

Thornbridge Hall and Park, Derbyshire

Written Scheme of Investigation for a Geophysical Survey

January 2022



**ARCHAEOLOGICAL
RESEARCH SERVICES LTD**
Digging with Purpose

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Prepared on behalf of: Emery Planning Ltd

Date of compilation: January 2022

Compiled by: William Rigby ACIfA

Local Authority: Peak District National Park
Authority

Site central NGR: SK 19985 70864

1 INTRODUCTION

1.1 Project Background

1.1.1 This Written Scheme of Investigation (WSI) has been prepared by Archaeological Research Service Ltd (ARS Ltd) for Emery Planning Ltd on behalf of Andromeda Park Ltd. It details a scheme for a geophysical survey on land at the Grade II Listed (List No.1158698) Thornbridge Hall and Park, Derbyshire. The client constructed a access road and car park with associated tarmac surface prior to planning consent, and as a result was issued an enforcement notice (Ref: ENF:21/0034), by the Peak District National Park Authority (PDNPA). This work forms part of retrospective mitigation works by the client in order to assess the impact on any affected heritage assets of archaeological interest that may survive below-ground within the area of the development.

1.1.2 The survey area has been the subject of an archaeological desk-based impact assessment (Jacklin 2021) which, along with a previous assessment (Bevan 1995), has identified evidence of ridge and furrow and a lynchet of medieval and post-medieval origin, and multiple post-medieval field boundaries within the survey area. Therefore, a scheme of geophysical survey is required, to ensure any surviving below-ground archaeological remains that have been impacted are properly evaluated. This is in line with *National Planning Policy Framework (NPPF)* paragraph 205 (MHCLG 2021, 57) ‘to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible.’

1.2 Site Description and Location

1.2.1 The ‘red line boundary’ of the survey area is depicted by a red polygon on Figure 1 and covers a total area of c. 7.4ha, centred on NGR SK 19985 70864.

1.2.2 The survey area is located at Thornbridge Hall and Park in Ashford in the Water, c. 2.5km from Bakewell, Derbyshire. The surveyable area is bisected by access road and soil bunds but will be treated as one survey area (Figure 2) detailed below.

Field	Area (m ²)	Area (ha)
1	74108.723	7.41
	74108.723	7.41

1.3 Geology and Soils

1.3.1 The underlying solid geology of the survey area comprises “Widmerpool Formation - Mudstone. Sedimentary Bedrock formed approximately 329 to 337 million years ago in the Carboniferous Period” (British Geological Survey 2022). There are no superficial deposits recorded. (ibid)..

1.3.2 The soils in the survey area belong to Soilscales 17 soils unit. These are described as “*slowly permeable seasonally wet acid loamy and clayey soils*” (Cranfield University 2022).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 The following archaeological and historical background is a summary of an archaeological desk based assessment report produced by Archaeological Research Services Ltd (Jacklin 2021).

2.2 There is limited evidence for the Prehistoric-Romano-British periods within the environs of the survey area. A Prehistoric flint flake (DHER MDR2034) and a Bronze Age hammer (DHER MDR2100), were not found in-situ c. 1km to the northwest and west of the survey area. It is probable that there was very little Prehistoric activity in this area, despite evidence for Bronze Age activity within the Peak District as a whole. While the proposed route of Brough to Carsington Roman Road (DHER MDR11383) is recorded c. 600m to the west of the survey area.

2.4 Medieval activity has been recorded within the vicinity of the survey area, Thornbridge Hall itself is bounded by settlements and farm land with Medieval origins. A number of former outfarms are recorded as well as strip lynchets cultivation c. 400m to the west of the west of the survey area (DHER MDR2052). Further, possible ridge and furrow cultivation has been identified on LiDAR data with the survey area, while the PDNPA have recorded extant ridge and furrow c. 200m to the north of the survey area (Jacklin 2021, 9).

2.5 It was during the Post-Medieval period that Thornbridge Hall as it is known today was constructed. It was built between 1752 and 1790 and removed several enclosed and open fields within the survey area. There is significant documentation of the area in 19th century tithe maps marking the majority of land as pastoral. As Thornbridge hall developed, more of this land was removed and by 1899 the remaining fields within the survey area were removed to create Thornbridge Hall Parkland.

3 AIMS AND OBJECTIVES

3.1 Regional Research Aims and Objectives

3.1.1 Research topics have been identified in East Midlands Historic Environment Research Framework (Research Frameworks 2021) for the following periods.

