Gravity

Smart Campus

Gravity EIA Scoping Report

Chapter 16

Appendix P5 - Cowslip Meadow Archaeological Mitigation

Gravity, Cowslip Meadow
Puriton, Somerset

Archaeological Mitigation
Interim Summary of Results

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Gravity, Cowslip Meadow Puriton, Somerset

Archaeological Mitigation Interim Summary of Results

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by This is Gravity Ltd ('the client'), to undertake archaeological mitigation works comprising the excavation of an area measuring 40 m by 40 m (with contingency for extension) at the former Royal Ordnance Factory (ROF) Bridgwater site near Puriton, Somerset. The excavation area is centred on NGR 333126 142013 (**Figure 1**).

1.1.2 The work was carried out as a condition of planning permission (ref. 43/13/00010) granted by Sedgemoor District Council (SDC) for the redevelopment of the former ROF Bridgwater site as a mixed-use campus, named Gravity:

Condition 9: No phase or parcel of development (including the construction of the main access road) shall commence until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in relation to the phase or parcel in accordance with a written scheme of investigation which has first been submitted to and approved in writing by the Local Planning Authority.

Reason: To ensure the protection of important heritage and historical features.

1.1.3 The excavation was the final stage in a programme of archaeological works, which had included desk-based assessment, extensive building recording, trial trench evaluations, geophysical survey and other small-scale excavation (Wessex Archaeology 2011; 2012a–b, 2019a–b).The area was targeted for excavation based on the results of trial trenching undertaken in 2012 (refer to section 2.3).

1.1.4 The excavation was undertaken in accordance with a written scheme of investigation (WSI), which detailed the aims, methodologies and standards to be employed for the fieldwork and the post-excavation work (Wessex Archaeology 2020). The Senior Historic Environment Officer (SHEO) for South West Heritage Trust approved the WSI on behalf of the Local Planning Authority (LPA) prior to the fieldwork.

1.1.5 The excavation was undertaken between 14 September and 1 October 2020.

1.2 Location, topography and geology

1.2.1 The excavation area is located in the south-western part of the development site, which encompasses approximately 250 ha on the flat and low-lying Somerset Levels, between the man-made drainage systems of the Huntspill River directly to the north and King's Sedgemoor Drain, 1 km to the south. It is adjacent to the villages of Woolavington and Puriton, to the south-east and south-west respectively. The excavation area coincides with a small, previously undeveloped area within the former ROF Bridgewater site.

1.2.2 The site is situated at 6–7 m above Ordnance Datum (aOD). The bedrock geology is mapped by the British Geological Survey (BGS 2020) as Jurassic Blue Lias limestone, overlain by Late Pleistocene–Holocene Estuarine Alluvium.

1.3 Scope of report

1.3.1 This document provides an initial summary of the excavation results, a rapid appraisal of the recovered finds and a quantification of the environmental samples. It does not constitute a full post-excavation assessment and is intended for information purposes only.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

2.1.1 The archaeological and historical background was assessed in a previous desk-based assessment (Wessex Archaeology 2011), which considered the recorded historic environment resource within a 1 km radius of the development site. A summary of the results is presented below, with selected references from the Somerset Historic Environment Record (SHER).

2.2 Archaeological and historical context

2.2.1 The site is located at the margins of two distinct environments. The Somerset Levels lie to the north, and a prominent ridge overlooking the River Parrett and tidal flats lies to the south. The Somerset Levels have been subject to continual cycles of marine ingression and regression throughout history, which has profoundly influenced the activities of past communities in this area. There is evidence of seasonal activity from the Mesolithic period onwards, with the Levels utilised as seasonal pasture during the Bronze Age and Iron Age. During the Iron Age, the Levels were also used for salt production and other industrial processes.

2.2.2 Although evidence of prehistoric activity in the local area is relatively sparse, sherds of Iron Age pottery from the sites of extensive Romano-British settlements to the west and south of the development area (see below), suggest that these may have been preceded by earlier phases of occupation. Several substantial later Iron Age ditches (SHER no. 28487) were also excavated to the south, near Knowle Hill, in 2009 as part of a series of investigations preceding the installation of a water main.

2.2.3 The remains of an extensive Romano-British settlement (SHER no. 10705) were uncovered near Down End during the construction of Junction 23 of the M5, which lies to the west of the development area. The settlement was situated on the edge of a ridge, overlooking the River Parrett. Another area of Romano-British occupation near Crandon Bridge (SHER no. 10039), to the south of the development area has been subject to numerous investigations since 1939, when the site was revealed during works to widen the Kings Sedgemoor drain. The Crandon Bridge site, which was apparently occupied throughout the 1st to 4th centuries, has yielded extensive archaeological remains, including the foundations of several structures, some of which may represent the remains of warehouses. The settlement appears to have lain on the eastern bank of a broad meander of the River Parrett, the position of which has shifted considerably to the west since the post-medieval period. As such, it has been asserted that the *likelihood of it being a port is strong* (Langdon and Fowler 1971). A tessellated pavement or mosaic reportedly discovered in *c.* 1670 near *Knoll Hill* (Knowle Hill) may be associated with the site.

2.2.4 A possible Roman road from Ilchester to Combwich is recorded 200 m south of the site (SHER no. 11831). Stone metalling associated with the Roman road was uncovered during

the works on the M5 construction. Evidence of possible Romano-British salt production has also been recorded to the south of the road (SHER no. 30221).

2.2.5 Royal Ordnance Factory Bridgwater was one of several purpose-built specialised production sites constructed across the UK during World War II. Despite the intensive building programme associated with the construction of the factory, the area of excavation remained an area of green space within a 'clean zone' surrounded by offices and administrative buildings.

2.3 Previous works related to the development

Trial trench evaluation (2012)

2.3.1 An archaeological evaluation, comprising the excavation of 14 trenches, was undertaken within the development area in 2012 (Wessex Archaeology 2012b). Trench 6, upon which the excavation area was subsequently targeted, revealed a pair of ditches (Figure 1). The ditches were aligned north-west to south-east and spaced approximately 3 m apart. Ditch 604 was 0.6 m wide and 0.22 m deep with steeply sloping sides. It contained a single fill, which appeared to have formed through gradual natural silting. A complete horse skull had seemingly been placed on the base of ditch. Romano-British pottery and pieces of fired clay were also recovered. Its counterpart, to the south (606) was 0.44 m wide, 0.25 m deep and had steeply sloping straight sides and a concave base. Its single fill also contained fragments of Romano-British pottery and fired clay. The most diagnostic piece within the small assemblage of fired clay was the base of a small 'pedestal', a distinctive form associated with salt-working (briquetage). Charred plant remains, retrieved from samples of the fill of ditch 606, were seemingly indicative of settlement waste.

3 AIMS AND OBJECTIVES

3.1 Aims

3.1.1 The general aims of the excavation, as stated in the WSI (Wessex Archaeology 2020) and in compliance with the Chartered Institute for Archaeologists' Standard and guidance for archaeological excavation (CIfA 2014a), were to:

- examine the archaeological resource within a given area or site within a framework of defined research objectives;
- seek a better understanding of the resource;
- compile a lasting record of the resource; and
- analyse and interpret the results of the excavation and disseminate them.

3.2 Research objectives

3.2.1 Following consideration of the archaeological potential of the site and the regional research framework (Webster 2007, Grove and Croft 2012), the research objectives of the excavation defined in the WSI (Wessex Archaeology 2020) were to:

- confirm the extent of the ditches and ascertain whether they are contemporary with each other and their function; for example, whether they relate to or define a route way across the site;
- determine the nature and extent of the Romano-British remains;
- identify any further remains or artefacts relating to salt production on the site;

- assess the potential for the recovery of artefacts to assist in the development of type series within the region.

