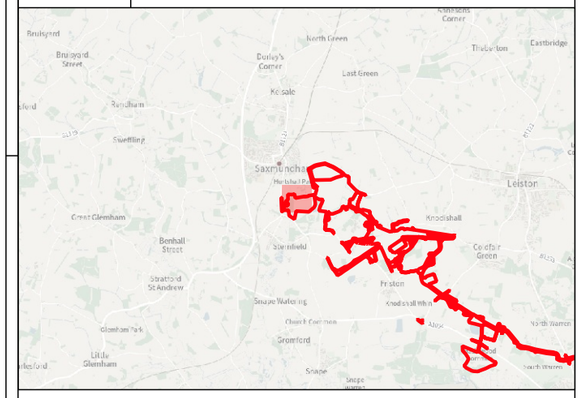

Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Former Pond

Abbreviations

D	Ditch
FB	Former Boundary
FP	Former Pond
MD	Magnetic Disturbance

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 45 Interpretation of magnetometer data; Sector 10

263250

263000

262750

639750

640000

640250

N

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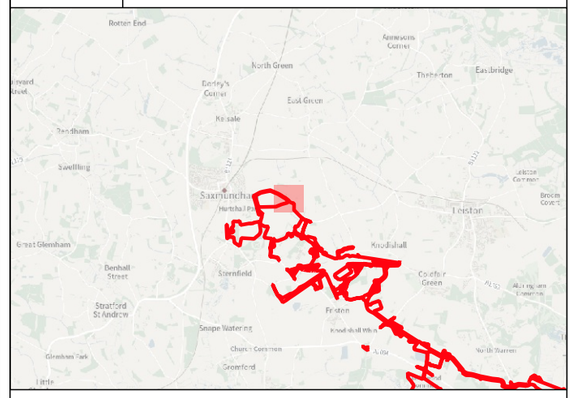

Key

Survey Extent

+2nT

-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 46 Processed greyscale magnetometer data; Sector 11

263250

263000

262750

639750

640000

640250

N

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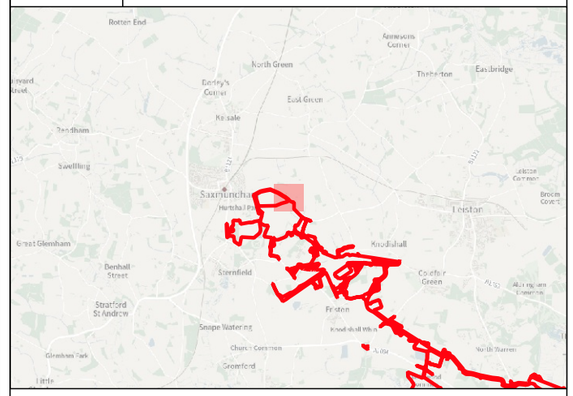