Medieval

- ◆ 6.1.7: Can we identify social/political boundaries (e.g. surviving linear earthworks and natural barriers) and/or estate centres in the Early Medieval?
- ◆ 6.7.5: To what extent did woodland regenerate in the post-Roman period and how were woodlands used and managed?

- ◆ 7.7.1: Can we shed further light upon the origins and development of the open-field system and its impact upon agricultural practices?
- ◆ 7.7.3: What can we deduce about changes in woodland management and animal or crop husbandry (including new crops, crop rotation, field systems, more intensive cultivation of clay soils and larger animals, particularly sheep)?

Post-Medieval

- ◆ 8.2.1: Can we elucidate further the use of social space in buildings and across the landscape, the manipulation of vistas and the integration of gardens with the wider landscape?
- ◆ 8.2.2: How were garden designs influenced by changing fashions and by a familiarity with Continental garden styles?
- ◆ 8.2.3: What horticultural methods, planting schemes and water management methods were employed by garden planners?
- ◆ 8.2.5: Can we establish regional typologies of parklands, parkland structures and the villages and cottages associated with estates?
- ◆ 8.3.1: How can we improve our understanding of the early landscapes of enclosure and improvement and the interrelationship between arable, pasture, woodland, commons and waste?
- ◆ 8.3.2: How did water management and land drainage change the landscape during this period?

3.1.2 It should be noted that other research objectives may come to the fore should any archaeological features from other periods be identified as a result of the geophysical survey or any further stages of evaluation/mitigation that might be required.

3.1.3 Provision should be made for updating *The Archaeology of the East Midlands: A framework for research* where the results of a fieldwork project contribute towards agenda topics. This should be done using the interactive digital resource at <https://researchframeworks.org/emherf/> and noted explicitly in the conclusions of the relevant report.

3.2 Geophysical Survey Aims and Objectives

3.2.1 The project will aim to gather sufficient information to establish the presence/absence of potentially archaeologically significant anomalies and the character and extent of those anomalies within the survey area. It should also identify areas of land where geological or recent deposits (e.g. disturbed ground, alluvium or colluvium) or modern features (e.g. culverts, pipelines, cellar activity) could be masking the detection of anomalies or have removed anomalies.

3.2.2 The following objective will contribute towards accomplishing this aim.

- ◆ To develop an appropriate scanning and targeted survey strategy using appropriate techniques to enable the targeted evaluation of archaeological features through trial trenching, if required.
- ◆ To determine the presence, extent and number of archaeological features.
- ◆ To provide a detailed interpretative sub-soil map of the site including archaeological anomalies and blank areas to assist in scoping any further stages of evaluation/mitigation that might be required.

4 PROFESSIONAL STANDARDS

4.1 ARS Ltd is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA). Registered Organisations are continuously assessed to ensure that the highest standards of work are carried out, in line with CIfA's *Code of Conduct* (2019). In addition to key management staff, who have achieved the highest grade of corporate CIfA membership, many of our field staff also hold corporate grade membership.

4.2 The presentation and interpretation of the results will be carried out in accordance with the CIfA's *Code of Conduct* (2019) and will follow the English Heritage guidelines (2008) *Geophysical Survey in Archaeological Field Evaluation*, CIfA's *Standard and Guidance for archaeological geophysical survey* (2020) and EAC *Guidelines for The Use of Geophysics in Archaeology* (2015).

4.3 ARS Ltd is a corporate member of the International Society of Archaeological Prospection (ISAP).

4.4 All staff employed on the project will be suitably qualified for their respective project roles and have substantial experience of geophysical survey. All staff will be made aware of the circumstances and potential archaeological importance of the work and will be fully briefed on the requirements of this specification.

4.5 All site operations will be carried out in a safe manner in accordance with ARS Ltd's health and safety policy. A risk assessment will be prepared before commencement on site.

5 GEOPHYSICAL SURVEY

5.1 Coverage

5.1.1 It is intended to conduct a geophysical (magnetometer) survey to provide 100% coverage of all surveyable areas to evaluate and determine the presence of archaeological features (Figure 2).

5.2 Selected Technique

5.2.1 The geophysical survey technique selected for the site is magnetometry. Magnetometry using Fluxgate Gradiometer instruments is the preferred geophysical technique utilised for the detection of buried features such as iron-based features

and objects, or those subjected to firing such as kilns, hearths and even the buried remains of brick walls. It is also used to locate subtle features such as boundary or enclosure ditches, pits and post holes which have been gradually in-filled by more humic material. The breakdown of organic matter through microbiotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil allowing features to be detected. In addition to this, variations in the magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field enabling the detection of features such as backfilled ditches or pits due to the fact that the topsoil has more magnetic properties than the subsoil or bedrock, resulting in a 'positive' magnetic anomaly. Conversely, earthwork or embankment features can also be identified as 'negative' magnetic anomalies due to the action of placing less magnetic subsoil on top of more magnetic top soil.

