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Volume 2 – Appendices

**Appendix 16.3 Geophysical Survey undertaken
outside the ROF Fence**



Gravity, Puriton, Cowslip Meadow, Somerset

Detailed Gradiometer Survey Report

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Portway House
Old Sarum Park
Salisbury
Wiltshire
SP4 6EB

www.wessexarch.co.uk

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Fieldwork directed by	Rok Plesnicar
Project management by	Tom Richardson
Document compiled by	Andrés Pérez Arana
Contributions from	Alexander Schmidt
Graphics by	Alexander Schmidt

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Summary

A detailed gradiometer survey was conducted over land north of Woolavington Road, Puriton, Bridgwater. The eastern perimeter of the site is centred on NGR 334315 141845 and the western perimeter centred on NGR 332590 141825. The project was commissioned by This Is Gravity Limited with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a planning application for Huntspill Energy Park.

The site comprises 27 pasture fields located to the north of Woolavington Road, Puriton, Bridgwater, covering an area of 50 ha. The geophysical survey was undertaken between 19 and 22 July 2021 and has demonstrated the presence of numerous anomalies of archaeological and possible archaeological interest throughout the areas subject to survey.

In the north-east an interconnected network of recti-linear enclosures has been identified. This is characteristic of a Romano-British ladder settlement but could form part of a wider settlement extending west and north outside of the surveyed area.

Further evidence of possible Roman settlement activity has been identified in the south-west of the surveyed area. A smaller area of enclosures has been identified alongside the possible remains of two structures.

In the centre of the surveyed area of field boundaries has been identified. These are of unknown date, but it is possible they relate to the settlement activity in the north-east as the area between them was not surveyed.

Several peripheral areas of archaeological or possible archaeological activity have been identified. In the north-east of the survey area, a key-hole shaped enclosure has been identified along with two rectangular enclosures. These are likely associated with the probable Romano-British settlement to the south but are slightly removed from the main focus of activity evident in the data.

Modern activity is evident in the form of an enhanced magnetic background of the fields located in the centre of the survey area. This enhancement could be caused by the spread of 'green-waste' for agricultural purposes but also by a dump of industrial material or rubble, likely related to the activity or construction of the ROF in the immediate vicinity. Other modern activity identified in the area is the probable infill of a pond on the centre north of the survey area. This is likely to have impacted the detection of potential archaeological features in this area.

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The fieldwork was undertaken by Rok Plesnicar and Davor Cakanic. Alexander Schmidt processed and interpreted the geophysical data. Andrés Pérez Arana wrote the report. Illustrations were prepared by Alexander Schmidt. The geophysical work was quality controlled by Tom Richardson, who managed the project on behalf of Wessex Archaeology.



Gravity, Puriton, Cowslip Meadow, Somerset

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by This is Gravity Limited to carry out a geophysical survey at land north of Woolavington Road, Puriton, Bridgwater, Somerset (The eastern perimeter centred on NGR 334315 141845, and the western perimeter centred on NGR 332590 141825 NGR) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application for the development of the proposed Huntspill Energy Park.

1.2 Scope of document

- 1.2.1 This report presents a brief description of the methodology followed by the detailed survey results and the archaeological interpretation of the geophysical data.

1.3 The site

- 1.3.1 The site is located immediately to the east of Puriton and the west of Woolavington, Somerset and comprises an area spanning 27 fields. The town of Bridgwater is located 4.5 km to the south-south-west and Weston-Super-Mare is 20 km to the north.
- 1.3.2 The survey comprises 50 ha of agricultural land, currently utilised for pasture. The site is bounded by droeways and open pastureland to the north, fields and residential property at Puriton to the west, fields to the east, residential property at Woolavington to the south-east, and Woolavington Road to the south.
- 1.3.3 The site is on a gentle north-facing incline, sloping from 6 m above Ordnance Datum (aOD) at the northern edge to 20 m aOD at the southern edge.
- 1.3.4 The solid geology comprises interbedded Limestone, Mudstone, Siltstone, and Sandstone of the Langport Member, Blue Lias Formation and Charmouth Mudstone Formation (undifferentiated). There are no recorded overlying superficial geological deposits except for the north-eastern corner where clay, silt, and sand Tidal Flat Deposits are recorded (BGS 2021).
- 1.3.5 The soils underlying the site to the north are likely to consist of brown rendzinas soils of the 343d (Sherborne) association and with palaeo-calcareous alluvial gley soils of the 814c (Newchurch 2) association recorded to the south (SSEW SW Sheet 5 1983). Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

- 2.1.1 An archaeological desk-based assessment (DBA) was prepared by Wessex Archaeology for the land at Huntspill Energy Park Access Road, Puriton, Somerset which examined the potential for the survival of buried archaeological remains within the development area and a 500 m study area around the wider development area (Wessex Archaeology 2012a). The



following background is not exhaustive but is summarised from aspects of the DBA that are considered relevant to the interpretation of the geophysical survey data.

2.2 Summary of the archaeological resource

- 2.2.1 One Grade I Listed building is noted within 500 m of the survey area – Church of St Mary in Woolavington (NHLE 1060144). Nine Grade II Listed buildings are noted in Woolavington. These comprise 17th – 19th century dwellings.
- 2.2.2 The site is broadly located at the edge of two distinct environments: the Somerset Levels to the north, and a distinct ridge overlooking the River Parrett and the tidal flats to the south, suggesting an archaeological potential for a variety of activity throughout prehistory and later periods. The Somerset Levels have been subject to continual cycles of sea ingressions and regression throughout prehistory. There is evidence of seasonal activity from the Mesolithic period onwards, with the Levels utilised as seasonal pasture during the Bronze Age to Iron Age. During the Iron Age, the Levels were used for salt production and industrial activities.
- 2.2.3 Evidence of Bronze Age settlements have been identified 900 m south of the site where archaeological investigations identified a substantial ditch.
- 2.2.4 A potential Iron Age settlement located 1.5 km to the west of the site is also recorded, this settlement continued into the Romano-British period.
- 2.2.5 An extensive Roman settlement was uncovered at Junction 23 of the M5 during its construction, 1 km west of the survey area. The settlement was situated on the edge of a ridge, overlooking the River Parrett. Excavations revealed stone paving, wall foundations, and pottery, including Samian ware. The settlement was observed to extend beyond the motorway to the west, with the limit of the settlement not identified during the excavations.
- 2.2.6 A potential Roman road from Ilchester to Combeitch is recorded 1 km south of the site. Stone metalling associated with the Roman road was uncovered during the works at the M5 construction.
- 2.2.7 Further Romano-British mounds thought to be associated with pottery and possibly salt production are recorded south of the Roman road, 1.4 km to the south of the site.
- 2.2.8 Archaeological investigations 100 m north of the site have identified small amounts of Romano-British pottery during the construction of a pipeline. This may indicate the presence of further Romano-British settlements to the north of the survey area.
- 2.2.9 The site is located on the periphery of several known medieval settlements, such as the village of Puriton established in the Saxon period. A further medieval settlement with surviving earthworks is recorded 1.2 km north of the site. Beyond the north-west of the site and the village of Puriton, extensive series of earthworks either representing ridge and furrow or field drainage lines, are recorded. These remains indicate later Saxon and medieval land management and reclamation across the Somerset Levels.
- 2.2.10 Several mills are recorded in the wider study area dating from the early 15th to the 17th century. A further potential mill site is located to the west of the site as the 1842 Tithe map describes the field as 'In Mill Field'. It is not clear whether this name is due to an additional mill or due to the proximity of known windmills in the surrounding area.