Key

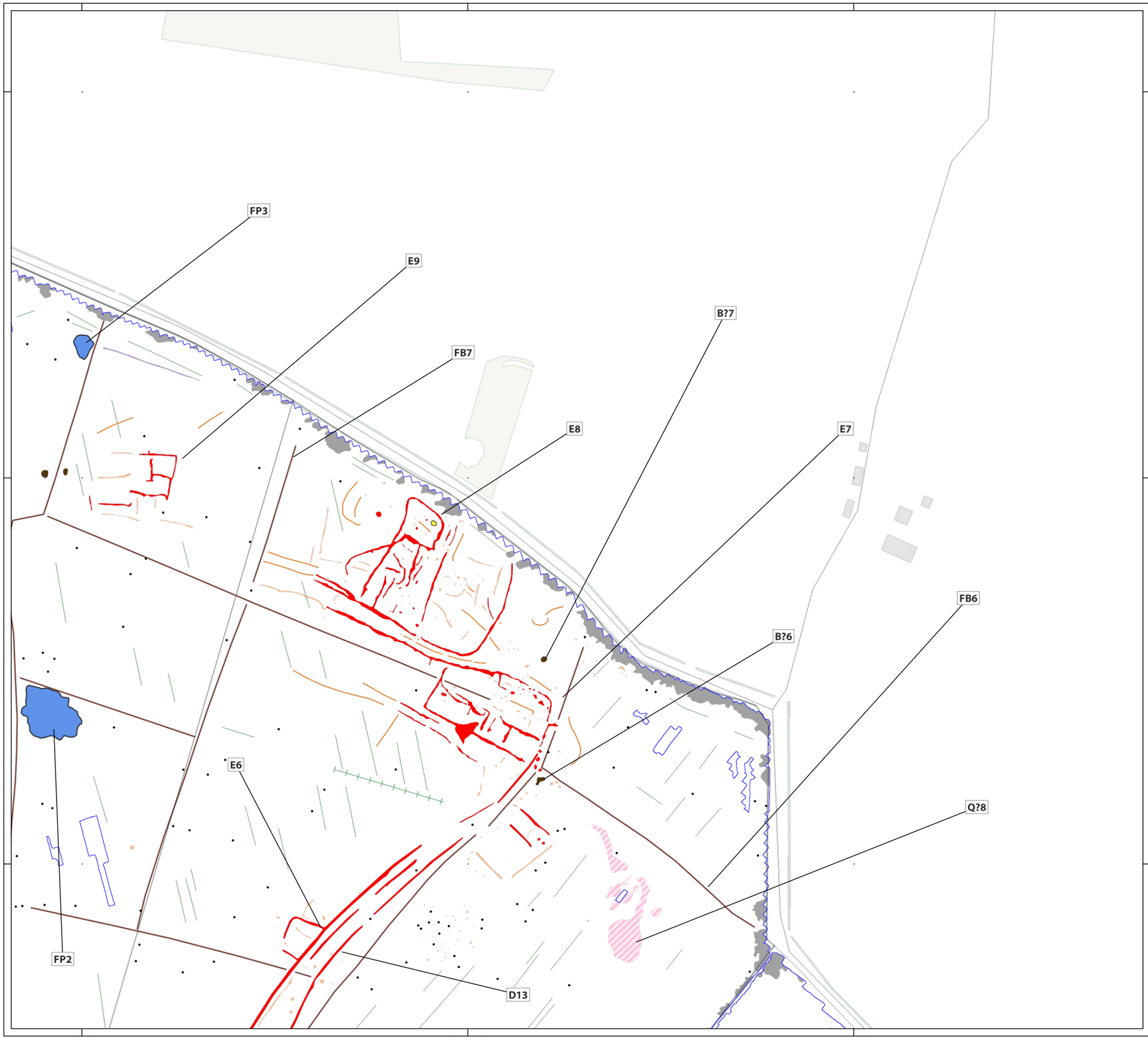
Survey Extent

XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 47 XY trace plot of minimally processed magnetometer data; Sector 11



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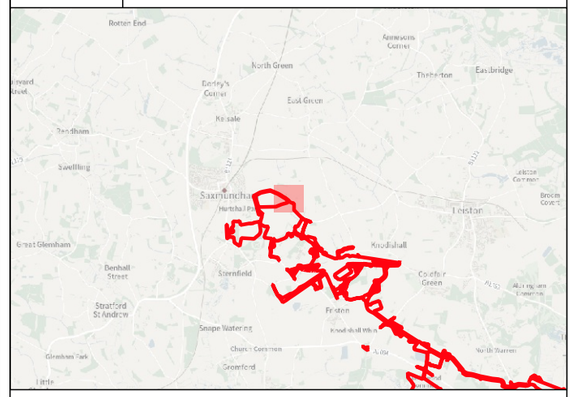


Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Possible Archaeology
- Archaeology
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Quarry
- Uncertain
- Burning?
- Former Pond