Allowance will be made where possible to limit the potential effect of magnetic interference produced by metal fencing, modern field boundaries or ferrous features upon the data, to limit distortion of the overall geophysical results

5.3 Methodology

5.3.1 A survey grid comprising 30m x 30m individual grids will be set up over the selected survey area. The grids will be accurately positioned using a Leica Zeno 20 GNSS field controller connected to Leica Smartnet to receive corrections resulting in an accuracy of typically +0.1m or better.

5.3.2 These grids will then be surveyed using a Bartington Grad 601-2 gradiometer. The Grad 601-2 has two gradiometer sensors and therefore collects two lines of data during each traverse. Data are collected in a zigzag fashion within the grid if possible starting in the south-west corner, facing north. Readings are taken every 0.25m on traverses 1m apart. This equates to 3600 readings in a complete 30mx30m grid. Sensor balance will be checked and adjusted at regular intervals.

5.3.3 At the end of the day the data will be downloaded to a PC or laptop using Geoscan Geoplot V3.

5.4 Data Processing, Interpretation and Report

5.4.1 Data processing will be undertaken by a geophysicist using Geoscan *Geoplot* V3. Anomalies will be digitised and geo-referenced. They will be colour coded using ARS Ltd's standard scheme to provide the most likely interpretation. Anomalies will be numbered and catalogued as systematic groups or individual anomalies as appropriate.

5.4.2 The results of the gradiometer survey should be processed and the results then discussed between ARS Ltd, the Client and the DCC. The results of the gradiometer survey should be presented in at least two different formats at a minimum 1:1000 scale, one of which must be an X/Y trace plot. There must also be an accompanying interpretation drawing at an appropriate scale.

5.4.3 The final report will include a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and

conclusions about any likely archaeology. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- ◆ A non-technical summary
- ◆ Introduction
- ◆ Geological and topographical setting
- ◆ Methodology
- ◆ Discussion of archaeological and historical background
- ◆ Discussion on the results of the survey
- ◆ Conclusions and recommendations
- ◆ Sources
- ◆ Copy of brief
- ◆ Figure showing location of the site
- ◆ Figure showing location of survey grids and referencing
- ◆ Figure showing processed data
- ◆ Figure showing trace plots of processed data
- ◆ Figure showing abstraction and interpretation of anomalies.

5.4.4 The digital data created during the geophysical survey will be deposited with the Archaeology Data Service (ADS) digital archive repository. This consists of the raw data deposited as xyz data, rendered images in TIF format as well as associated metadata. The archive will be prepared in line with *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation* (Brown 2007), ClfA's (2020b) *Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives*, *Archaeology Data Service/Digital Antiquity Guides to Good Practice* (ADS/Digital Antiquity 2011) and *EAC Guidelines for the Use of Geophysics in Archaeology* (Schmidt et al 2016).

5.4.5 One digital copy of the final report in PDF/A format will be deposited with the Derbyshire Historic Environment Record (HER) and the PDNPA HBSMR. A copy of the report will be uploaded as part of the OASIS record (see below) for online access via the Archaeological Data Service.

5.4.6 At the start of work an OASIS online record <http://ads.ahds.ac.uk/project/oasis/> will be initiated and key fields completed. All parts of the OASIS online form will be completed for submission to the HER. This will include an uploaded .pdf version of the entire report for release into the ADS Library.

5.5 Staffing and Timetable

5.5.1 All staff employed on the project will be suitably qualified and experienced for their respective project roles and have practical experience of archaeological prospection. All staff will be made aware of the archaeological importance of the area surrounding the site and will be fully briefed on the work required by this

specification. Each member of staff will be fully conversant with the aims and methodologies and will be given a copy of this WSI to read. All members of staff employed by ARS Ltd are fully qualified and experienced archaeologists, this will ensure that appropriate decisions regarding survey will be made in the field.

5.5.2 The outline timetable for the works is as follows. This will be updated by email as the project progresses.

Proposed Date	Commencement	Task
TBC		Geophysical survey
Completion of Task 1		Geophysical survey report

5.5.3 The report will be completed within four weeks of undertaking the survey

5.5.4 The Project Manager for the geophysical survey will be Dr Roger Doonan, Project Manager at ARS Ltd. The Geophysical Surveyor will be Richard Durkin ACIfA.