- 2.2.11 Further indications of post-medieval industrial activity are found 450 m south-west of the site where a possible 17th century lime kiln and pottery has been recorded.
- 2.2.12 The 1842 Puriton Tithe map also shows that the site was subdivided into numerous, narrow strips or strip lynchets, farmed by different occupiers. These fields were aligned approximately north – south.
- 2.2.13 A tramway is recorded on the 1904 Ordnance Survey (OS) map 1.5 km to the south-west of the site. This tramline linked a number of quarries to the cement and lime works located in Dunball. Several quarries are recorded in the surrounding area of the site on the 1888 and 1904-1930s OS maps. Some of these quarries are located within the site with two linear extensions of Shorthedge quarry, shown on the 1887 OS map located in the east of the site, on a north – south alignment.
- 2.2.14 Extensive military activity relating to World War II (WWII) has been identified 200 m to the north of the site where the site of a Royal Ordnance Factory (ROF) is located. Now decommissioned, it was one of a number of specialised production sites constructed during WW II to produce armaments. An extensive concentration of pillboxes is noted surrounding the site. The location of these features was designed to protect the ROF. The closest of these to the site is located 1.5 km to the west at Dunball.

2.3 Recent investigations in the area

- 2.3.1 A previous phase of detailed gradiometer survey was undertaken by Wessex Archaeology 2012 (2012b). This was a linear scheme starting at the A39 just south of Puriton heading east before turning north towards the former BAE Systems Properties Limited. The survey identified anomalies of archaeological interest as well as a large number of coherent ferrous responses. It identified a number of features associated with known quarries and the line of the former tramway to the north-west of the current survey area.
- 2.3.2 Further linear features possibly related to former quarrying were identified near the south-east corner of Puriton, 1.2 km to the south-west of the site. These features correspond with location of the Fourteen Acre Quarry as shown on OS mapping from 1910 – 1940.
- 2.3.3 600 m west of the site the survey identified linear features corresponding with a quarry recorded on the 1904 OS map. OS mapping from 1930s depicts that this quarry was subsequently abandoned.
- 2.3.4 700 m west of the site a series of ditches were identified which may form part of potential enclosures of unknown date. However, the presence of Romano-British artefacts previously discovered near these features may indicate their chronology.
- 2.3.5 In 2019, a geophysical survey undertaken by Wessex Archaeology revealed portions of linear features spanning the linear survey area as well as former quarrying activity. A later geophysical survey undertaken to the east of the survey area by Archaeological Surveys in 2020 revealed a number of ditched enclosures as well as areas of former quarrying.

3 METHODOLOGY

3.1 Introduction

- 3.1.1 This phase of geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 19 – 22 July 2021. Field conditions at the time of the survey were adequate. An overall coverage of 17.1 ha was achieved. Towards the western end of



the survey area, 16.1 ha was not subject to survey. Throughout the eastern portion, 13 ha was not subject to survey. This was the result of both overgrowing vegetation and ground cover, as well as the presence of livestock.

- 3.1.2 The methods and standards employed throughout the geophysical survey conform current best practice, and guidance outlined by the Chartered Institute for Archaeologists' (CIfA 2014) and European Archaeologiae Consilium (Schmidt *et al.* 2015).

3.2 Aims and objectives

- 3.2.1 The aims of the survey comprise the following:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and
- To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

- 3.2.2 In order to achieve the above aims, the objectives of the geophysical survey are:

- To conduct a geophysical survey covering as much of the specified area as possible, allowing for on-site obstructions;
- To clarify the presence/absence of anomalies of archaeological potential; and
- Where possible, to determine the general nature of any anomalies of archaeological potential.

3.3 Fieldwork methodology

- 3.3.1 The cart-based gradiometer system used a Leica Captivate RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey (OS) and Leica Geosystems. Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015).

- 3.3.2 The detailed gradiometer survey was undertaken using four SenSys FGM650/3 magnetic gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of 0.03 nT at a rate of 20 Hz, producing intervals of 0.08 m along transects spaced 4 m apart.

3.4 Data processing

- 3.4.1 Data from the survey were subjected to minimal correction processes. These comprise a moving window function (200 m window length), applied to correct for any variation between the sensors, and interpolation used to grid the data and discard overlaps where transects have been collected too close together.

- 3.4.2 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.



4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

4.1 Introduction

- 4.1.1 The detailed gradiometer survey has identified magnetic anomalies across the site. Results are presented as a series of greyscale plots, and archaeological interpretations at a scale of 1:1500 (**Figures 2 to 13**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale
- 4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous responses, burnt or fired objects, and magnetic trends (**Figure 3, 5, 7, 9, 11 and 13**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.
- 4.1.3 Numerous ferrous anomalies are visible throughout the dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.
- 4.1.4 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.
- 4.1.5 Gradiometer survey may not detect all services present on site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g. CAT and Genny) should be used to confirm the location of buried services before any trenches are opened on site.

4.2 Gradiometer survey results and interpretation

- 4.2.1 The geophysical survey has identified a number of anomalies that are likely to be related to archaeological remains throughout the surveyed areas. These anomalies indicate recti-linear and curvilinear ditch and enclosure features. Other anomalies corresponding to ridge and furrow cultivation and former field boundaries have been identified. In addition, modern agricultural trends are noted, as well as underlying services and field drains.
- 4.2.2 In Field 9, several weak positive linear anomalies have been identified at **4000 – 4002 (Figure 5)**. This network of anomalies forms several recti-linear alignments on a north – south axis covering an area of 101 m x 58 m. At **4000**, a recti-linear anomaly is noted. This measures 32 m x 17 m and indicates a ditched enclosure. In the south-east corner of the recti-linear form, an area of possible thermoremanent activity has been identified. Further investigation would be required to confirm whether this anomaly corresponds to an area of burning. Such a response could be more recent in origin, potentially relating to ferrous debris.
- 4.2.3 At **4001**, a second enclosure is noted measuring 27 m x 33 m. In the south-east corner of the enclosure, a 12 m x 12 m square anomaly is noted. A further sub-square enclosure is noted at **4002** measuring 14.5 m east – west, although any northern side has not been clearly identified by the survey. The defined edges and the continuous, albeit weak, positive response of the anomalies and their consistent orientation indicates a network of enclosures. This type of feature can date to the Iron Age – Romano-British period.
- 4.2.4 At **4003** in Field 9, two distinct negative, square shaped anomalies have been identified (**Figure 5**). The anomalies both cover an area of 6 m x 8 m and are on a shared west-north-west to east-south-east alignment. The negative responses have a positive response contained within and could indicate walls based on their magnitude and size/shape. This type of response is characteristic of structural remains that are likely associated with the surrounding enclosures.