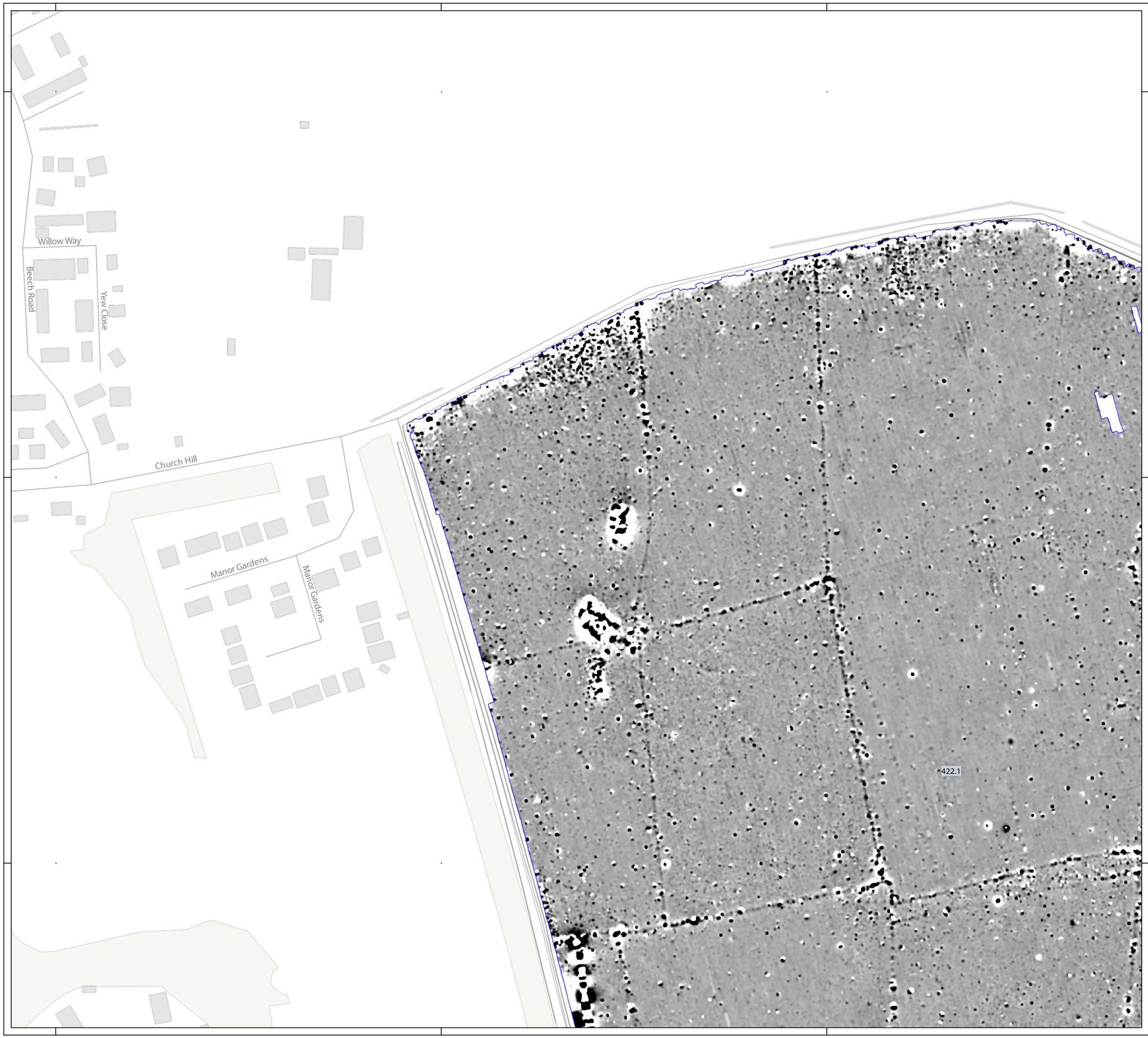
Abbreviations

B?	Burning?
D	Ditch
E	Enslosure
Q?	Quarrying?
FB	Former Boundary
FP	Former Pond

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 48 Interpretation of magnetometer data; Sector 11



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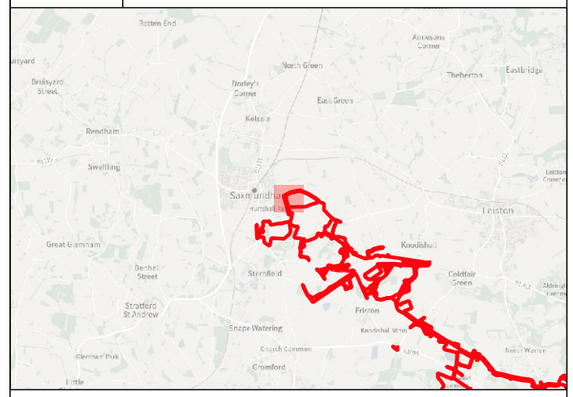


