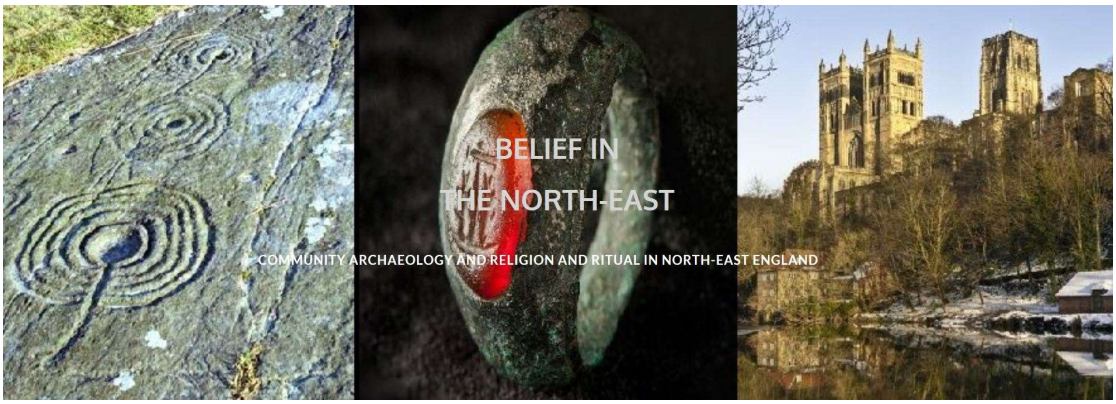
ARCHAEOLOGICAL SERVICES
DURHAM UNIVERSITY

on behalf of
Belief in the North-East



Beaurepaire, Bearpark
County Durham

geophysical survey

report 5194
October 2019

HERITAGE FUND

Durham University

Contents

Figures

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1. Summary

The project

1.1 This report presents the results of geophysical surveys conducted at Beaurepaire monastic site, Bearpark, Durham, as part of a larger research project *Belief in the North-East*, a community archaeology project lead by the Department of Archaeology at Durham University. The project aims to explore the archaeology of religion, ritual and belief across the north-east of England from prehistory to the modern day, with funding from the National Lottery Heritage Fund.

1.2 The works comprised magnetometer and electrical resistance surveys of approximately 2ha of land adjacent to the standing remains of Beaurepaire.

1.3 The surveys were commissioned by Dr David Petts, the project director, and conducted by Archaeological Services Durham University with community volunteers.

Results

1.4 Sub-surface structural remains have been identified in the surveys. These include the former chapel at the south-east corner of the grange, a structure adjacent to the south-eastern fishponds and probable other wall footings, some possibly enclosing an area in the north.

1.5 Former fishponds and occasional ditches and pits have also been detected. One soil-filled feature in the central part of the survey appears to reflect either a small ditched enclosure or trenches for wall footings.

1.6 Former ploughing has been identified across much of the field.

1.7 Several anomalies have been detected which reflect more recent features and activities, including pipes for drainage and ground source heat pumps.

2. Project background

Introduction (Figure 1)

2.1 Geophysical surveys were undertaken at Beaurepaire with community volunteers, as part of *Belief in the North-East*, a community archaeology project led by Durham University. The project is directed by Dr David Petts of the Department of Archaeology at Durham University, with funding from National Lottery Heritage Fund.

2.2 The project works with local people of all ages to explore the archaeology of religion, ritual and belief across the north-east of England, from prehistory to the modern day, using a range of traditional and technological archaeological techniques to record and research selected sites. A key element of the project is to provide community engagement and training opportunities.

2.3 Beaureparie was the country seat of the Priors of Durham in the 13th-16th centuries. It served as a retreat where monks could escape their usual duties and spend time in the countryside. The site, now in a ruined state, included a manor house, chapels and various other buildings. It is protected by law as a Scheduled Monument: 'Grange and Chapel, Bear Park, Durham' (HE List Entry no. 1002346) and as a Listed Building Grade II.

Location (Figure 1)

2.4 The survey area was located adjacent to the Beaurepaire monastic site, near Bearpark in County Durham (NGR centre: NZ 24400 43860). The site occupied a river terrace above, and east of, the River Browney. To the east was Bearpark Hall Farm and to the west were the standing remains of the grange with woodland and pasture next to the river. To the north and south was farmland. It was originally intended to survey a second field also, to the north-east of the manor house, close to the River Browney, however, this area was flooded for the duration of the fieldwork period.

2.5 Magnetometer and electrical resistance surveys were undertaken across approximately 2ha of land within one field.

Objectives

2.6 The overarching aims of the fieldwork were twofold: to provide training and engagement opportunities for community volunteers, and to determine the nature and extent of any sub-surface features of potential archaeological or historic significance.