- 4.2.5 A number of weaker positive linear and curvi-linear anomalies at **4004** are noted to the north-west of the complex at **4000 – 4003 (Figure 5)**. These anomalies are interpreted as ditch features, possibly relating to further enclosures and settlement activity. It is possible that they are an extension of the nearby activity or a separate phase. However, their weak nature makes confident interpretation difficult. They could equally relate to agricultural activity or natural variation.
- 4.2.6 Numerous discrete positive anomalies are noted in the area of **4000 – 4004**. These are 1 – 2.5 m in diameter and indicative of pit features. While it is possible these relate to settlement activity, such as refuse or storage pits, it is equally possible that they represent natural variation in the soils and bedrock.
- 4.2.7 In the west of Field 9, a positive linear anomaly has been identified at **4005 (Figure 5)**. This is 80 m long and up to 3 m wide on a north – south alignment. Towards the southern end an area of increased magnetic response has been identified. This corresponds to a former extraction pit or pond noted on OS mapping dating to 1904. The linear portion of the anomaly at **4005** could indicate a track of path associated with this extraction pit. A parallel linear trend of increased magnetic response is noted to the west. This is further evidence a former trackway. However, an earlier origin for positive element of the anomaly cannot be ruled out based on its positive magnitude and shared north – south alignment of the response corresponding to the complex at **4000 – 4003**.
- 4.2.8 In the centre of Field 16, two weak positive and parallel linear anomalies measuring 35 m long and 1 – 2 m wide are noted on a north-west – south-east orientation at **4006 (Figure 7)**. The anomalies are spaced 4.5 m apart and are interpreted as a probable ditch-features. Two perpendicular responses project from either end of the anomaly. The first extends to the north-north-east for 62 m and is 2 m wide (**4007**). The second extends south-south-west for 34 m and is 2 m wide (**4008**).
- 4.2.9 Adjacent to the response at **4007**, a small, square-shaped anomaly has been identified at **4009**. This measures 6 m x 7 m and indicates a small, ditched enclosure. A larger square trend is noted to the north-west measuring 16 m x 14 m. However this response is too weak to interpret more confidently, despite its proximity to the ditch-like anomalies and could be modern.
- 4.2.10 A smaller, semi-circular anomaly is noted adjacent to the south at **4010**. This response is 7 m in diameter and incomplete on its southern side. This indicates a further probable ditch that could form part of an enclosure or ring ditch.
- 4.2.11 Together, these anomalies (**4006 – 4010**) likely evidence an unrecorded field system comprising linear ditch boundaries and small enclosures. While a prehistoric origin cannot be ruled out, the limited and relatively isolated nature of the anomalies makes suggestion of a date difficult. Further investigation would be required to determine the origin of these anomalies.
- 4.2.12 In the north-east of the survey area, in Field 36, a weak positive subcircular / key-hole shaped anomaly is noted at **4011 (Figure 13)**. The anomaly is 2 m wide and has a 15 m diameter with a 10 m extension to the south. A 3 m gap is noted in the south-western corner. This is indicative of a ditched enclosure. The large size and lack of evidence for burning suggests this is unlikely to be associated with a corn dryer, which typically have this form. However, the exact purpose and date of this feature is unclear from the geophysical survey alone.
- 4.2.13 In the south-east corner of Field 36, a positive rectilinear anomaly is noted at **4012**. This extends west from the eastern survey boundary for 33 m, before turning south for 22 m. The anomaly is up to 3 m wide and is indicative of a ditch feature. While the date of this is

unclear, the fact that it does not extend south beyond the field boundary suggests it may be contemporary with the current field system.

- 4.2.14 In the north of Field 34, a stronger positive linear anomaly has been identified at **4013 (Figure 13)**. The anomaly is 2 m wide and extends south from the northern boundary for 80 m, forming a right angle on its southern tip and continuing towards the west for 56 m. This type of anomaly indicates a ditch-feature, probably forming part of a larger rectangular or square shaped enclosure. The north-western portion of the feature likely extends beyond the surveyed area. A small square-shaped anomaly measuring 8 m x 10 m is noted to the north-east of the visible portion of the anomaly at **4014**. This is likely evidence of a smaller internal enclosure ditch.
- 4.2.15 Extending south from the enclosure at **4013**, a series of interconnected rectilinear positive anomalies has been identified at **4015 – 4020 (Figure 11)**. This comprises at least 13 distinct enclosures formed of 1 – 2 m wide ditches. These are on a north-north-east – south-south-west alignment, spanning 250 m across Field 22, 33, and 34. The individual enclosures are 15 – 35 m east – west by 10 – 31 m north – south, although some are not fully realised due to the extent of the survey area. There is some evidence for internal features within the enclosures, such as at **4019**, where internal boundaries or divisions have been identified.
- 4.2.16 The anomalies at the south-western end of the series (**4017** and **4018**) extend to the west of a parallel linear anomaly comprised of two ditch-like positive anomalies spaced 5 m apart. This may form a central trackway adjacent to the enclosures. This trackway continues south into Field 32 for 55 m at **4020**. It is not clear whether this possible trackway extends to the north as this falls outside the current survey area. The trackway may also extend to the south. However, due to the modern pattern of land division and extent of the findings in this portion of the survey area, a confident interpretation is not possible.
- 4.2.17 At the northern end of the complex a slightly curved linear anomaly crosses the enclosures on an east – west alignment at **4021**. This is 58 m long and 2.5 m wide. While this shares some alignment with the surrounding anomalies it does not appear to respect all of them, crossing in places. This may represent a ditch or boundary feature associated with a separate phase of activity.
- 4.2.18 Combined, the anomalies at **4015 – 4020** form a linear series of enclosures typical of a Romano-British ladder settlement. However, given the somewhat linear nature of this portion of the survey it is equally possible this forms part of a wider settlement that potentially extends north and west outside of the survey area.
- 4.2.19 East of the anomalies at **4020** are a series of negative linear anomalies at **4022** and **4023**. Five anomalies are noted at **4022**, three on an east – west orientation for 25 m and two north – south for 20 m. These appear to form a corner of a square anomaly that likely joins up with the two anomalies to the east at **4023**. The anomalies at **4023** are both orientated north – south for 12 and 43 m respectively. These anomalies are spaced 24 m apart and interpreted as possible archaeology. While it is possible these anomalies are associated with the ladder settlement or field system, it is considered more likely these anomalies evidence a former orchard (as noted in adjacent fields on 1886 OS mapping) that have been removed with the perpendicular parallel linear trends between the anomalies indicative of former tree-lines.
- 4.2.20 Across the south-east of the site there are several weakly positive linear anomalies that are interpreted as possible archaeology (**4024 – 4027**). These are all indicative of ditch features and have the potential to be associated with the wider settlement activity. However, their weak nature and lack of direct relationship with other anomalies makes a more confident interpretation difficult.