Key

Survey Extent

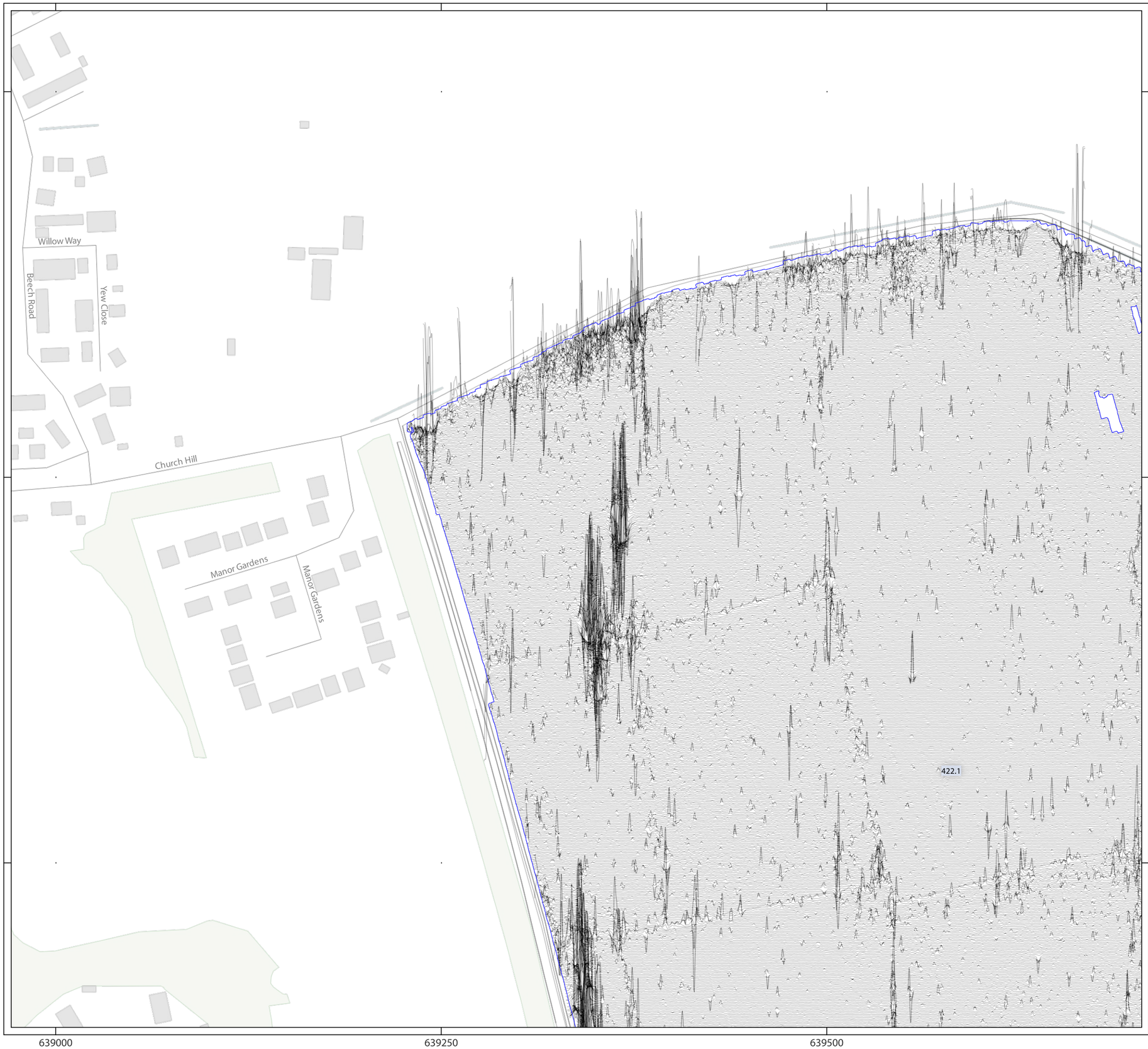
+2nT

-1nT

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 49 Processed greyscale magnetometer data; Sector 12