2.7 The regional research framework *Shared Visions: The North-East Regional Research Framework for the Historic Environment* (Petts & Gerrard 2006) contains an agenda for archaeological research in the region. In this instance, the scheme of works was designed to address the following research priorities: Later Medieval MDi. Settlement, MDii. Landscape, MDv. Churches and religion.

Methods statement

2.8 The surveys have been undertaken in accordance with instructions from the client, a Methods Statement prepared by Archaeological Services Durham University and national standards and guidance (see para. 5.1 below).

2.9 Since the geophysical surveys covered part of a scheduled area, they were undertaken in accordance with the conditions of a licence granted by Historic England (HE) under Section 42 of the Ancient Monuments and Areas Act 1979 (as amended by the National Heritage Act 1983).

Dates

2.10 Fieldwork was undertaken on 3rd to 7th October 2019. This report was prepared for October 2019.

Personnel

2.11 Fieldwork was conducted by volunteers from Belief in the North East and Dream Community:

Harry Alderson	John Emslie	Diane Newton
David Atkinson	Ken Fairless	Graeme Oliver
Lauren Bescoby	Craig Farlow	Daniel Percy
Cherly Blakey	Lucy Griffiths	Michael Pilarinos
Katherine Bradshaw	John Guest	Jeanette Raper
Simon Bull	Emma Hare	Kaye Rudd
Paul Cordes	Martin Jones	Steven Rudd
Rachel Cornelius	Pam Kitto	Daniel Simpson
Sarah Cox	Rob Lamey	Richard Straker
Darius Crooks	Greg McCormick	Stephen Taylor
Caitlin Curtis	Paul McCue	Rebecca Watkins
Debbie Donaldson	Alastair McDonald	Mark Wightman
Finley Donaldson	Jackie McVay	Andrew Young
Robert Eden	Kaylea Mitchell	

2.12 The volunteers were trained and supervised by Duncan Hale and Mark Woolston-Houshold (Archaeological Services Durham University). Geophysical data processing, interpretation and reporting was conducted by Duncan Hale, the project manager for Archaeological Services, with illustrations by Janine Watson and Dr Helen Drinkall. The project is directed by Dr David Petts.

Archive/OASIS

2.13 The site code is **BBR19**, for **B**earpark **B**eau**R**epaire 20**19**. The survey archive will be retained at Archaeological Services Durham University and a copy supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** project (**OASIS**). The OASIS ID number for this project is **archaeol3- 371016**.

Acknowledgements

2.14 Archaeological Services Durham University is grateful for the support of the landowners in facilitating this scheme of works.

2.15 Many thanks are also due to the volunteers who helped to clear upstanding weeds from the area close to the manor ruins, and especially to Paul Cordes, not just for clearance but also for his work with the archived resistivity data from the 1980s.

3. Historical and archaeological background

3.1 The following information is taken from various sources.

3.2 Roberts (2009) writes that the Beaurepaire estate was established gradually from the late 12th to the late 13th century, being just one of dozens of estates throughout the county, each at first managed directly by the priory through their monastic brethren. Each priory official, or obedientary, was allocated specific manorial estates within the whole priory landholdings, the income from the estate being specifically channelled to fund the expenditure of the official. Beaurepaire formed part of the estates belonging to the bursar who, as the central financial officer for the priory, held the most, 21 in all. It was the combined income from the estates that underpinned the economy of the priory, and consequently the maintenance and repair of Durham Cathedral, its priory church.

3.3 Beaurepaire was an enclosed estate, a medieval park, bounded by a ditch and fence and, in part, by a stone wall. It enclosed 1550 acres (627ha) of land, one of the largest parks in England. Its importance lay not just in its size. Its proximity to Durham meant it was the most convenient place of retreat for the Prior and his guests. Furthermore it was one of the four major manor houses that hosted the *ludi*, the four periods of recreation during the year, when brethren lived away from Durham, under a relaxed monastic rule.

3.4 The medieval park was a thriving agricultural enterprise, supplying not only arable crops, meat and milk, but also game and fish (fishponds are recorded at the site). The park was extensively wooded, providing both fuel and building materials. In 1465 a brief attempt was made to mine coal to supplement the pit at the neighbouring manor of Aldin Grange.

3.5 By the later medieval period the direct farming of the estate gave way to the use of contractors and leasing. Beaurepaire was the last priory estate to be leased, in 1465.