- 4.2.21 In the east of Field 32 (**Figure 11**), two linear anomalies have been identified at **4024**. These extend 30 and 22 m north – south respectively. While these could relate to the settlement to the north-west, they are most likely associated with orchards or agricultural activity. Similarly anomalies to the south in Field 27 at **4025** could relate to either the settlement or orchards. These are 40 m long north-east to south-west, turning east for 17 m at the northern end. They may form part of an enclosure or field boundary.
- 4.2.22 Two weak positive linear anomalies have been identified on the south of Field 27 at **4026** (**Figure 9**). The eastern anomaly is curved and extends for 50 m and is 1.5 m wide. The weak magnitude and sinuous nature of the anomaly is suggestive of a natural feature. The western anomaly is split into two portions, measuring 26 m long by 1.2 m wide and oriented on a north – south axis with a 12 m long turn to the east on its northern tip. These anomalies could form a larger enclosure feature. However, their weak magnitude and fragmented and isolated nature makes a confident interpretation difficult.
- 4.2.23 There is a broad and weak positive linear anomaly the centre of Field 27 and the eastern side of Field 26 at **4027** (**Figure 9**). The anomaly is on an east – west orientation and measures 90 m long by up to 6 m wide. This anomaly could relate to an unrecorded former field boundary following the projection of the existing hedgerow boundary located to the east. However, given its broad nature it could equally be natural.
- 4.2.24 Numerous, isolated discrete positive anomalies have been identified across the survey area. They are 1 – 3 m in diameter and are indicative of pit-like features of unknown origin. It is possible that they represent extraction activity similar to the recorded quarrying sites noted on historical OS mapping in the surrounding area. They may also relate to refuse pits associated with the Bronze Age to Romano-British settlement activity recorded in the wider area. However, they could equally be caused by localised variation in the magnetic susceptibility of the underlying deposits. Further investigations would be required to understand their provenance.
- 4.2.25 Across Fields 9–15, there is a notably increased magnetic response (**Figure 7**). This could relate to the spreading of green waste on fields, but it could also be caused by the presence of rubble of demolished buildings on the nearby area visible on OS maps from 1949-1970 or some form of industrial activity related to the ROF located adjacent to the north of these areas. The potential for the detection of potential archaeological features in this area is severely reduced as a result.
- 4.2.26 A series of dipolar linear anomalies have been identified in Fields 13, 14 and 15 at **4028 – 4031** (**Figure 11**). They are located on an east – west and north – south orientation. Despite the strong magnetic background of the area it has been possible to identify a correlation between the linear anomalies and former field boundaries recorded on the Somerset OS County Series from 1887-1888.
- 4.2.27 In Fields 27 and 36, weakly positive parallel anomalies aligned north – south and spaced 7 m apart indicate the presence of ridge and furrow cultivation (**Figure 9**). This corresponds to the modern pattern of land division that remains largely unchanged in these areas since the late 19th century. Such activity dates to the mid – late medieval period. In Fields 32 and 33, closer spaced (~1 m) positive linear trends have been identified following an east – west and north – south alignment. These trends suggest a modern ploughing regime.
- 4.2.28 In the west of Field 22, an irregular area of increased magnetic response has been identified at **4032** (**Figure 11**). This covers 20 m x 28 m and represent a concentration of material with a high magnetic contrast to the surrounding background magnetic response. This likely is evidence of an area of infilling, such as a former pond or extraction pit, although no such feature is recorded on available historical mapping. A similar response is noted in the south-west of the site (**4005**), so such activity is noted in the landscape.



- 4.2.29 In the north of the survey area, in Fields 35 and 36, an area of sinuous and broader linear anomalies have been identified. This corresponds to a recorded change in the underlying superficial alluvial deposits and is interpreted as natural in origin.
- 4.2.30 Numerous, weak magnetic trends of unknown origin have been identified within the data. It has not been possible to assign these anomalies a specific origin because some of these anomalies appear within areas of increased magnetic response, and others present a very weak magnitude and are isolated. The lack of a clear distinctive shape or any indicative context implies that all these anomalies could correspond to an agricultural, modern, natural, or even an archaeological origin, impossible to define without additional studies.
- 4.2.31 A number of highly magnetic linear anomalies have been identified throughout the survey results. These are interpreted as evidence of underlying services such as pipes or cables. A highly magnetic response is noted to the east at **4033** in Field 27 (**Figure 9**). This corresponds to an extant pylon.

5 DISCUSSION

- 5.1.1 The gradiometer survey has been successful in detecting anomalies of an archaeological origin across the survey area. Three distinct groups of anomalies indicative of ditch-features have been identified on the western edge, the centre and the north-east of the survey area.
- 5.1.2 In the north-east an interconnected network of recti-linear enclosures has been identified. This is characteristic of a Romano-British ladder settlement. However, this section of the survey area is generally linear in nature, so it may be that the anomalies form part of a wider settlement extending west and north outside of the surveyed area. This would be consistent with Romano-British activity recorded in the surrounding area.
- 5.1.3 Further evidence of possible Roman settlement activity has been identified in the south-west of the surveyed area. A smaller area of enclosures has been identified alongside the possible remains of two structures. While this area is smaller than that in the north-east, it may extend west beyond the survey extents.
- 5.1.4 In the centre of the surveyed area of field boundaries has been identified. These are of unknown date, but it is possible they relate to the settlement activity in the north-east as the area between them was not surveyed.
- 5.1.5 Several peripheral areas of archaeological or possible archaeological activity have been identified. In the north-east of the survey area, a key-hole shaped enclosure has been identified along with two rectangular enclosures. These are likely associated with the probable Romano-British settlement to the south but are slightly removed from the main focus of activity evident in the data.
- 5.1.6 Further possible small ditch and pit-like features have been identified throughout the survey area. Given the proximity of prehistoric and Romano-British settlements in the surrounding area an archaeological interpretation cannot be ruled out for these anomalies. However, they could equally be evidence of modern agricultural activity, post-medieval material extraction, or natural variations in the underlying geological deposits.
- 5.1.7 Former field boundaries identified on post-medieval mapping have been identified. However, an earlier origin cannot be ruled out for these features as ridge and furrow are evident in the central and eastern fields of the survey area respecting the modern pattern of land division which is evident on the same mapping.
- 5.1.8 Modern activity is evident in the form of an enhanced magnetic background of the fields located in the centre of the survey area. This enhancement could be caused by the spread of 'green-waste' for agricultural purposes but also by a dump of industrial material or rubble, likely related to the activity or construction of the ROF in the immediate vicinity. Other



modern activity identified in the area is the probable infill of a pond on the centre north of the survey area. This is likely to have impacted the detection of potential archaeological features in this area.

- 5.1.9 Natural variations likely caused by alluvial deposits are noted in the north-eastern corner of the survey area.
- 5.1.10 More recent activity relating to ploughing, modern services, and ferrous debris have been identified throughout the dataset.



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APPENDICES

Appendix 1: Survey Equipment and Data Processing

Survey methods and equipment

The magnetic data for this project were acquired using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03 nT over a ± 100 nT range, and measurements from each sensor are logged at intervals of 0.08 m. All of the data are then relayed to a Leica Viva CS35 tablet, running the MLgrad601 program, which is used to record the survey data from the array of probes at a rate of 20 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. This receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125 m intervals along traverses spaced up to 0.25m apart.

Post-processing

The magnetic data collected during the detail survey are downloaded from the SenSys cart system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

The cart-based system generally requires a lesser amount of post-processing than (for example) the handheld Bartington Grad 601-2 fluxgate gradiometer instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error; caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps may include:

- GPS DeStripe – Determines the median of each transect and then subtracts that value from each datapoint in the transect. May be used to remove the striping effect seen within a survey caused by directional effects, drift, etc.
- GPS Base Interpolation – Sets the X & Y interval of the interpolated data and the track radius (area around each datapoint that is included in the interpolated result).



- Discard Overlaps - Intended to eliminate a track(s) that have been collected too close to one another. Without this, the results of the interpolation process can be distorted as it tries to accommodate very close points with potentially differing values.

Typical displays of the data used during processing and analysis:

- Greyscale – Presents the data in plan using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.
- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies. XY plots can be made available upon request.



Appendix 2: Geophysical Interpretation

The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural, and uncertain origin/geological.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Possible archaeology – used for features which give a response, but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative, or broad bipolar (positive and negative) anomalies.