4 METHODS

4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (Wessex Archaeology 2020) and in general compliance with the standards outlined in CIfA guidance (CIfA 2014a).

4.2 Fieldwork methods

4.2.1 The excavation area was set out using a Global Navigation Satellite System (GNSS), in the same position as that proposed in the WSI (Figure 1). The topsoil/overburden was removed in level spits using a 360º excavator equipped with a toothless bucket, under the constant supervision and instruction of the monitoring archaeologist. Machine excavation proceeded in level spits until the uppermost archaeological horizon or the geological substrate was exposed.

4.2.2 At the request of the SHEO, and in agreement with the client, the excavation area was extended slightly to establish the extent of archaeological features, as per the contingency outlined in the WSI (Wessex Archaeology 2020). The area was extended to the west by approximately 15.7 m by 4.5 m and 24 m by 10 m to the north-east.

4.2.3 Where necessary, the surfaces of archaeological deposits were cleaned by hand. A sample of archaeological features and deposits was hand-excavated, sufficient to address the aims of the excavation. A sample of natural features was also investigated.

4.2.4 Spoil derived from machine stripping and hand-excavated archaeological features was visually scanned for the purposes of finds retrieval. Artefacts were collected and bagged by context. All artefacts from excavated contexts were retained, although those from features of modern date (19th century or later) were recorded on site and not retained.

4.2.5 All archaeological features and deposits were recorded using Wessex Archaeology's pro forma recording system. A complete record of excavated features and deposits was made, including plans and sections drawn to appropriate scales (generally 1:20 or 1:50 for plans and 1:10 for sections) and tied to the Ordnance Survey (OS) National Grid.

4.2.6 A Leica GNSS connected to Leica's SmartNet service surveyed the location of archaeological features. All survey data is recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15 and OSGM15, with a three-dimensional accuracy of at least 50 mm.

4.2.7 A full photographic record was made using digital cameras equipped with an image sensor of not less than 16 megapixels. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

4.2.8 Photogrammetry was undertaken to record an upstanding wall (1016) using a Canon EOS60D with an EF-S18-55mm f/3.5-5.6 III (18mm) lens and a Leica Captivate RTK GNSS system. The wall was surveyed using manual settings suitable for the light conditions on site; images collected are 5184 x 3456 pixels. The georeferencing targets were surveyed with an average 3DCQ below 0.05 m The Ground Sample Distance (GSD) of the photos

are 0.352 mm/pixel. The survey was carried out using OSGB36(15) coordinate system. The photographs were processed in Agisoft Metashape 1.6.4 to produce a 3D model. This was then georeferenced using a subset of the survey data collected. The remaining survey data was used as a check of model accuracy. The resulting 3D model has a root mean square error of 2.57cm. True model accuracy likely exceeds this; however, checks are limited by the accuracy of the survey instrument used. An orthographic plan view was exported for the photogrammetric model. This was subsequently mounted to create a scaled image (Plate 4).

4.3 Finds and environmental strategies

4.3.1 Strategies for the recovery, processing and rapid assessment of finds and environmental samples (where applicable) were in line with those detailed in the WSI (Wessex Archaeology 2020). The treatment of artefacts and environmental remains was in general accordance with: *Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b) and *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (English Heritage 2011).

4.4 Monitoring

4.4.1 The SHEO monitored the works on behalf of the LPA. Variations to the WSI, where required to better address the project aims, were agreed in advance with the client and the SHEO.

5 STRATIGRAPHIC EVIDENCE

5.1 Soil sequence and natural deposits

5.1.1 The excavation area was overlain by an approximately 0.1 m thick mid-brown silty clay topsoil containing occasional small limestone fragments. Below this was a 0.1–0.2 m thick layer of grey-brown alluvial clay. The upper surface of the natural substrate in the northern part of the area consisted of a stiff light yellow-brown and light grey-brown mottled clay with outcrops of weathered limestone bedrock. A natural outcropping of the bedrock was also exposed towards the south-east corner of the excavated area.

5.2 Middle–Late Iron Age

Ditch 1068

5.2.1 The earliest identifiable phase of activity was evidenced by a substantial curvilinear ditch (1068), exposed in the northern part of the excavation area (**Figure 2**). The ditch extended south-east from the north-west corner of the excavation area for 18.5 m before continuing to the east for another 18.5 m, beyond which it turned again and terminated 14 m to the north-east. The ditch was up to 2.2 m wide and 1.06 m deep, and had straight, steeply sloping sides and a flat base (**Plates 1** and **2**). It became gradually narrower and shallower towards its terminal.

5.2.2 Between two and five, generally homogenous, silty clay fills were recorded in sections excavated through the ditch; these seem to have formed largely through natural processes, possibly including the erosion of an internal bank. Its fills produced 141 sherds (1144 g) of (predominantly) Middle–Late Iron Age pottery, animal bone (3756 g), fired clay (33 pieces, 414 g), an iron nail, a small fragment of copper alloy and a tiny quantity of fuel ash slag (94 g). Finds were recovered from all excavated sections of the ditch, although the bulk of this material came from four of the fills in one slot (cut 1044). A few small Romano-British sherds, which came from the upper fills, could be intrusive but perhaps indicate that the

ditch remained only partially infilled when the site was in use during a later phase of activity (see below).

5.2.3 No other features were obviously contemporary with the ditch, the function of which is not immediately apparent. It may have formed part of an enclosure sited on a slightly raised area of ground in the northern part of the excavation area. However, an extension to the north-eastern corner of the excavation area did not locate its projected continuation (an opposing terminal potentially forming an entrance). The excavation area could not be extended further due to the presence of an extant drainage ditch.

5.3 Romano-British

Wall 1016 and associated features/deposits

5.3.1 The remains of a substantial NNE–SSW masonry wall (**Plate 4**) were exposed in the south-western part of the site (**Figure 2**), following the removal of layer 1019 (described below). The faces of the wall were constructed of randomly coursed, large angular Lias limestone blocks and slabs, which had been split along their natural bedding planes and joints and roughly dressed. The core was of rubble. The wall was 0.6 m wide and at least 9.4 m long, both ends having been lost to truncation or robbing in antiquity. It survived to a maximum height of 0.39 m to the south, where it consisted of six courses. No mortar/bonding agent was apparent. Since the remains of the wall were left *in situ*, no construction cut or foundation were observed.

5.3.2 A rubble filled trench (1060) extended approximately 10.5 m NNE of wall 1016. This was 0.85 m wide and 0.36 m deep and had steeply sloping sides and a flat base. It potentially represents the robbed-out remains and/or disturbed foundation cut for the northward continuation of the wall. The backfill of the trench (1061), described as a dark grey, friable silty deposit with common charcoal inclusions, yielded five sherds (181 g) of Romano-British pottery, animal bone (200 g) and a tiny piece of fired clay.

5.3.3 A further, 4.7 m long linear feature (1003), again, possibly a continuation of the robbed-out wall, extended NNE from 1060. This was 0.5 m wide, 0.17 m deep and had gradually sloping sides and a flattish base. It was infilled with a layer of very dark grey silty clay (1004), which incorporated abundant angular fragments of limestone. Finds from feature 1003 comprise Iron Age and Romano-British pottery (8 sherds, 20 g), animal bone (826 g) and fired clay (61 g). The suspected robber trenches were only partially overlain by layer 1019 (see below). Consequently, the survival of wall 1016 could perhaps be accounted for as a result of this being sealed by a thicker accumulation of the deposit, which may have rendered it less visible/easily accessible than the robbed-out part of the structure to the NNE which was located on the higher ground.