3.6 The buildings of medieval Beaurepaire were numerous; almost thirty are listed in the priory account rolls, though perhaps not all were standing at the same time. Beyond the extensive residential buildings were numerous farm buildings: barns, byres, granary, stables, hen houses etc. These stood to the north and east of the manor house (Roberts 2009).

3.7 Pevsner records that the 1300 acre estate of Beau Repaire ('beautiful retreat') was created between 1200 and 1267 through a series of grants to the prior and convent of Durham, mostly from the bishops. The licence to enclose and empark was granted in 1267, the first stone wall replaced a fence in 1311 (Pevsner 1985).

3.8 At the heart of the estate was the prior's residence, built by Prior Bertram de Middleton (1244-58) on his retirement in 1258, then comprising living quarters and a chapel, and subsequently altered and extended until the early 16th century. Whilst the Prior and Bishop of Durham lived at close quarters within the city, the Bishop had his favourite country seat at Bishop Auckland and the Prior his retreat at Beaurepaire; both houses were the centres of large hunting parks.

3.9 The buildings suffered badly during several Scottish attacks, culminating in the nearby Battle of Neville's Cross in 1346. The buildings were restored and extended

again by Prior Fossour (1341-1374) to develop the site into a rest home for the monks of Durham; the manor house was extended to three western wings (an 'E-plan' house) attached to an eastern courtyard with ranges of rooms around it (Clack 1985). The Priors continued to use it as a favoured country residence until the Dissolution; Prior Hugh de Whitehead, the last Prior (died 1551), is known to have carried out considerable alterations. The buildings continued in use as an occasional residence of the early deans of Durham, until the Scots inflicted further extensive damage in 1640 and 1644, leaving most of the buildings in ruins.

3.10 At least three chapels stood at the priory; the roofless remains of one of these chapels is still visible, but it is not known which of the three chapels it is. The chapels were dedicated to St Edmund, St Catherine and St John.

3.11 A programme of excavation and consolidation was undertaken at the site between 1980 and 1984, directed by Peter Clack on behalf of Durham University Excavation Committee. These excavations revealed the layout of various parts of the residence and enabled phased plans of the ruins to be produced. Structural evidence indicated that a chapel at the south-east corner of the complex, and adjacent rooms to the west, were constructed as one building; architectural details suggested a mid-13th-century construction date. These rooms and chapel are therefore believed to have been the core of Prior Bertram's original manor house, built in 1258 (Clack 1981). Three small trenches had previously been excavated in the 1960s by Harbottle, within the area later excavated by Clack.

3.12 Some small electrical resistance surveys were conducted at Beaurepaire in the early 1980s, by the Department of Geophysics at Newcastle University; the approximate locations of the surveys are shown in Figure 2. One survey was undertaken to the east of the standing ruins and another was undertaken in the field to the south of the present survey area. The former survey indicated several broad high resistance anomalies, some of which correspond to the former chapel at the south-east corner of the building complex; high resistance anomalies in the southern field almost certainly reflect differential drainage associated with natural variation in the sand and gravel deposits there. A third survey indicated the possible presence of some stone structures on a platform approximately 200m south of the manor house (Clack 1981), part way down the bank, although no meaningful plan was produced.

4. Landuse, topography and geology

4.1 At the time of fieldwork, the survey area comprised one fallow field. The field was largely overgrown with vegetation, up to 1.5m high in places, including a great many tree saplings, some over 2m in height. It was not practicable to conduct electrical resistance survey over the central part of the field because of the density of saplings there.

4.2 The field occupied a river terrace above the River Browney and was predominantly level with a mean elevation of approximately 90m OD. A slight depression was evident next to the south-eastern field boundary. The ground rose up to approximately 95m OD in the north-east, next to an agricultural shed and barn conversion. Narrow infilled trenches were evident on the slope up to the buildings; these contained recently-laid pipes associated with ground source heat pumps.

4.3 The underlying solid geology of the majority of the survey area comprises mudstone, siltstone and sandstone of the Pennine Middle Coal Measures Formation (PMCM); the higher ground in the north-east of the field is underlain by sandstone of the PMCM. These strata are overlain by glaciofluvial sheet deposits of sand and gravel. The majority of the field is recorded as being covered by till, however, during survey it was noted that there was barely any topsoil, till or other material overlying the sand and gravel.

5. Geophysical survey

Standards

5.1 The surveys and reporting were conducted in accordance with Historic England guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for archaeological geophysical survey* (2014); the CIfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service & Digital Antiquity *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt 2013).

Technique selection

5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.

5.3 In this instance, based on documentary and cartographic evidence and previous investigations, it was considered likely that wall foundations might be present within the survey area and that other types of feature such as ditches and pits, ponds, trackways and fired structures (for example kilns and hearths) might also be present.