Appendix 3: OASIS form

Project Details:

Project name		Gravity, Puriton, Cowslip Meadow, Somerset			
Type of project		Detailed gradiometer survey			
Project description		<p>Three distinct groups of anomalies indicative of ditch-features have been identified on the western edge, the centre and the north-east of the survey area.</p> <p>The ditches from the north-eastern area form an interconnected network of recti-linear enclosures and evidence a ladder settlement or field system. The anomalies thought to be archaeological in origin in the south-west indicate a localisation of small enclosure features.</p> <p>While evident in the surrounding landscape, no obvious settlement activity has been identified by this phase of geophysical survey, with the exception of a small area of possible thermoremanent activity in the far south-west of the survey results.</p> <p>Further possible small ditch and pit-like features have been identified throughout the survey area. Given the proximity of prehistoric and Romano-British settlements in the surrounding area an archaeological interpretation cannot be ruled out for these anomalies. However, they could equally be evidence of modern agricultural activity, post-medieval material extraction processes or natural variations in the underlying geological deposits. Further investigation would be required to understand the nature of these features.</p> <p>Former field boundaries identified on post-medieval mapping have been identified as well as natural variations likely caused by changes on the superficial geological composition in the area. More recent activity relating to ploughing, modern services and ferrous debris have been identified throughout the dataset.</p>			
Project dates		Start: 19-07-2021		End: 22-07-2021	
Previous work		Yes			
Future work		Not known			
Project Code:	218373	HER event no.	N/A	OASIS form ID:	wessexar1-431227
		NMR no.	N/A		
		SM no.	N/A		
Planning Application Ref.					
Site Status		None			
Land use		Cultivated Land 3 – operations to a depth of greater than 0.25 cm			
Monument type			Period		

Project Location:

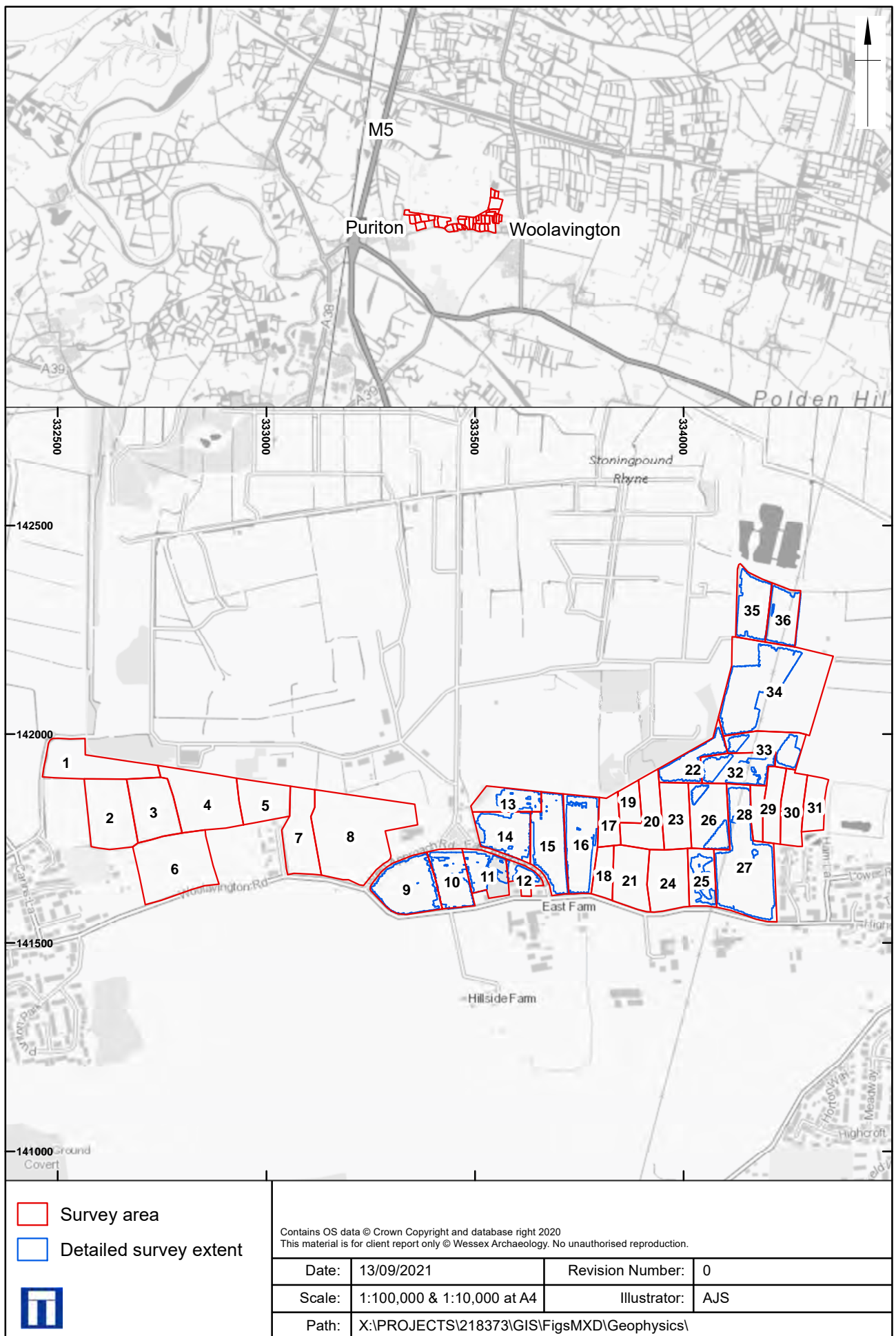
Site Address	West Approach Road, Puriton, Sedgemoor			Postcode	TA7 8AD
County	Somerset	District	Sedgemoor	Parish	Puriton
Study Area	51 ha	Height OD	6 – 20 m aOD	NGR	343150 141845 332590 141825

Project Creators:

Name of Organisation	Wessex Archaeology		
Project brief originator	This is Gravity Ltd	Project design originator	Wessex Archaeology
Project Manager	Tom Richardson	Project Supervisor	Rok Plesnicar
Sponsor or funding body	This is Gravity Ltd	Type of Sponsor	Client

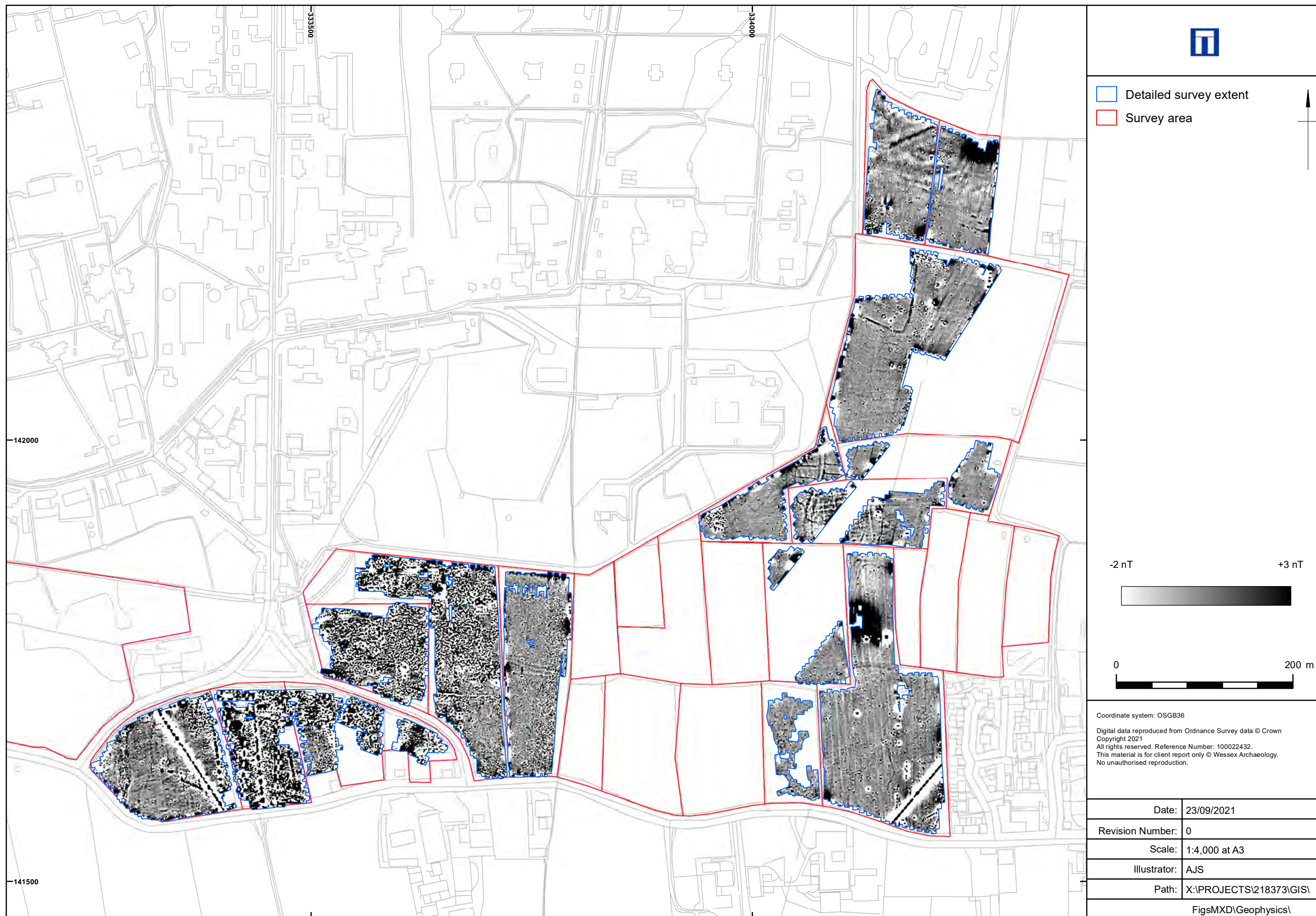
Project Archive and Bibliography:

Physical archive	N/A	Digital Archive	Geophysical survey and report	Paper Archive	N/A
Report title	Gravity, Puriton, Cowslip Meadow, Somerset Detailed Gradiometer Survey Report			Date	2021
Author	Wessex Archaeology	Description	Unpublished report	Report ref.	218373.03



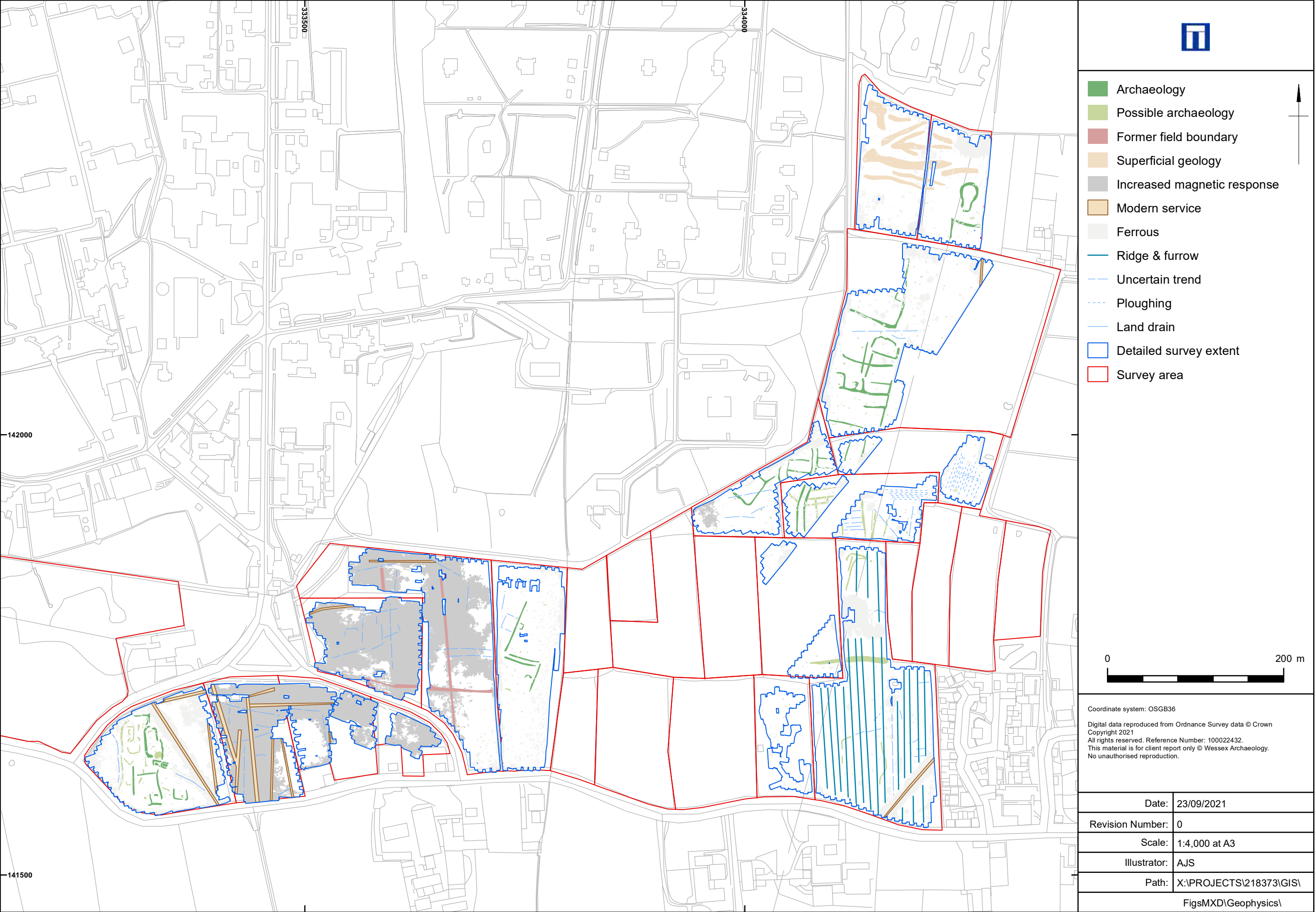
Site location and survey extent

Figure 1



Detailed gradiometer survey results: overall greyscale plot