5.3.4 A possible limestone rubble-filled drain 1064 (**Plate 5**) may have been contemporary with wall 1016. This extended at least 9 m south-west from the southern end of the wall and continued beyond the southern limit of the excavation area. The feature was 0.55–0.65 m wide but its depth and profile were not ascertained, and no finds were recovered from it.

5.3.5 A layer of limestone rubble (1018), presumably derived from the collapse/demolition of the structure, extended an average of 0.7 m to the east and 2 m west from wall 1016. Due to its diffuse edges, the precise extent of the layer could not be established. Finds recovered from the rubble layer comprised 20 sherds (353 g) of Romano-British pottery (some of which potentially dates to the 3rd/4th century AD), animal bone (106 g), an iron nail and 81 pieces (1854 g) of fired clay. The latter includes the fragmentary remains of briquetage pedestals and vessels used in salt production. Very similar material – notably the briquetage – was

retrieved from the overlying layer 1019 (see below). The presence of the rubble deposits beneath layer 1019 indicates that the structure had been abandoned and partially demolished, robbed out or collapsed by the time that the latter deposit was formed.

5.3.6 No returns to the wall or other associated structural elements or surfaces were apparent. As a result, the plan form, nature and extent of the structure, of which wall 1016 was a component, are uncertain. Its function is also unclear at this stage.

Ditches/gullies

5.3.7 A set of shallow ditches or gullies (604, 1021, 1069, 1070 and 1072; **Figure 2**), lay immediately to the east of, and were arranged co-axially to wall 1016, with which they are presumably contemporary. The features, which were also partially overlain by layer 1019 (see below), potentially defined a set of enclosures and accesses attached to the exterior of the structure evidenced by the wall.

5.3.8 West-north-west to east-south-east ditch 604, which had been recorded during the evaluation (Wessex Archaeology 2012b), was not observed to continue beyond its previously recorded extent. Given its comparatively modest proportions (0.6 m wide and 0.22 m), this could be a result of truncation.

5.3.9 Ditch 1070, which lay parallel to and 3 m south of ditch 604, had also been recorded during the evaluation (as ditch 606). The excavation demonstrated that this feature was at least 18.4 m long, although it may also have been lost to truncation at both ends. It was 0.45–0.9 m wide and up to 0.2 m deep, with moderately steeply sloping sides and a concave or flat base. It contained a lower mottled red-brown silty clay fill, rich in burnt material, and an upper fill consisting of a grey silty clay. Finds from ditch 1070 comprise Romano-British pottery (15 sherds, 384 g), animal bone (70 g), fired clay (91 g) and oyster shell (18 g).

5.3.10 Ditch 1069 joined and was ostensibly cut by ditch 1070. It extended 18.5 m to the SSW of ditch 1070 and lay parallel to wall 1016, which was located 7.5 m to the west. Ditch 1069 was 0.6–1 m wide and up to 0.3 m deep, with moderately or steeply sloping sides and a concave or flat base. Its grey silty clay fill yielded Romano-British pottery (three sherds, 25 g), fired clay (165 g) and animal bone (24 g).

5.3.11 Ditch 1021, which was immediately south of, and parallel to, the possible drain (1064), extended 7.5 m to the south-east, and continued beyond the southern limit of the excavation area. It was approximately 0.6 m wide and 0.15 m deep, with shallow sloping sides and a concave base. It contained a single fill, recorded as a red brown silty clay, which produced small quantities of Romano-British pottery (four sherds, 7 g), fired clay (9 g) and animal bone (3 g).

5.3.12 Two other small ditches or gullies (1005 and 1071) lay on a different orientation to those described above. Although their relative chronologies have not been definitively established at this point, it is provisionally suggested that ditches 1005 and 1071 are the earlier of the features on the basis of the small quantities of Late Iron Age/Romano-British pottery (five sherds, 38 g) recovered from them. Other finds, exclusively from ditch 1071, comprise a few fragments of animal bone (57 g) and fired clay (4 g).

5.3.13 The north-east to south-west ditch (1005) was at least 5.3 m long, and continued beyond the western limit of the excavation area and terminated, or was lost to truncation, to the north-east. It was 0.95 m wide, 0.3 m deep had steeply-sloping, concave sides and a concave base and contained a single undistinctive silty clay fill. Ditch 1071, 12.5 m to the south-east, extended north-east for 9.5 m before turning and terminating or fading out 5 m

to the east. It was 0.3 m wide and 0.12 m deep, with gently sloping sides and a concave base. It contained a single grey silty clay fill.

Discrete features

5.3.14 An east–west group of three probable postholes (alternatively, small pits; 1031, 1033 and 1035) was also revealed in the southern part of the excavation area (**Figure 2**) following the removal of layer 1019. The features were spaced 0.6–1.6 m apart, measured between 0.4–0.65 m in diameter, were 0.1–0.2 m deep and had moderately steeply sloping sides and concave bases. Each contained a single fill, typically recorded as a dark grey silty clay with occasional limestone inclusions. No traces of post-pipes or obvious packing material were noted. Two small sherds (9 g) of Romano British pottery and two tiny crumbs of undiagnostic prehistoric pottery were recovered from feature 1031 and small individual pieces of fired clay were found in 1033 and 1035. Although the function of the features is uncertain, it is perhaps significant that they were arranged perpendicular to ditch/gully 1069.

5.3.15 'Keyhole-shaped' feature 1042, to the north-east of the probable postholes, was 3.65 m long, up to 1.6 m wide and 0.58 m deep and had moderately steep sloping sides and a concave base. Its single, dark grey silty clay fill, with common, poorly sorted limestone inclusions, contained 13 sherds (82 g) of mostly Romano-British pottery (some is potentially of Late Iron Age date), fired clay (nine pieces, 95 g), a worked stone disc, and animal bone (275 g). The function of this feature is unclear. It superficially resembles a crop-dryer, but the excavator noted that there was no evidence of *in situ* burning as would be expected if this were the case.

5.3.16 Approximately 1.5 m to the east of 1042 was a shallow, elongated feature (1028), which was tentatively interpreted by the excavator as a 'hearth'. This measured 1.1 m by 0.4 m, was 0.15 m deep and had a slightly irregular, undulating base. Its thin basal fill (1029) consisted of a charcoal-rich dark grey brown–black clay with common red-brown mottling (ostensibly derived from the inclusion of heat-affected clay). The clay rich substrate into which the feature had been cut was slightly reddened and hardened through exposure to heat, although it is unclear if this was a result of *in situ* burning or contact with a dump of still hot/smouldering burnt waste represented by deposit 1029. The overlying fill, of dark grey-brown silty clay, may have formed through natural processes but could have equally been deposited to infill the feature and cover its burnt contents. No finds were retrieved from the feature, although it is presumed to be broadly contemporary with other Romano-British remains that were also sealed by layer 1019.

5.3.17 A large pit (1054) was uncovered towards the south-west corner of the excavation area, where it was sealed beneath layer 1019. Although difficult to define in plan, the pit, of which one quadrant was excavated, was at least 2.25 m in diameter and 0.75 m deep, with steeply sloping, slightly convex sides and a concave base (**Plate 3**). It was largely infilled by the earliest of its two fills (1055), a thick layer of dark grey brown silty clay with occasional poorly sorted limestone inclusions, potentially formed through deliberate infilling. The deposit yielded 47 sherds (597 g) of Romano-British pottery and single large sherds of Iron Age (45 g) and Late Iron Age/Romano-British (28 g) date. Other finds comprise small amounts of animal bone (214 g) and fired clay (20 pieces, 375 g). No finds came from the overlying light yellow brown silty clay fill (1056).