5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the study area a magnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This technique involves the use of magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

5.5 Also, given the likely presence of wall-footings, and possibly other built features, an electrical resistance survey was considered appropriate. Earth electrical resistance survey can be particularly useful for mapping stone and brick features. When a small electrical current is injected through the earth it encounters resistance which can be measured. Since resistance is linked to moisture content and porosity, stone and brick features will give relatively high resistance values while soil-filled features, which typically retain more moisture, will provide relatively low resistance values.

Field methods

5.6 A 20m grid was established across the survey area and related to the Ordnance Survey (OS) National Grid using a Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.

5.7 Magnetic gradient measurements were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 20m grid units. The instrument sensitivity was effectively 0.03nT, the sample interval was 0.25m and the traverse interval was 1m, thus providing 1,600 sample measurements per 20m grid unit.

5.8 Measurements of earth electrical resistance were determined using Geoscan RM15D Advanced resistance meters with MPX15 multiplexers and mobile twin probe separations of 0.5m. A zig-zag traverse scheme was employed and data were logged in 20m grid units. The instrument sensitivity was 0.05ohm, the sample interval was 0.5m and the traverse interval was 1m, thus providing 800 sample measurements per 20m grid unit.

5.9 Data were downloaded on site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

5.10 Geoplot v.4 software was used to process the geophysical data and to produce both continuous tone greyscale images and trace plots of the raw (minimally processed) data. A plot of filtered resistance data is also provided. The greyscale images and trace plots are presented in Figures 3-4 and 6-8; the interpretations are provided in Figures 5 and 9-10. In the greyscale images, positive magnetic/high resistance anomalies are displayed as dark grey and negative magnetic/low resistance anomalies as light grey. Palette bars relate the greyscale intensities to anomaly values in nanoTesla/ohm, as appropriate. The palette bar with the filtered resistance data image relates the greyscale intensities to standard deviations rather than absolute values.

5.11 The following basic processing functions have been applied to the magnetometer data:

clip	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
zero mean traverse	sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities
de-stagger	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses

interpolate — increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

5.12 The following basic processing functions have been applied to the resistance data:

add — adds or subtracts a positive or negative constant value to defined blocks of data; used to reduce discontinuity at grid edges

de-spike — locates and suppresses spikes in data due to poor contact resistance

interpolate — increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

5.13 The following filter has been applied to the resistance data to reduce the effects of differential draining associated with natural variation in the sand and gravel deposits (Figure 7):

high pass filter — (applied with Gaussian weighting) for preserving high frequency small-scale spatial detail whilst suppressing low frequency large-scale detail, such as underlying geological background

Interpretation: anomaly types

5.14 Colour-coded geophysical interpretation plans are provided. Three types of magnetic anomaly have been distinguished in the data:

positive magnetic — regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches

negative magnetic — regions of anomalously low or negative magnetic field gradient, which may correspond to features of low magnetic susceptibility such as wall footings and other concentrations of sedimentary rock or voids

dipolar magnetic — paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths

5.15 Two types of resistance anomaly have been distinguished in the data:

high resistance — regions of anomalously high resistance, which may reflect foundations, tracks, paths and other concentrations of stone or brick rubble

low resistance — regions of anomalously low resistance, which may be associated with soil-filled features such as pits and ditches

Interpretation: features

5.16 A colour-coded archaeological interpretation plan is provided. For ease of reference, magnetic and resistance anomaly labels shown bold in the text below (eg **m1**, **r1** etc) are also shown on the archaeological interpretation plan.

5.17 Two series of closely spaced positive and negative magnetic striations have been detected across the survey area, which almost certainly reflect relatively recent ploughing. Similar sets of anomalies were also detected in the resistance data, though these were more widely spaced in the southern half of the field.

5.18 Except where stated otherwise in the text, positive magnetic anomalies are taken to reflect relatively high magnetic susceptibility materials, typically sediments in cut archaeological features (such as ditches or pits) whose magnetic susceptibility has been enhanced by decomposed organic matter or by burnt materials. Occasional linear, curvilinear and discrete positive magnetic anomalies have been detected across the area. One slightly curved ditch (**m1**) detected across the north of the field could reflect a former boundary. A former boundary is shown in this part of the field on OS maps until the 1960s, however, the recorded location of that boundary is some 15m north of the magnetic anomaly (**m1**); the old boundary shown on the OS maps has not been detected by either geophysical technique in this instance.

5.19 Similar linear magnetic anomalies (**m2**) have been detected adjacent to the south-east field boundary. These anomalies could possibly reflect earlier courses of this field boundary, or perhaps more likely, plough headlands or drainage gullies for a former track along the edge of the field.