5.5 Monitoring Arrangements

5.5.1 ARS Ltd acknowledges that it is the responsibility of the Archaeologist for DCC to monitor the archaeological works. Reasonable notice, ideally no less than 5 working days, shall be provided before the commencement of works and to arrange monitoring visits.

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5.5.2 ARS Ltd will liaise with the Archaeologist for DCC at regular intervals throughout the course of the work.

5.5.3 The client will afford reasonable access to the Archaeologist for DCC or his representative, for the purposes of monitoring the archaeological mitigation.

6 GENERAL ITEMS

6.1 Health and Safety

6.1.1 All work will be carried out in accordance with The Health and Safety at Work Act 1974. Specific health and safety policies exist for all our workplaces and all staff employed will be made aware of the policy and any relevant issues. The particular risks involved with this project will be assessed, recorded and relevant mitigation

measures put in place as part of a full risk assessment, which will be compiled in advance of fieldwork and will be read and signed by all on-site operatives. ARS Ltd retains Citation as its expert health and safety consultants and the appointed Health and Safety Officer for the company is Mark Potter.

6.2 Insurance Cover

6.2.1 ARS Ltd holds full Employer's Liability (£10 million), Public Liability (£10 million) and Professional Indemnity (£10 million) insurance, which also cover community groups and volunteers working under the supervision of ARS Ltd staff.

6.3 Community Engagement and Outreach

6.3.1 Any opportunities will be sought for engaging the local community in any archaeological investigations and findings, for example through participating in further excavations, a guided site tour and/or dissemination of information via ARS Ltd's and the client's websites and social media.

6.4 Changes to the Written Scheme of Investigation

6.4.1 Changes to the approved methodology or programme of works will only be made with prior written approval of the Archaeologist for DCC.

6.5 Publication and dissemination

6.5.1 In the event of significant remains being encountered, there may be the need for a more formal publication than in the summary form. The requirement for, and the final form of, any publication arising from the project will be agreed with the DCC County Archaeologist and the client dependent on the results of the fieldwork. Provision will be made for publicising the results of the work locally, e.g. via ARS Ltd's website, social media and local media (at the client's discretion) and talking to local societies.

6.6 Publicity and Copyright

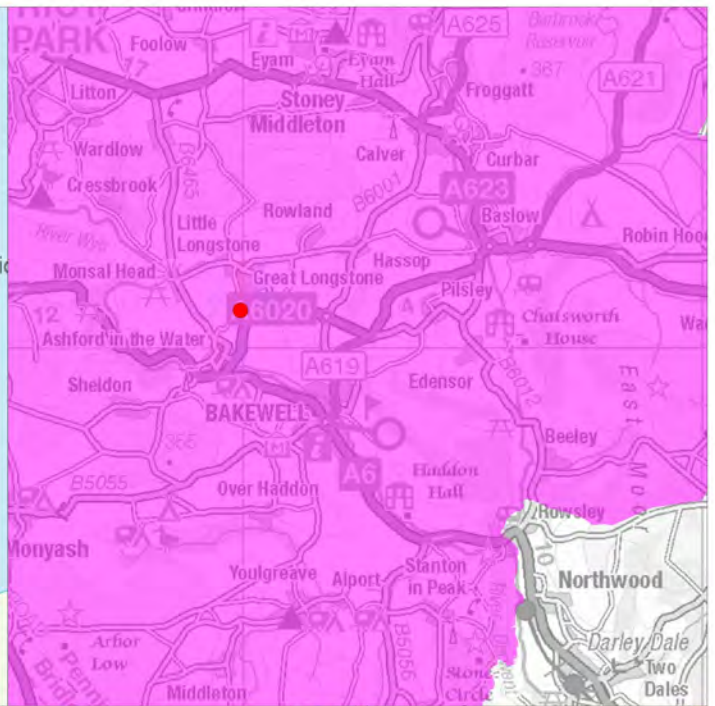
6.6.1 Any publicity will be handled by the client. ARS Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

7 REFERENCES

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FIGURES





Site name: Thornbridge Hall
 Date: January 2022
 Drawn by: WR
 Scale: Varies

**Figure 1:
 Site location**

- Location of Surevy Area
- Peak District National Park Authority
- Survey Area

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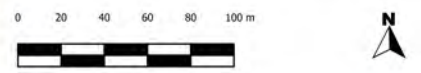
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Figure 2: Geophysical Survey Area

- Survey Area
- Thornbridge Hall Access Road and Car Park
- Thornbridge Hall Soil Bunds



Site name: Thornbridge Hall
 Date: January 2022
 Drawn by: WR
 Scale: 1:3,500 @ A4

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