Layer 1019

5.3.18 Mechanical removal of the topsoil and subsoil exposed a layer of dark grey silty clay (1019, described below) across the lower-lying south-western part of the excavation area (**Figure 1**). The deposit covered an area of at least 38 m (east–west) by 21.5 m (north–south), and continued beyond the southern and western limits of the excavation area, where

it was observed to attain a maximum thickness of approximately 1 m. The layer gradually thinned out to the north-east, corresponding with the progressively elevated rise of the natural substrate. The deposit sealed and post-dated the majority of the Romano-British features in the south-western part of the excavation area but did extend over the large Iron Age ditch (1068) to the north. The processes responsible for the formation of layer 1019 are currently uncertain, although it may have resulted from inundation following, or precipitating the abandonment, collapse/demolition of wall 1016, perhaps in the Late Romano-British or early post-Roman period.

5.3.19 Finds from layer 1019 comprised 27 sherds (322 g) of Late Iron Age/Romano-British and Romano-British pottery, a worked flint flake, animal bone (429 g), a possible fragment of stone roof tile and 63 pieces (1758 g) of fired clay including briquetage. The finds, perhaps along with those from the surface of rubble layer 1018, may represent residual debris from occupation/and or other forms of activity associated with the structure indicated by wall 1016. The presence of briquetage, in layers 1018 and 1019, is of note, but not unusual given the extensive evidence of salt production recorded throughout the Somerset Levels (eg, Grove and Brunning 1998). The absence of characteristic features such as settling tanks, evaporation hearths, water channels and sluices, or indeed substantial layers of briquetage and burnt waste, indicates that salt production was likely not undertaken on the site, but probably nearby.

6 FINDS AND ENVIRONMENTAL EVIDENCE

6.1 Finds

6.1.1 Approximately 19 kg of finds were recovered during the excavation (**Table 1**). The pottery is of Middle Iron Age to late Roman date. Little closely dated material was present amongst the other material types. The largest group of Iron Age pottery came from ditch 1068 and includes two bowls in the South-Western Decorated Wares style, of 3rd to 1st century BC date. Other Iron Age vessels of note comprise a bead-rimmed bowl decorated with vertical ribs emphasised by small impressed dots, found in pit 1054. This Late Iron Age form was made into the 1st century AD, probably by the pottery industries of the Exeter area (Brown 1997, 41). The Roman pottery is dominated by locally produced coarsewares with small quantities of regional wares and limited imported wares (samian, Dressel 20 amphora).

6.1.2 The fired clay assemblage includes the remains of salt production artefacts such as the briquetage containers and pedestals used to support the brine pans during the evaporation process. All were recovered from rubble layers 1018 and 1019. The stone comprises an undated granitic grinding stone (from the topsoil), a Lias limestone disc – possibly a gaming counter (pit 1042) and probable Lias roofing material (layer 1019). Metal objects comprise a piece of copper alloy waste and two iron nails. The very small quantities of fuel ash recovered derive from high temperature activities.

6.1.3 The animal bone was recovered from features of Iron Age and Roman date. Almost all Iron Age material derives from ditch 1068; most are from sheep/goat, with some from cattle and two bones from horse. The material is a mixture of waste from primary butchery and meat consumption. Most of the identified bones from Roman contexts are from cattle. Of note is the skull of a small horned breed of cattle from ditch 1068. Several of the cattle bones show signs of butchery. Sheep/goat bones are also common and include a fragment of skull from a horned breed.

Table 1 Quantification of finds

Material	Number	Weight (g)
Pottery		
Late prehistoric	*2*	*2*
Middle to Late Iron Age	*143*	*1178*
Late Iron Age or Romano-British	*18*	*209*
Roman	*168*	*2421*
Unknown	*7*	*31*
Sub-total	338	3841
Fired clay	324	6095
Flint	1	2
Copper alloy	1	26
Iron	2	23
Slag	12	109
Stone	3	261
Animal bone	428	6618
Shell	1	18

6.2 Environmental

6.2.1 Environmental samples taken during the excavation (Table 2) have been retained for processing and assessment at a future stage.

Table 2 Quantification of environmental samples

Feature	Sample Number	Volume	Date
Layer 1019	101	40 L	Romano-British
'Hearth' 1028 (context 1029)	102	20 L	Romano-British
Ditch 1068 (cut 1044, context 1046)	103	40 L	Iron Age

7 DISCUSSION

7.1 Overview

7.1.1 Although the excavations were of relatively small scale, the later Iron Age and Romano-British remains revealed during the work are clearly significant and will contribute to our understanding of the distribution and character of activity in the local area during these periods.

7.1.2 It is anticipated that the excavation results will be the subject of a formal post-excavation assessment, which will:

- report the provisional results in detail, including the finds and environmental evidence;
- review the significance and research potential of the evidence;
- set out proposals for further analysis and publication, where appropriate; and
- contain a strategy for the curation of the project archive

7.1.3 It is recommended that the post-excavation assessment addresses the results of all stages of fieldwork associated with the project (including both 2012b and 2019b). The requirements

for post-excavation assessment, and any subsequent analysis and publication, will be agreed through consultation with the SHEO for South West Heritage Trust.

8 ARCHIVE STORAGE AND CURATION

8.1 Museum

8.1.1 The archive resulting from the excavation is currently held at the offices of Wessex Archaeology in Bristol. The Somerset Heritage Centre has agreed in principle to accept the archive on completion of the project, under the accession code TTNCM: 48/2019. Deposition of any finds with the museum will only be carried out with the full written agreement of the landowner to transfer title of all finds to the museum.

8.2 Preparation of the archive

8.2.1 The archive, which includes paper records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by the Somerset Heritage Centre, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014c; Brown 2011; ADS 2013). All archive elements will be marked with the site/accession code and a full index will be prepared.

8.3 Selection policy

8.3.1 Wessex Archaeology follows national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum and fully documented in the project archive.

8.4 Security copy

8.4.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

8.5 OASIS

8.5.1 An OASIS (online access to the index of archaeological investigations) record (http://oasis.ac.uk/pages/wiki/Main) has been initiated (ref. 403561). This will be finalised on completion of the project and any associated reports will be submitted following approval by the SHEO. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

9 COPYRIGHT

9.1 Archive and report copyright

9.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however,

will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*. In some instances, certain regional museums may require absolute transfer of copyright, rather than a licence; this should be dealt with on a case-by-case basis.

9.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research or development control within the planning process.

9.2 Third party data copyright

9.2.1 This document and the project archive may contain material that is non-Wessex Archaeology copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of *the Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material

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Wessex Archaeology 2019a *Gravity, Woolavington, Puriton, Bridgwater: Detailed Gradiometer Survey Report*. Unpublished client report ref. 218371

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Gravity

Smart Campus

Gravity EIA Scoping Report

Chapter 16

Appendix P6 – Geophysical Survey

Gravity, Woolavington, Puriton Bridgwater

Detailed Gradiometer Survey Report

Ref: 218371.03
April 2019

wessexarchaeology

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Document Information

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Document subtitle	Detailed Gradiometer Survey Report
Document reference	218371.03
Client name	This Is Gravity Limited
Address	c/- Salamanca Group 3 Burlington Gardens London W1S 3EP
Site location	Land south of Woolavington Road, Puriton, Bridgwater
County	Somerset
National grid reference	East - 332615 141115 (ST 32615 41115) West - 332216 141120 (ST 32216 41120)
Planning authority	Somerset District Council
Primary record number	41280
WA project name	Gravity, Woolavington, Puriton, Bridgwater
WA project code	218371
Date of fieldwork	05/04/19
Fieldwork directed by	Jenna Jackson
Project management by	Tom Richardson
Document compiled by	Patricia Voke
Contributions from	Alexander Schmidt
Graphics by	Patricia Voke

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Summary

A detailed gradiometer survey was conducted over land south of Woolavington Road, Puriton, Bridgwater. The eastern perimeter of the site is centred on NGR 332615 141115 and the western perimeter centred on NGR 332215 141120. 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 the development of an access road to the proposed Huntspill Energy Park.