5.20 Some of the other occasional positive magnetic anomalies in the field may reflect further ditches, gullies and pits. One sub-rectangular magnetic anomaly (**m3**) detected in the centre of the survey measures approximately 8m by 6m and could reflect a very small ditched enclosure, or perhaps foundation trenches for wall-footings, now robbed-out. Two diffuse sinuous bands of very weak magnetic anomalies in the southern half of the survey could possibly reflect areas where more soil or boulder clay is still present, however, they are not evident in the resistance data. The southern band may correspond to a very slight bank noted in the field.

5.21 Some of the most prominent anomalies recorded by both survey techniques were detected in the south-east of the field. The resistance survey recorded a large well-defined area of very low resistance (**r1**), which corresponds to a similarly well-defined concentration of small, intense, dipolar magnetic anomalies (**m4**). The resistance anomaly indicates a predominantly soil-filled feature while the magnetic anomalies almost certainly reflect ferrous and fired debris within the soil fill. These anomalies reflect infilled ponds, which are shown on early OS maps of the site, and which occupy what is still evident as a broad shallow hollow on the ground. The ponds are believed to have been fishponds associated with the monastic grange to the north. Particularly strong linear magnetic anomalies were detected associated with the northern and eastern edges of the northern pond; these anomalies probably indicate some sort of revetment, or possibly an adjacent narrow platform around the pond. These anomalies are too strong to reflect the local sandstone and probably reflect the use of brick here.

5.22 On the north side of the ponds both techniques have detected a very well-defined rectangular anomaly measuring 10m by 7m. The high resistance anomaly (**r2**) could indicate stone, brick or concrete. The magnetic anomaly (**m5**) is relatively strong and probably reflects fired brick; the anomalies are not considered intense enough to reflect steel re-bars in concrete. These anomalies appear to reflect a brick-built structure, of uncertain age and function.

5.23 Further high resistance anomalies have been detected in the north of the area. Of particular interest are three sides of a well-defined rectangular anomaly (**r3**) adjacent to the south-east corner of the manor house complex. This anomaly almost certainly reflects the stone footings for the chapel that formed part of the earliest phase of building by Prior Bertram in 1258. Within the survey area the chapel measures approximately 8m east-west by 7m north-south, though of course the footings extend westward to join the standing ruins; the chapel therefore measures 12m in length, east-west. The structure is largely absent in the magnetometer survey, though the eastern wall has been detected magnetically.

5.24 Some of the other high resistance anomalies in the north of the survey (as elsewhere) reflect differential drainage associated with natural variation within the sand and gravel deposits, however, other linear anomalies have also been detected. Two parallel anomalies (**r4**) are aligned broadly east-west, on the same alignment as the standing remains. These could also reflect the remains of stone walls. The northern anomaly turns northward at its western end, apparently curving slightly, then returning eastward. The more diffuse nature of this anomaly could indicate rubble from a collapsed wall rather than just wall footings. There is no clear internal detail for this feature, which may be an enclosure wall rather than a building complex. The magnetic data for this area give a more disturbed picture, almost certainly reflecting a greater concentration of ferrous and fired materials here.

5.25 Additional anomalies in the geophysical surveys are known to represent more recent features. For example, strong linear negative and dipolar magnetic anomalies (eg **m6/r5**), which were detected just north of the fishponds in the south-east, reflect the pipes for recently-installed ground source heat pumps, also evident in the resistance data. A ceramic pipe (**m7/r6**) has also been detected crossing the central part of the field north-east/south-west; water was seen gushing out of the south-west end of the pipe during the wetter fieldwork days.

5.26 Small, discrete dipolar magnetic anomalies have been detected throughout the survey area. These almost certainly reflect near-surface items of ferrous and/or fired debris, such as horseshoes and brick fragments, and in most cases have little or no archaeological significance. A sample of these is shown on the magnetometer geophysical interpretation plan, but they have been omitted from the archaeological interpretation plan.

6. Conclusions

6.1 Geophysical surveys were undertaken with volunteers next to the medieval ruins at Beaurepaire, Bearpark, in County Durham, as part of the 'Belief in the North East' community archaeology project.

6.2 Sub-surface structural remains have been identified in the surveys. These include the former chapel at the south-east corner of the grange, a structure adjacent to the south-eastern fishponds and probable other wall footings, some possibly enclosing an area in the north.

6.3 Occasional ditches and pits have also been detected. One soil-filled feature in the central part of the survey appears to reflect either a small ditched enclosure or trenches for wall footings.

6.4 Former ploughing has been identified across much of the field.

6.5 Several anomalies have been detected which reflect more recent features and activities, including pipes for drainage and ground source heat pumps.

7. Sources

CIfA 2014 *Standard and Guidance for archaeological geophysical survey*. Chartered Institute for Archaeologists

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Appendix: Geophysical Survey Database Questionnaire

Historic England

English Heritage Geophysical Survey Database Questionnaire

Survey Details

Name of Site: GRANGE AND CHAPEL, BEAR PARK, DURHAM

County: DURHAM

NGR Grid Reference: NGR north: NZ 2440 4386

Start Date: 3 OCTOBER 2019 **End Date:** 18 OCTOBER 2019

Geology at site (Drift and Solid):
Pennine Middle Coal Measures Formation, overlain by glaciofluvial sheet deposits of sand and gravel, and till.

Known archaeological Sites/Monuments covered by the survey
Scheduled Monument: 'Grange and Chapel, Bear Park, Durham' (HE List Entry no. 1002346) and Listed Building Grade II.
The survey covered ground to the east and south of the standing ruins.

Archaeological Sites/Monument types detected by survey
Medieval chapel and other structures and soil-filled features including fishponds

Surveyor (Organisation, if applicable, otherwise individual responsible for the survey):
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Name of Client, if any:
Dr D Petts, Durham University. Community archaeology project BELIEF IN THE NORTH EAST

Purpose of Survey: RESEARCH/COMMUNITY PARTICIPATION
Location of:
a) Primary archive, i.e. raw data, electronic archive etc:
ARCHAEOLOGICAL SERVICES DURHAM UNIVERSITY

b) Full Report:
CO DURHAM HER
HISTORIC ENGLAND (NORTH EAST OFFICE, NEWCASTLE)
HISTORIC ENGLAND (GEOPHYSICS SECTION, PORTSMOUTH)
OASIS ref: **archaeol3-371016**
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Technical Details

Type of Survey (Use term from attached list or specify other):
MAGNETOMETRY

Area Surveyed, if applicable (In hectares to one decimal place): 2HA

Traverse Separation, if regular: 1m **Reading/Sample Interval:** 0.25m

Type, Make and model of Instrumentation:
BARTINGTON GRAD601-2

Land use at the time of the survey (Use term/terms from the attached list or specify other):
GRASSLAND, OVERGROWN

Type of Survey (Use term from attached list or specify other):
RESISTANCE

Area Surveyed, if applicable (In hectares to one decimal place): 2HA

Traverse Separation, if regular: 1m **Reading/Sample Interval:** 0.5m

Type, Make and model of Instrumentation:
GEOSCAN RM15 & MPX15

Probe configuration: TWIN

Probe Spacing: 0.5m

Land use at the time of the survey (Use term/terms from the attached list or specify other):
GRASSLAND, OVERGROWN; REPEATED RAINFALL DURING 5 DAY SURVEY PERIOD

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Beaurepaire
Bearpark
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report 5194