Figure 2



Detailed gradiometer survey results: overall interpretation

Figure 3



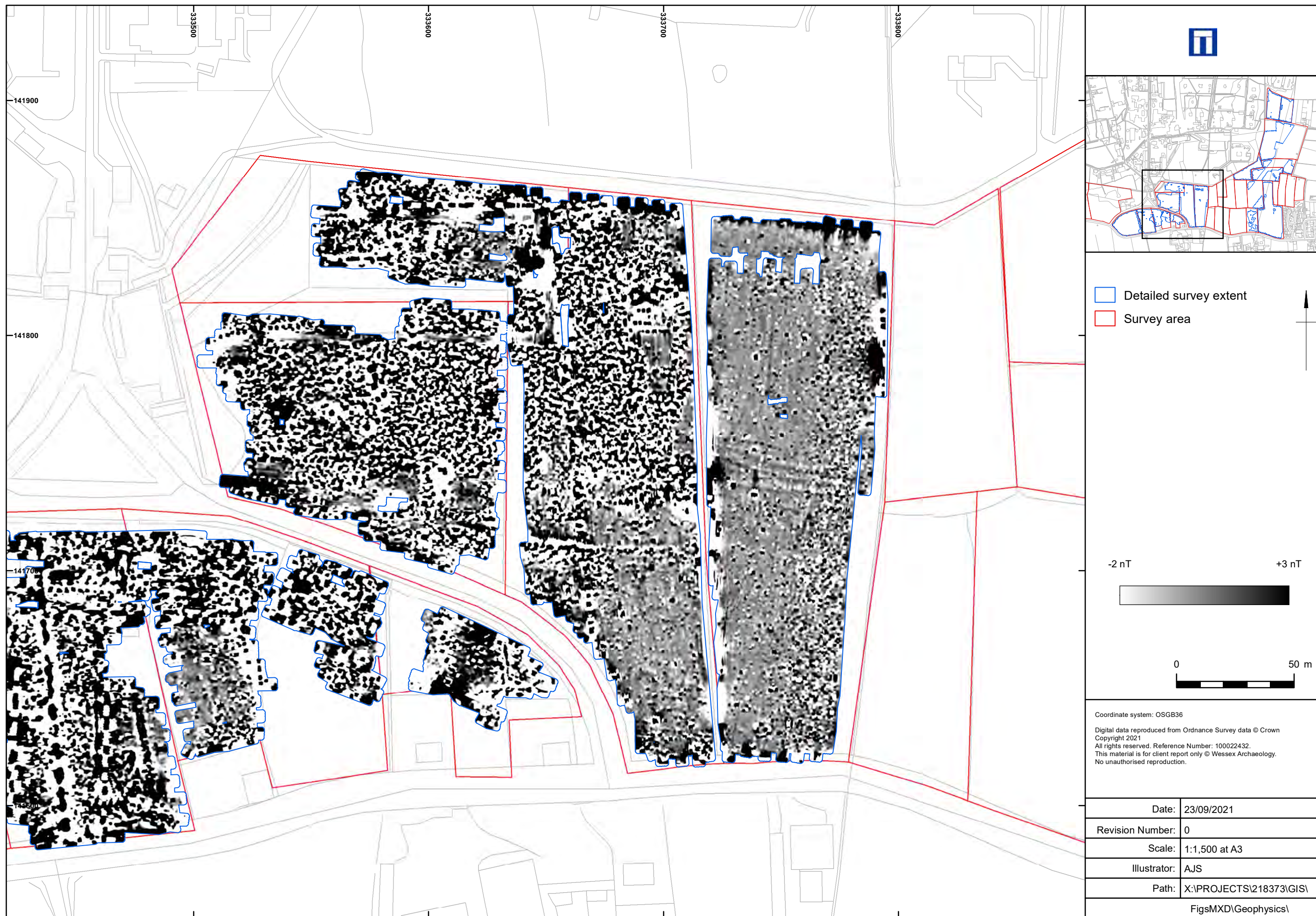
Detailed gradiometer survey results: greyscale plot (Areas 9-14)

Figure 4



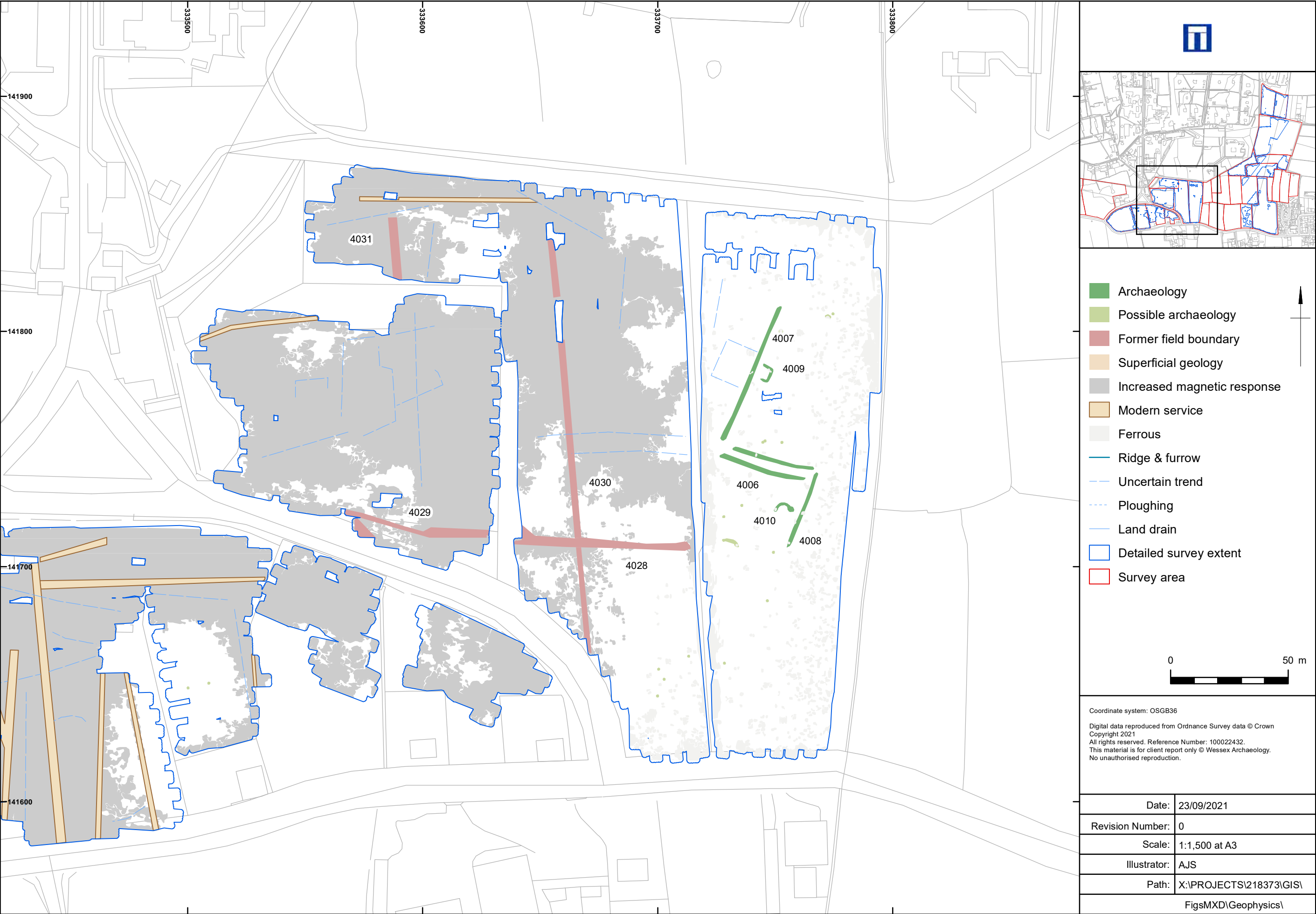
Detailed gradiometer survey results: interpretation (Areas 9-14)

Figure 5



Detailed gradiometer survey results: greyscale plot (Areas 11-16)