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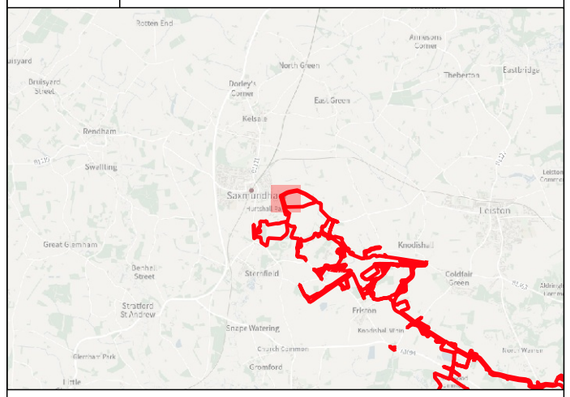
HEADLAND ARCHAEOLOGY
part of the RSK Group



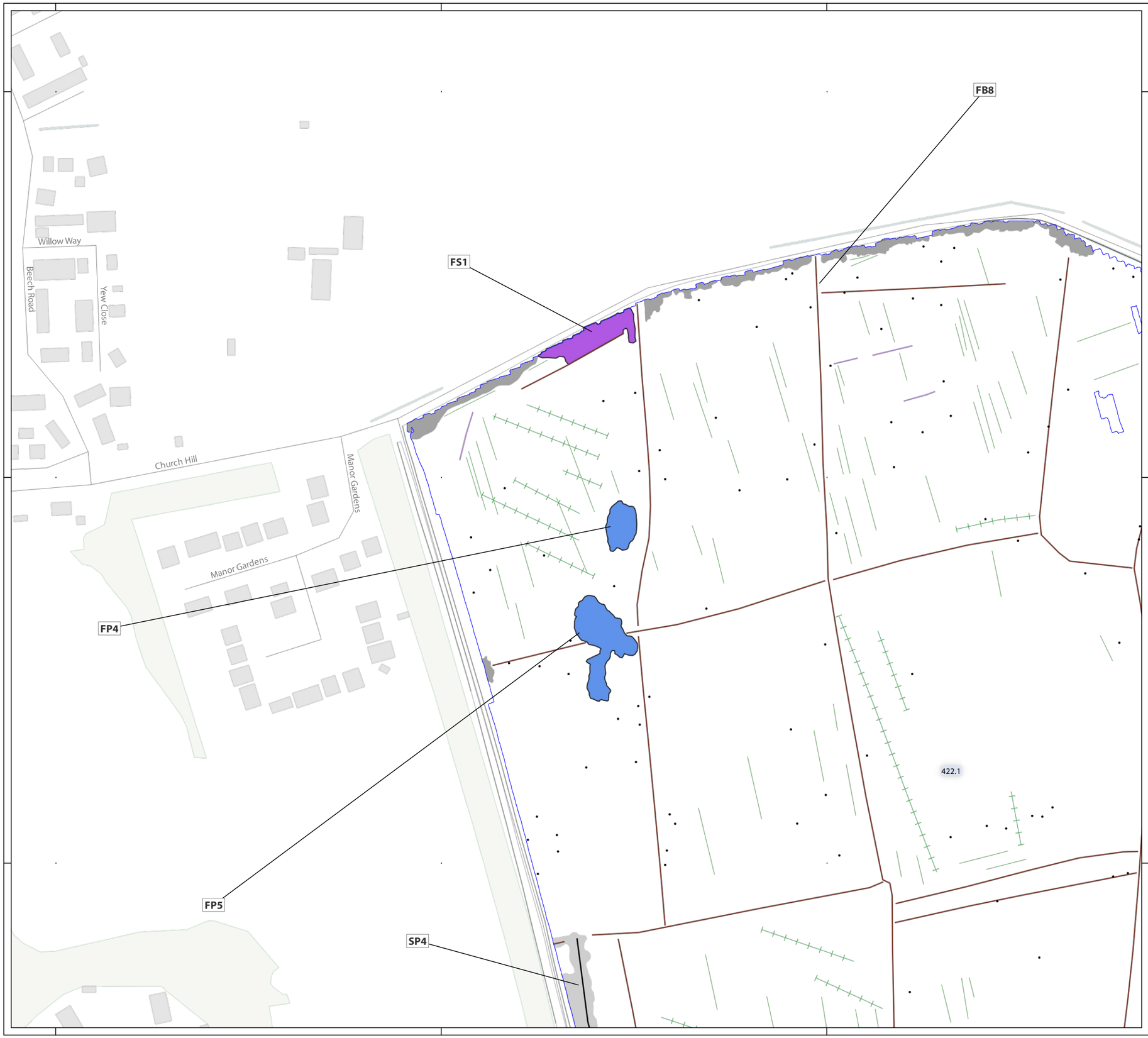
Key

- Survey Extent
- XY Trace (25nT/cm)

0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 50 XY trace plot of minimally processed magnetometer data; Sector 12



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HEADLAND ARCHAEOLOGY