Figure 1: Site location

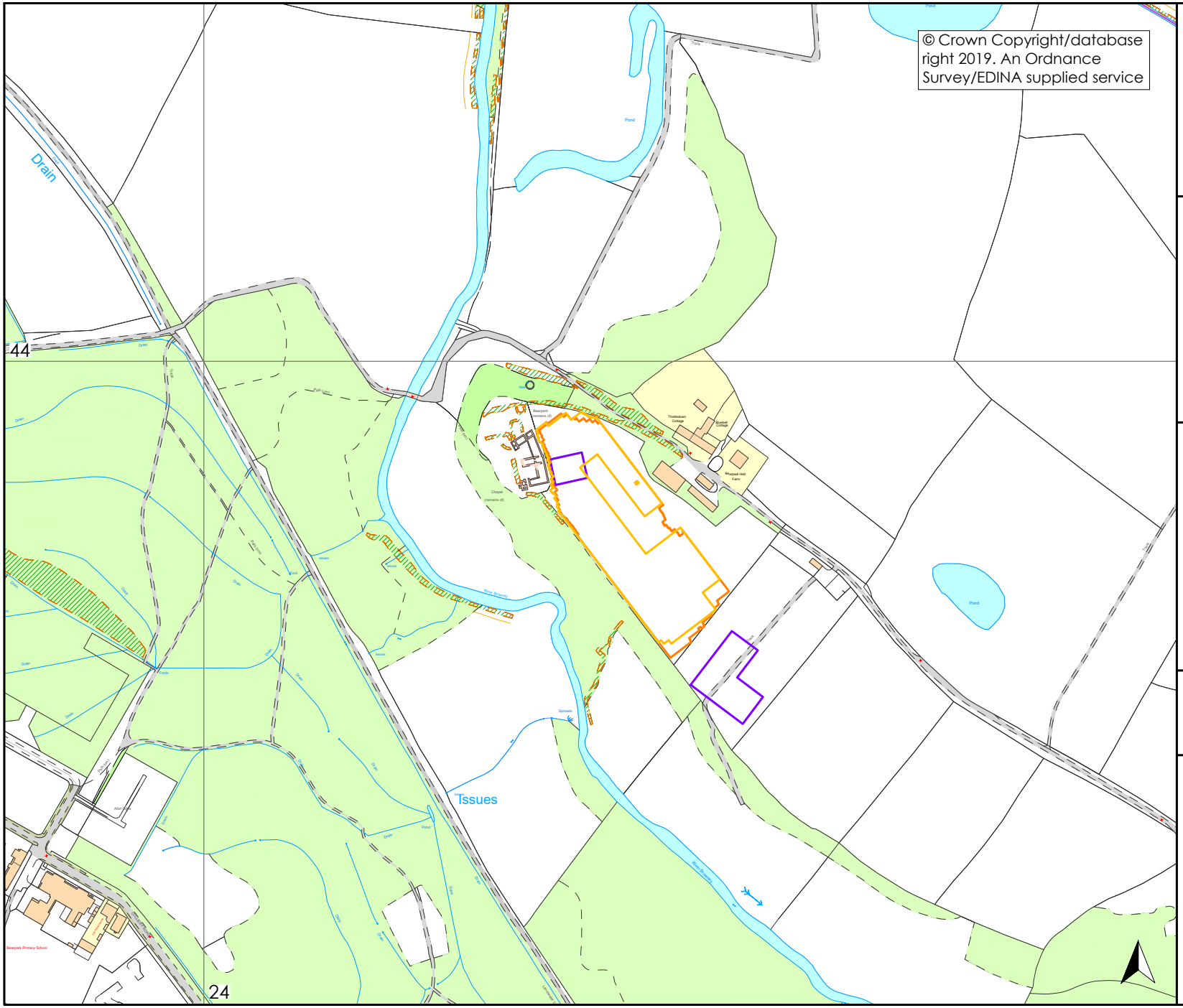

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Figure 2: Location of surveys

0 250m
scale 1:5000 for A4 plot

magnetometer survey
resistance survey
1980s resistance survey

magnetic survey

-4 nT 6

440

Well

Bearpark
(remains of)

Thistledown
Cottage

Bluebell
Cottage

Bearpark Hall
Farm

439

Chapel
(remains of)

438

River Browney

Track

437

243 244 245

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0 50m
scale 1:1000 for A3 plot

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Figure 3: Magnetometer survey

25.00nT/cm

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0 50m
scale 1:1000 for A3 plot

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Figure 4: Trace plot of magnetometer data

magnetic survey

dipolar magnetic anomaly

negative magnetic anomaly

positive magnetic anomaly

440

Well

Bearpark
(remains of)

Thistledown
Cottage

Bluebell
Cottage

Bearpark Hall
Farm

439

Chapel
(remains of)

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River Browney

Track

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Dr D Petts
Belief in the North East

HERITAGE FUND

0 50m
scale 1:1000 for A3 plot

Beaurepaire
Bearpark
County Durham

geophysical survey
report 5194

Figure 5: Geophysical interpretation of magnetometer data

magnetic survey

10 ohm 90

440

Well

Bearpark
(remains of)

Thistledown
Cottage

Bluebell
Cottage

Bearpark Hall
Farm

439

Chapel
(remains of)

438

River Browney

Track

437

243

244

245

ARCHAEOLOGICAL SERVICES
DURHAM UNIVERSITY

on behalf of
Dr D Petts
Belief in the North East

HERITAGE FUND

0 50m
scale 1:1000 for A3 plot

Beaurepaire
Bearpark
County Durham

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Figure 6: Resistance survey

resistance survey

-2 SD 2

440

Well

Bearpark
(remains of)

Thistledown
Cottage

Bluebell
Cottage

Bearpark Hall
Farm

439

Chapel
(remains of)

438

River Browney

Track

437

243

244

245

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0 50m
scale 1:1000 for A3 plot