Figure 6



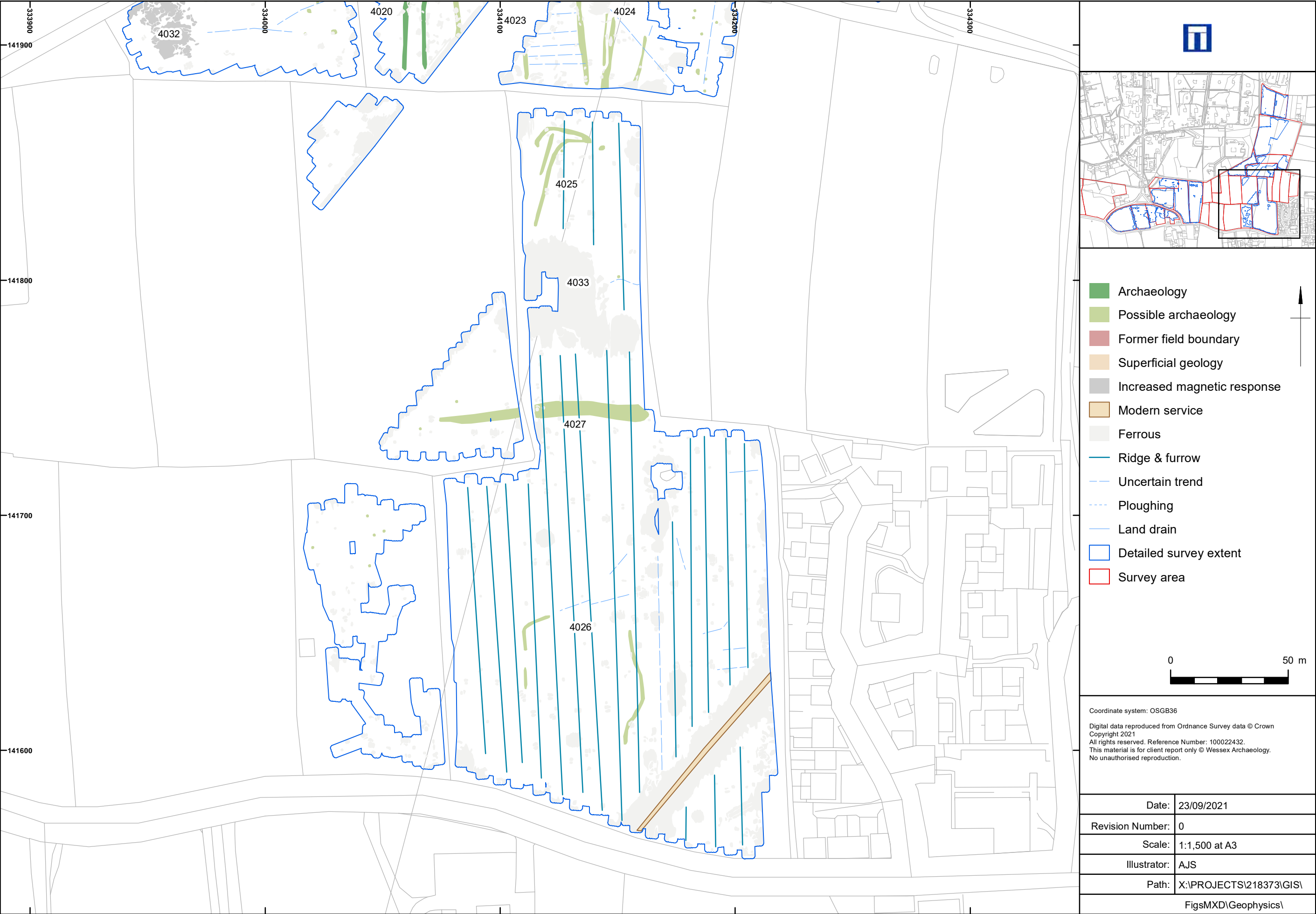
Detailed gradiometer survey results: interpretation (Areas 11-16)

Figure 7



Detailed gradiometer survey results: greyscale plot (Areas 25-27)

Figure 8

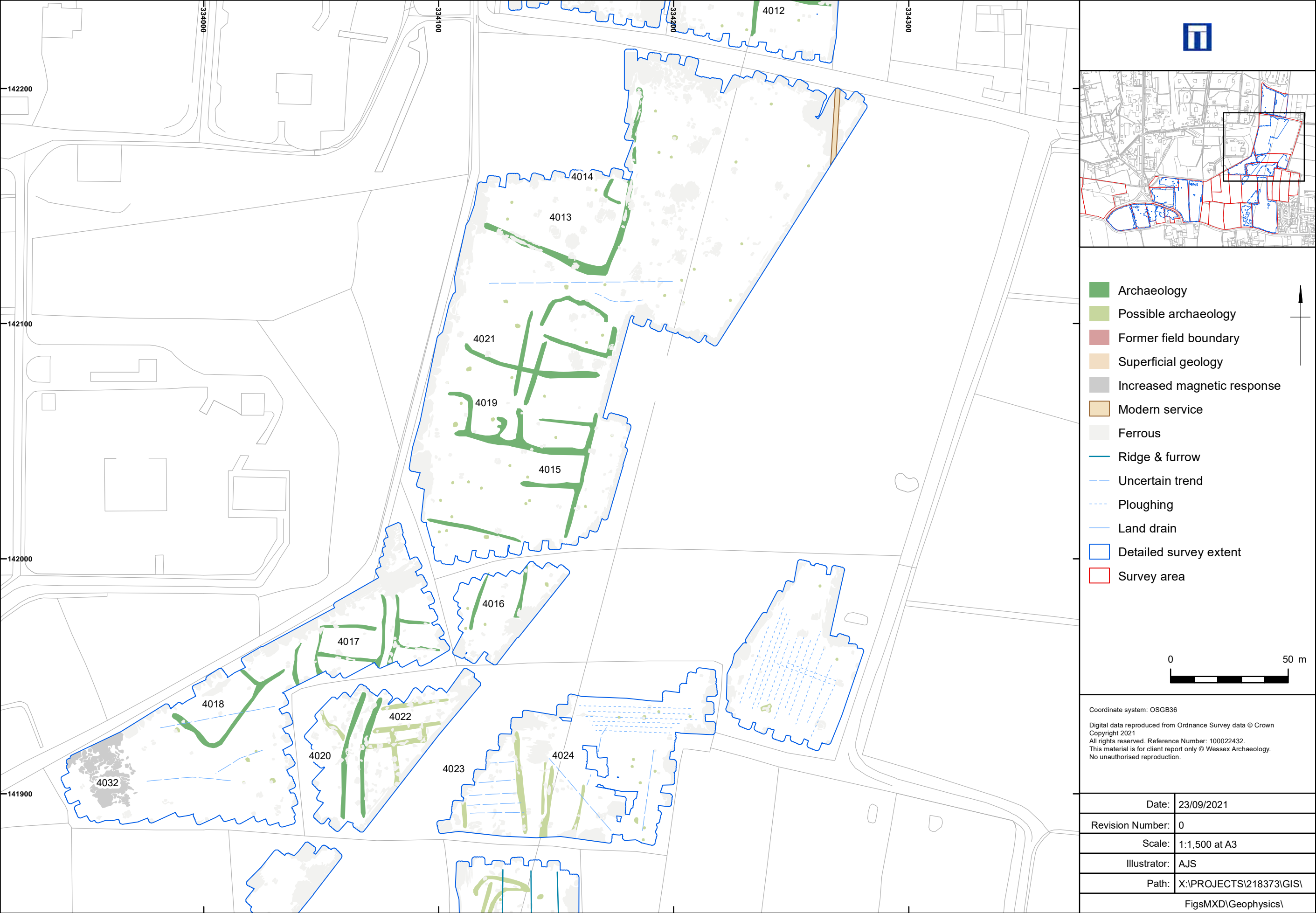


Detailed gradiometer survey results: interpretation (Areas 25-27)

Figure 9



Detailed gradiometer survey results: greyscale plot (Areas 22, 32, 33 and 34)



Detailed gradiometer survey results: interpretation (Areas 22, 32, 33 and 34)

Figure 11



Detailed gradiometer survey results: greyscale plot (Areas 35 and 36)



Detailed gradiometer survey results: interpretation (Areas 35 and 36)

Figure 13



Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk