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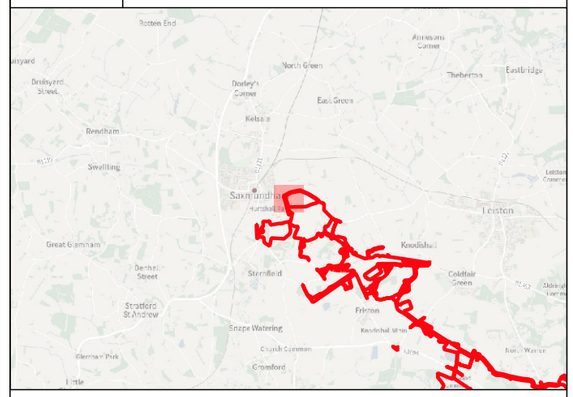


Key

- Survey Extent
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Service
- Uncertain
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Former Pond
- Former Structure

Abbreviations

FB	Former Boundary
FP	Former Pond
FS	Former Sturcture
SP	Service Pipe

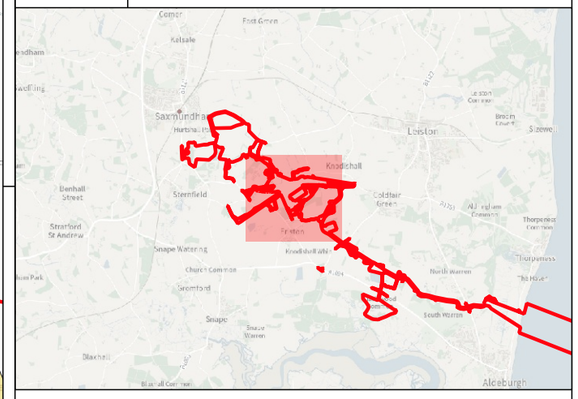
0 40 80 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:2,500 @ A3

Illus - 51 Interpretation of magnetometer data; Sector 12

N

HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

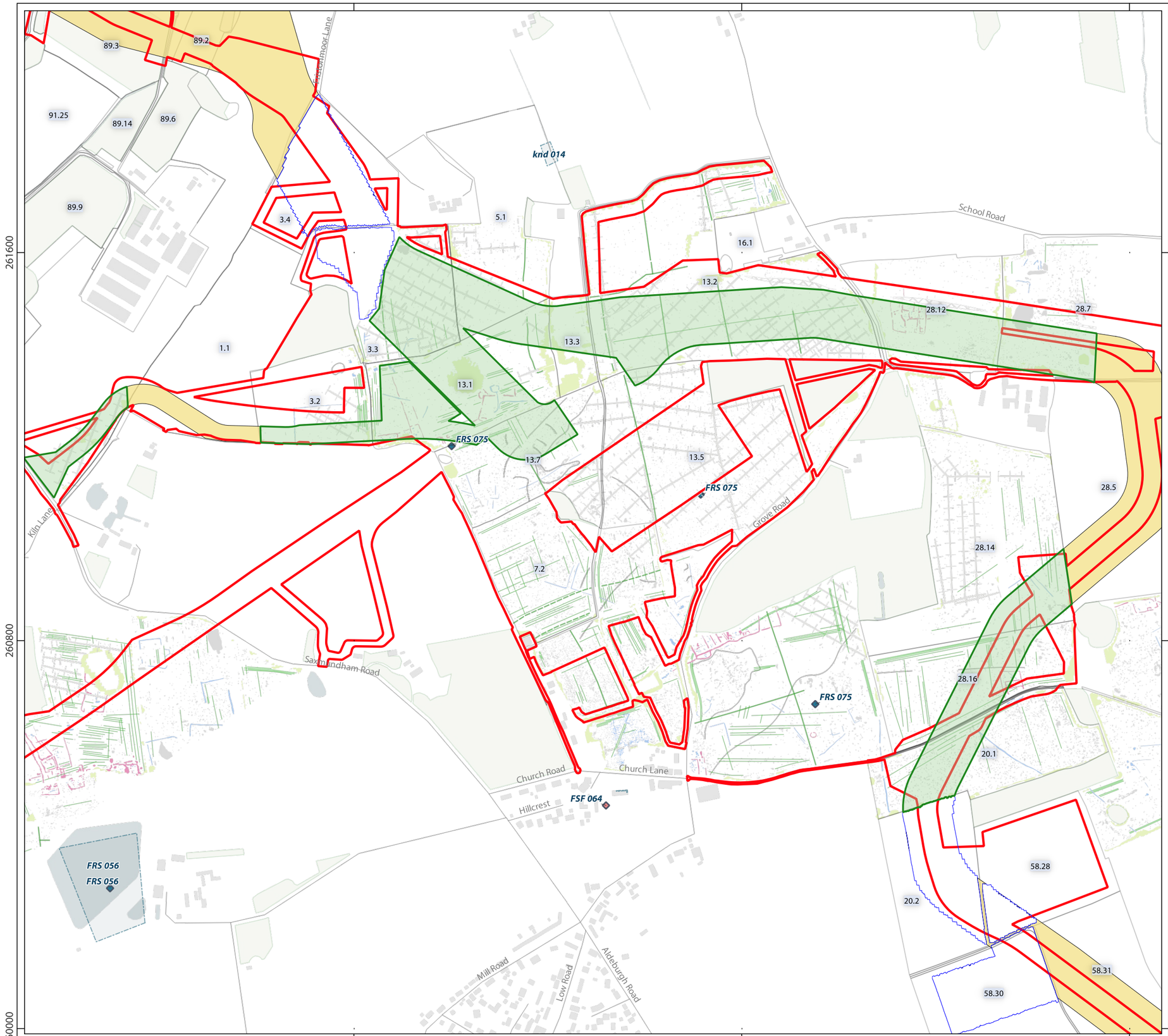
- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- HER Events
- HER Events
- HER Schefuled Monuments

+2nT
-1nT

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:8,000 @ A3

Illus 52 - Overall Greyscale plot of previously surveyed area (Headland 2020)



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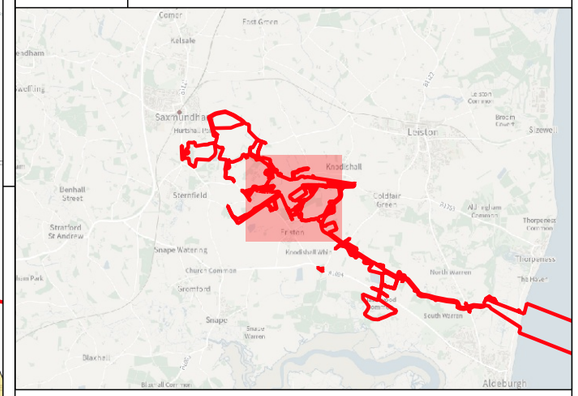
HEADLAND ARCHAEOLOGY
part of the RSK Group



Key

- Geophysical Survey Area
- Survey Extent
- Headland Survey 2020
- Unsuitable Survey Area
- HER Events
- HER Events
- HER Schefuled Monuments

Headland Survey Interprettaion 2020

- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Archaeology
- Magnetic Disturbance
- Natural
- Overhead
- Possible Archaeology
- Quarry

0 100 200 m

Site:	SSSK23
Created by:	LD
Checked by:	SH
Version:	v5.1
Date:	27/11/2024
Scale:	1:8,000 @ A3

Illus 53 - Overall Interpretation of previously surveyed area (Headland 2020)

7 APPENDICES

APPENDIX 1 RAW DATA GREYSCALE PLOTS OVERVIEWS 1–3

APPENDIX 2 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

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

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

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

Types of magnetic anomaly

In most 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 introduced into the topsoil during 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 and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Lightning-induced remnant magnetisation (LIRM) LIRM anomalies are thought to be caused in the near surface soil horizons by the flow of an electrical current associated with lightning strikes. These observed anomalies have a strong bipolar signal which decreases with distance from the spike point and often appear as linear or radial in shape. None are recorded in the present data set.

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

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

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

APPENDIX 3 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R10 model).

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

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

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

APPENDIX 4 GEOPHYSICAL SURVEY ARCHIVE

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

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

APPENDIX 5 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format. Raw data pre-filtering and smoothing is contained within Appendix 1.

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

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

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

APPENDIX 6 OASIS DATA COLLECTIO FORM: ENGLAND

OASIS ID (UID): headland1-527451

Project Name:	Sea Link (Suffolk Section) Geophysical Magnetometry Survey Report
Activity type:	Geophysical Survey, Magnetometry Survey, MAGNETOMETRY SURVEY
Sitecode(s):	SSSK(S)23
Project Identifier(s):	p23-232
Planning Id:	[no data]
Reason for Investigation:	Planning requirement
Organisation Responsible for work:	Headland Archaeology (UK) Ltd
Project Dates:	18-Sep-2023 - 22-Nov-2023
HER:	Suffolk HER
HER Identifiers:	[no data]
Project Methodology:	The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point. MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v.3.28.5 software was used to process and present the data respectively.
Project Results:	The survey has successfully evaluated 132.5 hectares. The survey has recorded a wide range of magnetic anomalies interpreted as of archaeological and/or possible archaeological origin, the majority of which were previously unknown, in addition to various features with non-archaeological causes. Concentrations of archaeological activity in the form of ditches, enclosures, localised quarrying, pits, and possible sites of burning are recorded at the very eastern extent of the Scheme Boundary and within the large parcel of land at the western end south-east of Saxmundham. Outside of these areas archaeological findings include an isolated ring ditch, a rectilinear enclosure and a further four possible enclosures, as well as multiple ditch like features which cross the Scheme corridor at oblique angles to the present field boundaries and that are interpreted as belonging to possible field systems or trackways of possible archaeological origin. Interspersed amongst these in the central section of the corridor are multiple amorphous spreads of magnetic enhancement interpreted as deriving from localised quarrying. In addition to those anomalies of clear archaeological potential the survey has mapped the location of several former field boundaries, ponds and former buildings that are all detailed on historic mapping. Four service pipes, patterns of field drains, and modern agricultural trends constitute the remainder of the findings. The survey results largely corroborate, but also expand on, the current understanding of the archaeological potential of the landscape within which the Scheme is located, as contained within the Suffolk Historic Environment Record (SHER) and gleaned from previous developer led work. The survey results are assessed as providing a reliable indication of the extent of all the significant areas of archaeological potential within the Scheme and although the suspected archaeological remains extend throughout the Scheme there are still large areas where no anomalies of archaeological potential have been identified from the geophysical survey. As a result, the archaeological potential of the easternmost and central areas of the converter station area south-east of Saxmundham are considered very high and locally high elsewhere within the Scheme Boundary where clear features such as enclosures and a ring ditch have been identified. Outside of these locations the archaeological potential is considered low to moderate given the prevalence of isolated linear and discrete anomalies of possible archaeological origin.
Keywords:	
Subject/Period:	Ditched Enclosure: UNCERTAIN FISH Thesaurus of Monument Types
Subject/Period:	Pit: UNCERTAIN FISH Thesaurus of Monument Types
Subject/Period:	Quarry: UNCERTAIN FISH Thesaurus of Monument Types
Archive:	–

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