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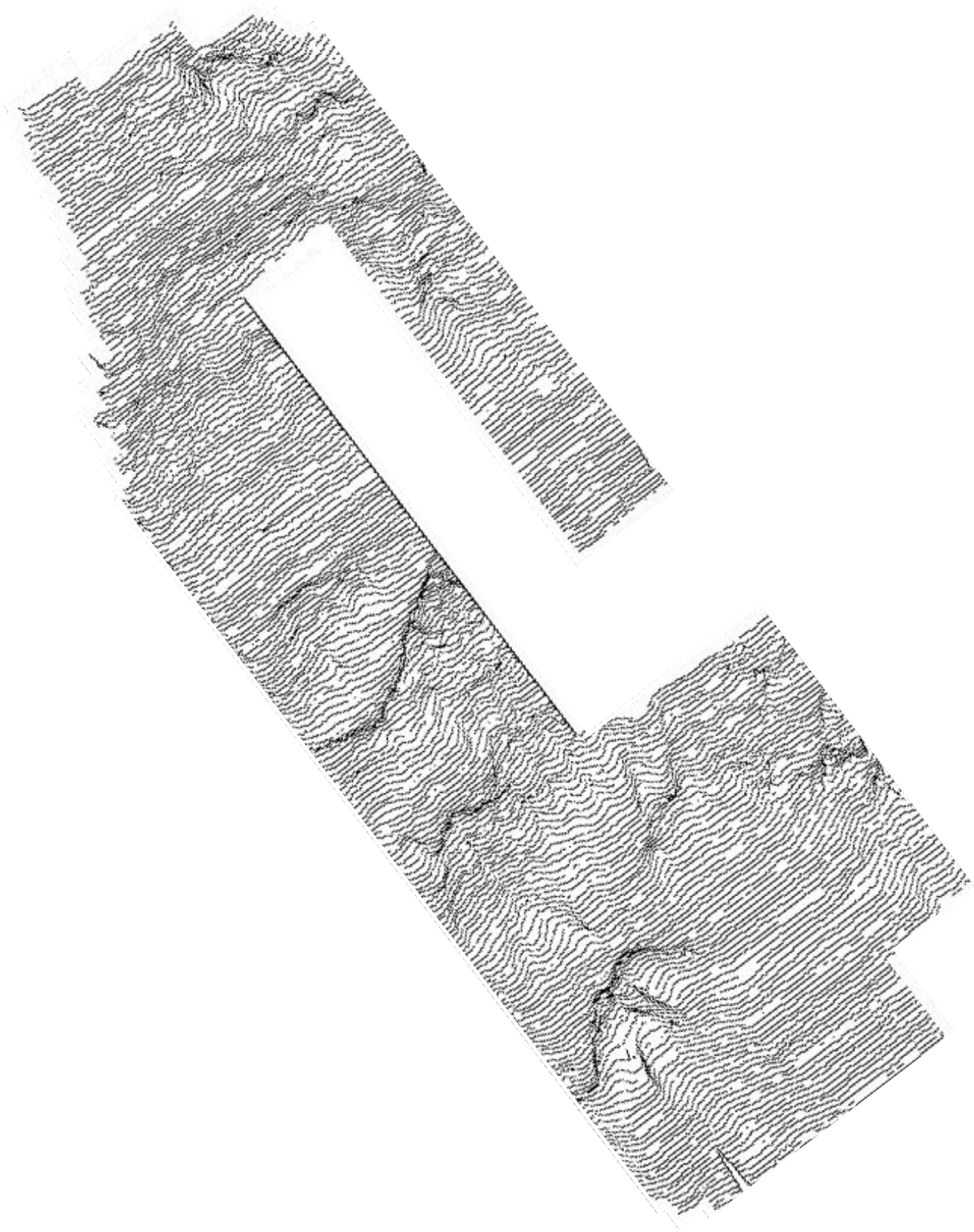
Figure 7: Resistance survey (filtered data)

140.00ohm/cm



0 50m
scale 1:1000 for A3 plot

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Figure 8: Trace plot of resistance data

resistance survey

high resistance anomaly

low resistance anomaly

440

Well

Bearpark
(remains of)

Thistledown
Cottage

Bluebell
Cottage

Bearpark Hall
Farm

439

Chapel
(remains of)

438

River Browney

Track

437

243

244

245

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0 50m
scale 1:1000 for A3 plot

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County Durham

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Figure 9: Geophysical interpretation of resistance data

magnetic survey

resistance survey

possible soil-filled feature

possible stone

fishponds

fishponds from 1873 OS map

pipe

ridge and furrow

440

439

438

437

243

244

245

Well

Bearpark (remains of)

Chapel (remains of)

Thistledown Cottage

Bluebell Cottage

Bearpark Hall Farm

River Browney

Track

r4

m1

r3

m7 / r6

m3

m6 / r5

m5 / r2

m4 / r1

m2

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0 50m
scale 1:1000 for A3 plot

Beaurepaire
Bearpark
County Durham

geophysical survey
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Figure 10: Archaeological interpretation