The site comprises linear parcels across two agricultural fields located to the south of Woolavington Road, Puriton, Bridgwater, covering an area of 1.7 ha. The geophysical survey was undertaken on the 5th April 2019 and has been successful in detecting anomalies of archaeological origin toward the east of the survey area, with some of these pertaining to possible prehistoric activity.

The clearest archaeological evidence is located in the east of Area C where parallel ditches have been identified. These ditches may represent Bronze Age to Romano-British land divisions. They may also be associated with the possible Romano-British enclosures directly north of the survey area identified during the 2012 phase of survey.

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 discounted. However, they could equally be evidence of modern agricultural activity or natural variation in the bedrock. Further investigation would be required to understand the nature of these features.

Evidence of post-medieval extraction has been revealed in Area C. The remains of Shorthedge Quarry have been identified in the centre of this area. Further possible evidence of extraction activity has been identified to the east and west. It is possible that this extraction activity has truncated archaeological features, particularly the ditch features identified by this survey, which stop abruptly at the boundaries of these anomalies.

Post-medieval sub-division of the land is evident throughout the survey area where strip lynchet field boundaries have been identified. The location of these correspond with the field boundaries on the 1842 Puriton Tithe map.

More recent activity relating to ploughing and ferrous debris have been identified throughout the dataset.

Acknowledgements

Wessex Archaeology would like to thank This Is Gravity Limited for commissioning the geophysical survey. The assistance of Paul Lowndes is gratefully acknowledged in this regard.

The fieldwork was undertaken by Jenna Jackson and Tom King. Rok Plesnicar processed the data and Rok Plesnicar and Patricia Voke interpreted it. Patricia Voke wrote the report and prepared the illustrations. The geophysical work was quality controlled by Alexander Schmidt and Tom Richardson. The project was managed on behalf of Wessex Archaeology by Tom Richardson.

Gravity, Woolavington, Puriton, Bridgwater

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 south of Woolavington Road, Puriton, Bridgwater, Somerset (The eastern perimeter of the site is centred on NGR 332615 141115 and the western perimeter centred on NGR 332215 141120) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application for the access road to 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 south of Puriton, Somerset and comprises a linear area spanning two fields of arable and pasture land (**Figure 1**). The town of Bridgwater is 4.5 km to the SSW and Weston-super-Mare is 20 km to the north.

1.3.2 The survey comprises 1.7 ha of agricultural land, currently utilised for arable to the west and sheep grazing to the east of the survey area. The site is contained within fields bounded by residential properties and the village of Puriton to the north, a small copse along the southern boundary, with further agricultural land to the south and east. Hillside Road is noted along the western boundary of Area B.

1.3.3 The survey area forms part of a former geophysical survey carried out by Wessex Archaeology in 2012 (Wessex Archaeology 2012*a*). This previous survey was a linear scheme starting south of Puriton at the A39 heading east before turning north towards the former BAE Systems Properties Limited site. The survey area was divided into nine areas (A-I). Due to access issues and mature crop during the 2012 survey, two fields (Area B & C) in the south-western portion of the original scheme remained unsurveyed. These two fields comprise the survey location for this current phase of work (**Figure 2**).

1.3.4 The site is situated on a slight incline from 46 m above Ordnance Datum (aOD) at the southern edge of the field containing Area C, to approximately 34 m aOD at the northern edge of the field containing Area B.

1.3.5 The site is bisected between Area B and C by a set of overhead cables traversing north to south.

1.3.6 The solid geology comprises Langport Member, Blue Lias Formation, and Charmouth Mudstone Formation interbedded Limestone and Mudstone with no overlying superficial geological deposits recorded (BGS 2019).

1.3.7 The soils underlying the site are likely to consist of Brown Rendzinas of the 343d (Sherborne) association (SSEW SE 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 0.5 km study area around the site (Wessex Archaeology 2012*b*). 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 The site is 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 ingression 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.

2.2.2 Evidence of Bronze Age settlement have been identified 200 m south of the site where archaeological investigations identified a substantial ditch.

2.2.3 A potential Iron Age settlement located 1 km to the north-west of the site is also recorded, this settlement continued into the Romano-British period.

2.2.4 An extensive Roman settlement was uncovered at Junction 23 of the M5 during its construction, 600 m 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. The settlement was observed to extend beyond the motorway to the west, with the limit of the settlement not identified during the excavations.

2.2.5 A potential Roman road from Ilchester to Combwich is recorded 200 m south of the site. Stone metalling associated with the Roman road was uncovered during the works at the M5 construction.

2.2.6 Further Romano-British mounds thought to be associated with pottery and possibly salt production are recorded south of the Roman road, approximately 400 m to the south of the site.

2.2.7 Archaeological investigations 850 m north-east 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 settlement to the north of the survey area.

2.2.8 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 850 m 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 drainage rhynes are recorded. These remains indicate the later Saxon and medieval land management and reclamation across the Somerset Levels.

2.2.9 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.

2.2.10 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.

2.2.11 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 to south.

2.2.12 A tramway is recorded on the 1904 Ordnance Survey (OS) map 75 m to the north-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 to south alignment.

2.2.13 Extensive military activity relating to the World War II (WWII) has been identified 1.3 km to the north-east 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 closet of these to the site is located 1 km west of the site 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 (WA 2012*a*). 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, 100 m to the north-east 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 north-east 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 north-east 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.

3 METHODOLOGY

3.1 Introduction

3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on 5 April 2019. Field conditions at the time of the survey were good. An overall coverage of 1.9 ha was achieved.

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 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 Bartington Grad-01-1000L 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 10 Hz, producing intervals of 0.15 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 ‘Destripe’ function (±5 nT thresholds), applied to correct for any variation between the sensors, and an 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, along with numerous ferrous anomalies. Results are presented as a single greyscale plot, and archaeological interpretation at a scale of 1:2000 (**Figures 3** and **4**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image.

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 4**). 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 In the east of Area C, a fragmented, positive linear anomaly has been identified at **4000**. It measures 80 m long, however it is divided into three distinct sections. There is a gap at the western end of it measuring 17 m wide, where a region of magnetic disturbance interrupts the anomaly. The anomaly is aligned WNW – ESE, measures 1 m wide, and likely represents a ditch-like feature. Due to the proximity of a Bronze Age ditch to the south of the site and an Iron Age to Romano-British settlement to the north-west of the site, it is conceivable that this ditch may relate to a former land division from the Bronze Age to Romano-British period. Furthermore, an extensive Romano-British settlement to the west of the site, a Roman road directly south, and a possible Romano-British enclosure identified during the 2012 phase of survey (WA 2012*b*) are also recorded. The proximity of these archaeological sites may further strengthen this interpretation. However, further investigations would be required to confirm this.

4.2.2 A further linear positive anomaly has been identified in the north-east of Area C at **4001**. It is parallel to anomaly **4000** with a gap of 30 m between them, measuring 14 m long and 1m wide. This is also indicative of a ditch-like feature. It is feasible that the two ditches represent the same phase of land division, although this cannot be determined from the geophysical data alone.

4.2.3 In the south-east of Area C, a weakly positive, linear anomaly has been identified at **4002**. It is orientated east – west and measures 7 m long and 1 m wide. It is likely that this anomaly represents a ditch-like feature of unknown origin. It is possible that this ditch is the continuation of the ditch identified at **4000** due to their similar alignment. However, it would require further investigation to establish this.

4.2.4 A strong, discrete positive anomaly has been identified in the south of Area C at **4003**. The anomaly is 5 m in diameter and likely represents a large pit-like feature. This most likely relates to quarrying activity, which is recorded within the site and the surrounding area. However, a natural origin cannot be discounted.

4.2.5 A weakly positive linear anomaly has been identified in the south-west of Area C at **4004**. This is 12 m long and 1.2 m wide, aligned east – west. It is likely to represent a ditch-like feature, possibly relating to archaeological activity. However, the weak nature of the anomaly makes confident interpretation difficult and it could equally indicate agricultural activity or natural variations in the magnetic susceptibility of the underlying deposits.

4.2.6 Numerous, isolated circular and sub-circular positive anomalies have been identified across the survey. They measure between 1 – 3 m in diameter and are indicative of pit-like features of unknown origin. It is possible that they represent extraction activity due to the numerous 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 surrounding 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.

4.2.7 A band of magnetically strong dipolar responses has been detected in the centre of Area C at **4005**. The anomaly measures 43 m long by 12 m wide and is indicative of an area backfilled with a magnetically strong material, such a building debris. It is broadly aligned north – south and corresponds with the location of linear section of the Shorthedge Quarry as show on the 1888 OS map. It is likely that this quarrying activity truncated ditch **4000** as the ditch appears to continue either side of this feature.

4.2.8 To the west of this a further, broad linear anomaly has been identified at **4006**. This weakly positive and negative anomaly is somewhat diffuse in nature. It is aligned north – south and measures 19 m long by 11 m wide. The anomaly potentially extends towards the south as two, negative linear anomalies are visible. These combined anomalies correspond with the location of a strip lynchet field boundary on the 1842 Puriton Tithe map. It is also possible that the northern end of this anomaly could relate to unrecorded quarrying, as the nature of the anomaly is indicative of a cut feature. However further evaluation of this feature would be required to determine this.

4.2.9 In the east of Area C, a sub-rectangular region of increased magnetic response has been identified at **4007**. It measures 60 m north – south and 40 m east – west. The western edge of this anomaly corresponds with the location of a former land divisions which sub-divided the area into narrow strip lynchets fields as show on the 1842 Puriton Tithe map. It is unclear whether this relates to unrecorded industrial activity such as quarrying as it is 55 m to the east of Shorthedge Quarry. It may also represent former agricultural practices associated with the strip lynchet field systems however further investigation would be required to understand this. It is possible that this feature has truncated ditches **4000** and **4001** as they appear to end abruptly at the western edge of this possible quarrying activity.

4.2.10 A series of weakly positive linear anomalies have been identified throughout the site at **4008** – **4012**. They are all aligned north – south and correspond with a former field boundaries forming a series of strip lynchets noted on the 1842 Puriton Tithe map.

4.2.11 An irregular shaped area of increased magnetic response has been identified in the south-east of Area B at **4013**. It measures 90 m east - west and 35 m north – south. It represents a concentration of ferrous or fired material in the near surface in this area. It is unclear from the geophysical results alone whether this relates to industrial activity due to the proximity of the Shorthedge Quarry or modern debris possibly related to recent agricultural practices.

4.2.12 The only other anomalies of note are a series of evenly spaced, weakly positive parallel anomalies aligned east – west in Area C. They likely indicate former ploughing regimes. Whilst medieval ridge and furrow and drainage rhynes have been identified to the north-west of the site it is unclear from the geophysical results alone what period this ploughing pertains to.

5 DISCUSSION

5.1.1 The detailed gradiometer survey has been successful in detecting anomalies of archaeological origin in east of the survey area, with some of these pertaining to possible prehistoric to Romano-British activity.

5.1.2 The clearest archaeological evidence is located in the east of Area C where parallel ditches have been identified. These ditches may represent Bronze Age to Romano-British land divisions, given the presence of such features in the surrounding area. They may also be associated with the possible Romano-British enclosures directly north of the survey area identified during the 2012 phase of survey.

5.1.3 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 discounted. However, they could equally be evidence of modern agricultural activity or natural variation in the bedrock. Further investigation would be required to understand the nature of these features.

5.1.4 Evidence of post-medieval extraction has been revealed in Area C. The remains of Shorthedge Quarry have been identified in the centre of this area. It is possible that this extraction activity truncated the archaeological ditch identified in the centre of Area C. In addition, a possible extraction pit has also been identified in the south- west of Area C. Although this pit does not correspond with the location of a former quarry shown on OS mapping, it may relate to post-medieval extraction given the presence of several quarries to the north and north-east of the survey area. However, it may also represent quarrying earlier than the post-medieval period.

5.1.5 Evidence of further possible extraction activity has been identified in the west and east of Area C. It is unclear from the geophysical data alone whether these areas represent unrecorded quarrying associated with the nearby Shorthedge Quarry. Possible quarrying in the east of Area C may also have truncated the eastern end of the archaeological ditch features, which end abruptly at the western edge of this feature.

5.1.6 Potential activity associated with quarrying has also been identified in the south-east of Area B, but this could equally reflect differing agricultural practices in this area.

5.1.7 Post-medieval sub-division of the land is evident throughout the survey area where strip lynchet field boundaries have been identified. The location of these correspond with the field boundaries on the 1842 Puriton Tithe map.

5.1.8 More recent activity relating to ploughing and ferrous debris have been identified throughout the dataset.

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Wessex Archaeology 2012*a Huntspill Energy Park, Bridgwater, Somerset: Detailed Gradiometer Survey Report*. Unpublished report 84301.02

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Online resources

British Geological Survey Geology of Britain Viewer (accessed April 2019) http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Old Maps (accessed April 2019) https://www.old-maps.co.uk

Somerset Historic Environment Record (accessed April 2010) https://swheritage.org.uk/historic-environment-service/historic-environment-record/

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 4x Bartington Grad-01-1000L 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 0.25 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 Grad601 probes at a rate of 10 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 Bartington 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 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:

- 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.
- Greyscale – Presents the data in plan view 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.

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, Woolavington, Puriton, Bridgwater			
Type of project		Detailed gradiometer survey (Field evaluation)			
Project description		A detailed gradiometer survey was conducted over land south of Woolavington Road, Puriton, Bridgwater The eastern perimeter of the site is centred on NGR 332615 141115 and the western perimeter centred on NGR 332215 141120. The project was commissioned with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a planning application for the development of an access road to the proposed Huntspill Energy Park. The site comprises two agricultural fields located to the south of Woolavington Road, Puriton, Bridgwater, covering an area of 1.7 ha. The geophysical survey was undertaken on the 5th April 2019. The detailed gradiometer survey has been successful in detecting anomalies of archaeological origin in west of the survey area, with some of these pertaining to possible prehistoric activity. The clearest archaeological evidence is located in the west where parallel ditches have been revealed. These ditches are possibly related to prehistoric land divisions, Further possible small ditch and pit-like features have been identified throughout the survey area. However, their interpretation has been limited due to the small survey area and makes their provenance less than clear. Evidence of post-medieval extraction has been revealed in the east of the survey area. Post-medieval sub-division of the land is evident throughout the survey area where evidence of the strip lynchet field boundaries have been identified. The location of this correspond with the field boundaries on the 1842 Puriton tithe map.			
Project dates		**Start: 05**-04-2019		**End:** 05-04-2019	
Previous work		DBA and Geophysical survey			
Future work		Unknown			
Project Code:	218371	**HER event no.**	If relevant	**OASIS form ID:**	wessexar1-348739
		NMR no.	N/A		
		SM no.	N/A		
Planning Application Ref.		N/A			
Site Status		None			
Land use		Cultivated land 2			
Monument type		None	**Period**	N/A	

Project Location:

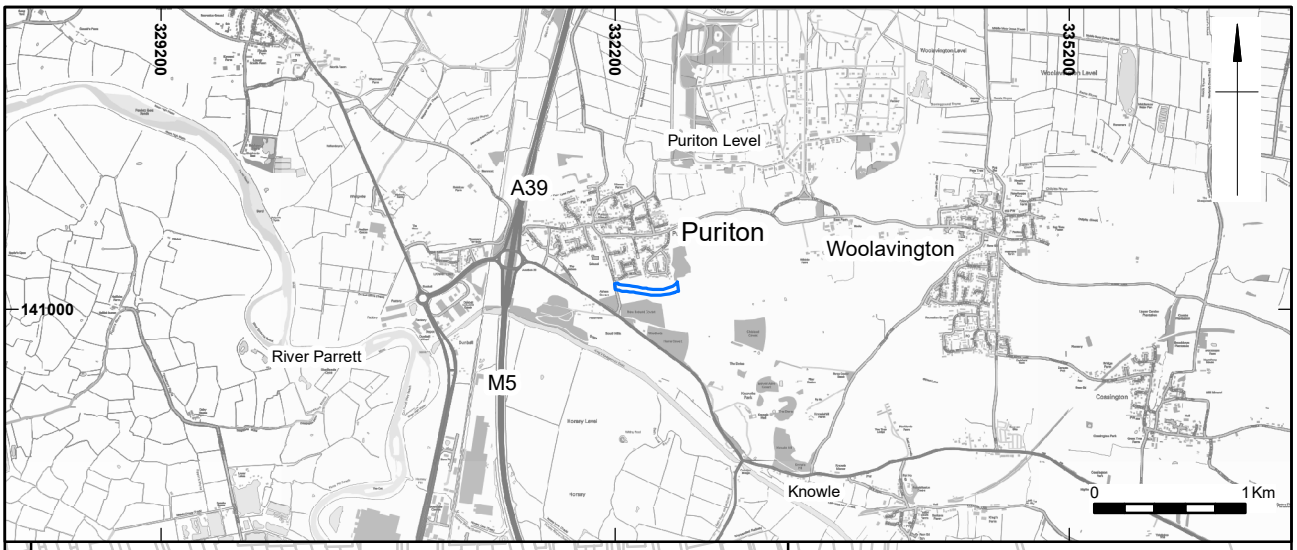
Site Address	Land south of Woolavington Road, Puriton Bridgewater			**Postcode**	TA7 8AH
County	Somerset	**District**	Sedgemoor	**Parish**	Puriton
Study Area	1.7 ha	**Height OD**	35 – 45 m aOD	**NGR**	Eastern perimeter (ST 32615 41115) Western perimeter (ST 32216 41120)

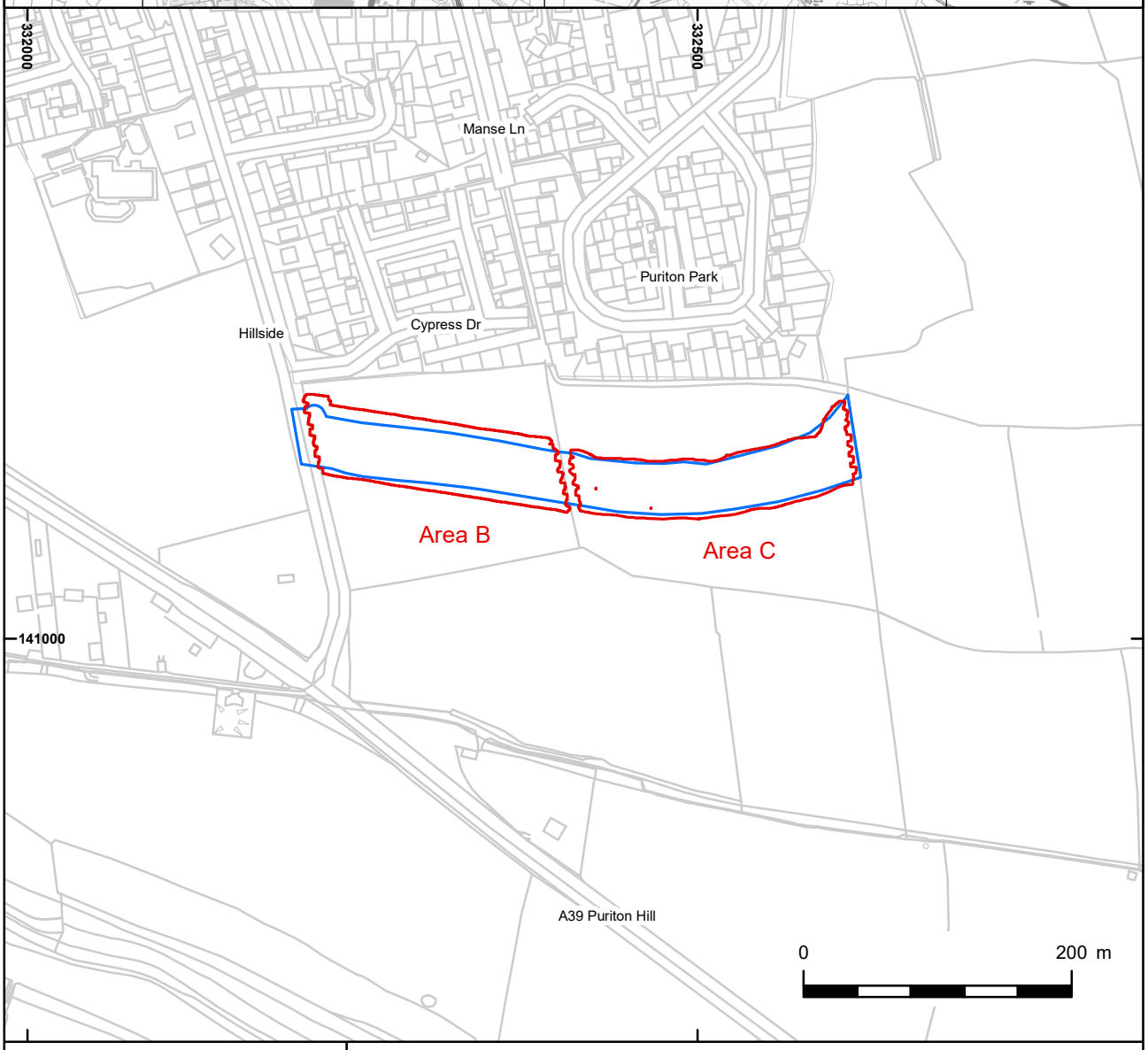
Project Creators:

Name of Organisation	Wessex Archaeology		
Project brief originator	Gravity Limited	**Project design originator**	Wessex Archaeology
Project Manager	Tom Richardson	**Project Supervisor**	Patricia Voke
Sponsor or funding body	Gravity Limited	**Type of Sponsor**	Developer

Project Archive and Bibliography:

Physical archive	N/A	**Digital Archive**	Geophysical survey and report	**Paper Archive**	N/A
Report title	Gravity, Woolavington. Puriton, Bridgwater			**Date**	2019
Author	Wessex Archaeology	**Description**	Unpublished report	**Report ref.**	218371.03





Site boundary

Detailed survey extents

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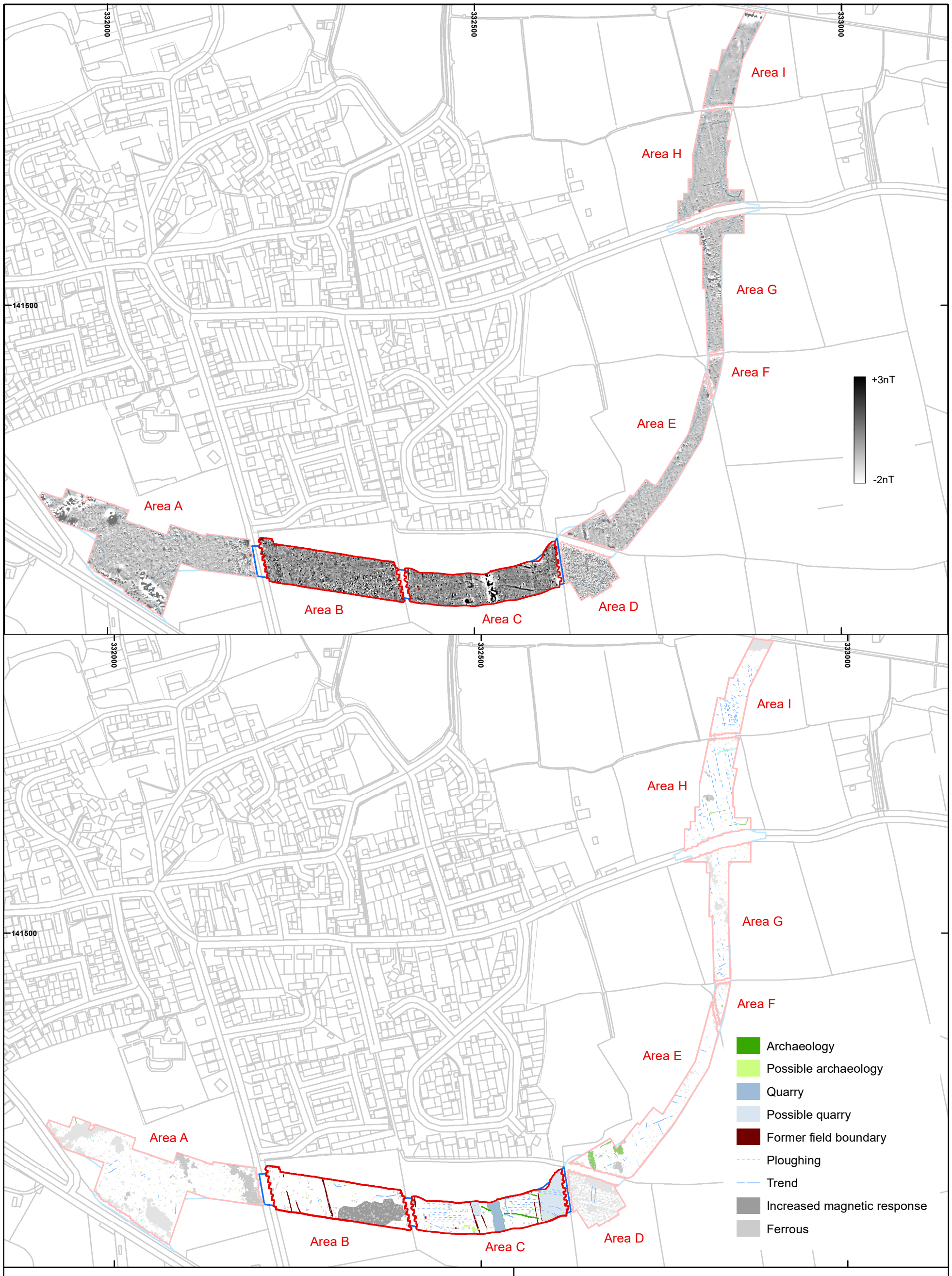
Site location

Figure 1



Detailed survey extents 2019
Detailed survey extents 2012
Site boundary 2019
Site boundary 2012

0 200 m

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Date:	09/04/2019	Revision Number:	0
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Geophysical survey results: Results of 2012 and 2019 geophsyical survey combined

Figure 2

Site boundary

Detailed survey extents

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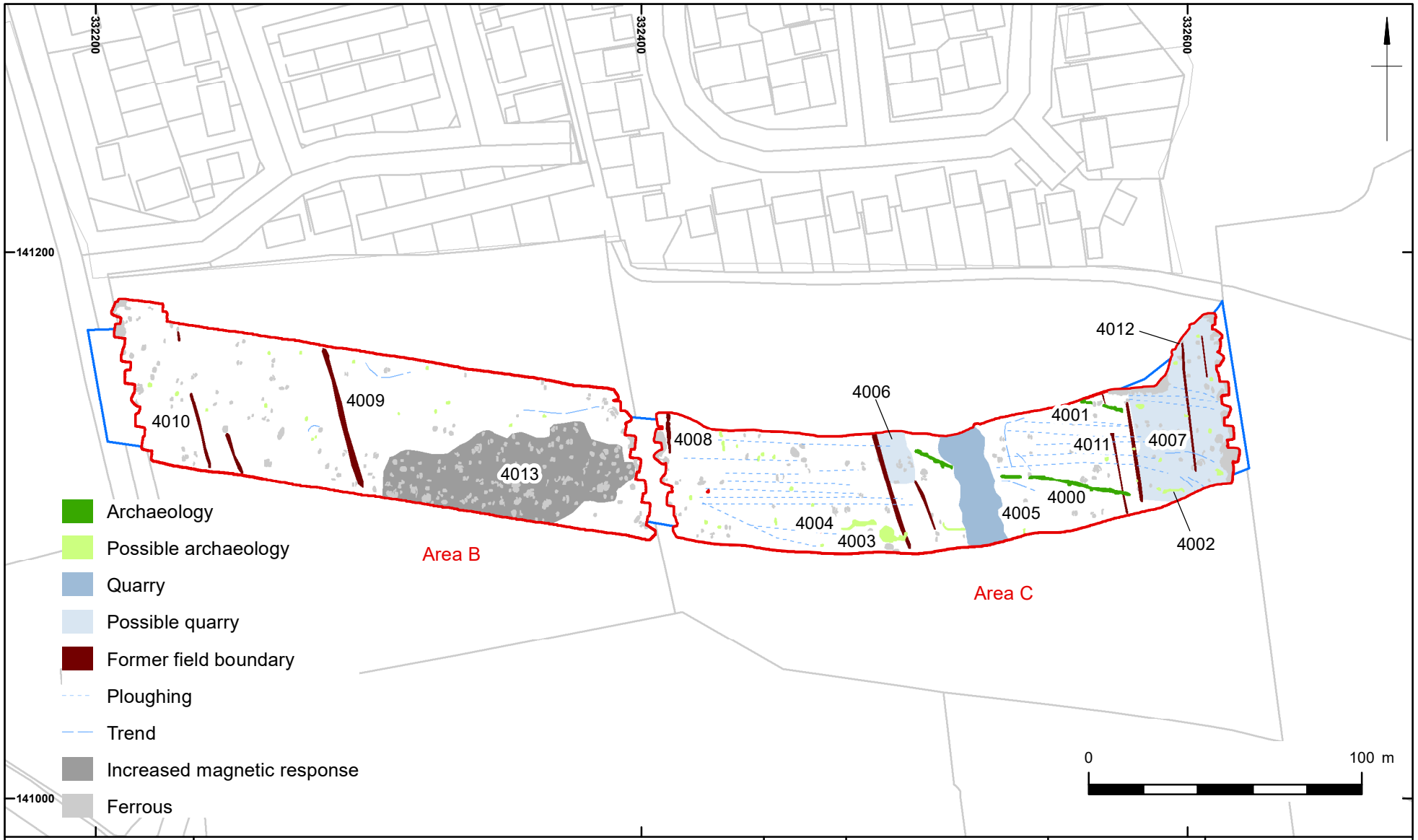
Geophysical survey results: Greyscale plot Area B & C

Figure 3



Detailed survey extents | Site boundary

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Geophysical survey results: Interpretation Area B & C

Figure 4

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