DigVentures

Bright Water: Middleham Castle

Written scheme of investigation for geophysical survey

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Purpose of document

This document has been prepared as a written scheme of investigation for community geophysical survey at Middleham Castle, Bishop Middleham, County Durham, for the Bright Water Landscape Partnership and Durham County Council Archaeology. The purpose of this document is to provide the methods proposed for undertaking geophysical survey at Middleham Castle as part of the application for a Section 42 Licence for Survey on Scheduled Monuments and other Protected Places.

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Project summary

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1 PROJECT BACKGROUND

1.1 Introduction

1.1.1 DigVentures has been appointed by the Bright Water Landscape Partnership and Durham County Council Archaeology Section (DCCAS) (hereafter 'the Client') to prepare a Written Scheme of Investigation (WSI) for a community geophysical survey to be undertaken at Middleham Castle (Bishop's Palace), Bishop Middleham, County Durham (hereafter 'the Site'), Figure 1.

1.1.2 The Bright Water Landscape Partnership is a Landscape Partnership Scheme, led by Durham Wildlife Trust and Durham County Council, and supported by the National Heritage Lottery Fund (NHLF). The Partnership has come together with DCCAS and developed a range of community-based archaeological research projects that will investigate and celebrate the natural and built heritage of the Bright Water area and re-connect people with the amazing landscape on their doorstep.

1.1.3 Alongside desk-based research, geophysical survey at Middleham Castle forms the baseline for developing a three-year programme of community archaeological excavation at the Site. The survey provides opportunity to engage the local community with their heritage from the outset of the project and to provide transferable skills training. The results of the geophysical survey will inform the location of trenches for archaeological excavations in 2019, 2020 and 2021.

1.1.4 The Site is a Scheduled Monument under the Ancient Monuments and Archaeological Areas Act 1979 (Historic England List Entry No. 1002330). This WSI forms part of the requirements for a Section 42 Licence for Survey on Scheduled Monuments and other Protected Places in accordance with Historic England requirements (Historic England 2018).

1.1.5 The geophysical will be undertaken with community volunteers by Phase Site Investigations and DigVentures under the guidance of David Mason, Principal Archaeologist, Durham County Council Archaeology Section (DCCAS).

1.2 Scope of document

1.2.1 This WSI sets out the strategy and methodology by which the archaeological contractor will implement the geophysical survey archaeological watching brief. In format and content, it conforms with current best practice and to the guidance outlined the Management of Archaeological Research Projects in the Historic Environment (Historic England 2015), the North East Regional Research Framework for the Historic Environment (NERRF – 2006) and the Europae Archaeologiae Consilium (EAC) Guidelines for the Use of Geophysics in Archaeology (Schmidt et al. 2016). Work will also be undertaken to the DCCAS Standards for Archaeological Work in County Durham and Darlington (March 2017).

1.2.2 This WSI is to be submitted to DCCAS for approval prior to the commencement of the geophysical survey and submission with the application for a Section 42 Licence to Historic England.

1.3 Site location, geology and background

1.3.1 The site of Middleham Castle is located immediately to the south-east of Bishop Middleham village in the parish of Bishop Middleham, County Durham Unitary Authority, County Durham, NZ 32718 31055, see Figure 1. The Site is a Scheduled Monument under the Ancient Monuments and Archaeological Areas Act 1979 (Historic England List Entry No. 1002330).

1.3.2 The remains of Middleham Castle are located on sedimentary dolostone bedrock of the Ford Formation, which formed 252-272 million years ago when the local environment was dominated by shallow carbonate seas. These sedimentary rocks are shallow-marine in origin and generally comprise carbonate material including fossilised coral and molluscs. The superficial geology formed through glacial action creating till and glaciofluvial deposits of sand and gravel during the Devension period of the Quaternary up to 2 million years ago. The area is also interspersed with alluvial deposits of clay, silt, sand and gravel resulting from the fluvial processes of the rivers that once existed here (BGS, http://mapapps.bgs.ac.uk).

1.3.3 Summary archaeological and historic background to Middleham Castle is provided by a number of authors (Jackson 1996, 16-17; Emery 1996, 51-54; Thompson 1998, 116, 174; Salter 2002, 18). More recent work on the Site is presented in brief below.

1.3.4 Bishops were among the most powerful figures in medieval Britain, controlling vast swathes of land and were major drivers of ecological, social and political change. Consequently, the role of medieval bishops has long captured both scholarly and public attention (Rollason 2017). Unlike some other medieval building types, bishop's houses were particularly diverse and regionally variable. The Bishops of Durham alone possessed 18 residences intermittently, consisting of castles, palaces, manor houses and hunting lodges, together with numerous parks (Smith and Graves 2017). Traditionally, narratives of bishops are based on evidence from documentary sources, whilst the contribution of archaeological research has tended to be minimal (Petts and Gerrard 2006; Smith 2016). There are estimated to have been more than 300 medieval bishops houses and their associated landscapes in England and Wales (Thompson 1998). Few of these houses have been investigated in detail, fewer still have had modern scientific archaeological techniques applied to them. As a result, our understandings of bishop's houses are fragmentary, often focused solely around standing building remains and lack the depth of focus to best distinguish patterns of uniqueness and commonality related to this site type.

1.3.5 In recent years, development-led archaeology has provided valuable contributions to the archaeological record. Among the residences of the Bishops of Durham, three sites have been the focus of intense archaeological investigation in the last ten years; Westgate Castle, Darlington Bishop's Manor and Auckland Castle. Results from these projects, carried out by Archaeology Services Durham University (ASDU), highlight the potential to discover new and intriguing information about the nature, development and uses of them. The discovery of previously unknown buildings has transformed our understandings of the scale and development at these sites, while palaeoenvironmental and faunal remains recovered through excavation have impacted our understandings of consumption, production, trade and landscape

exploitation. Elsewhere, geophysical prospection has been used to ground-truth observations from documentary sources (Dunning 2010), while detailed standing buildings analysis has informed reinterpretations of building chronologies (White and Cook 2015). While adding to our knowledge of bishop's houses, the results from these projects highlight the deficits in our understandings of these sites and the potential contribution of using a range of archaeological techniques.

1.3.6 Further archaeological study of Bishop Middleham Castle provides a unique opportunity to shed light on two key areas for which we know tantalisingly little. Firstly, due to the limited use of Bishop Middleham Castle as a residence, the in-situ building remains have the potential to reveal important insights into the early formation of bishop's houses, and possibly shed light on its abandonment. Bishop Middleham Castle is known to have been occupied from the 12th-14th centuries, though the buildings likely date from earlier, and were regularly occupied until the mid-14th century, though the bishop's maintained ownership of the site until 1649 (Smith 2016). Its decline in use coincides with identified trends in increased building elsewhere (Smith 2016), which continued into later periods. Consequently, at other bishop's houses the early building phases are often obscured. Moreover, there has been no post-medieval development on the site of Bishop Middleham Castle, providing unprecedented access to a relatively undisturbed 12th-14th century episcopal residence. To date, there are no other episcopal residences that have been excavated in England and Wales which can boast this combination of factors.

1.3.7 Secondly, studies of the surviving documentary accounts for Bishop Middleham Castle reveal that the surrounding park was used to produce a range of resources between the 14th-17th centuries, some of which were not produced at other residences of the Bishops of Durham. Medieval accounts indicate that the watery landscape was used for the rearing of swans and doves, and to produce hay from meadows/water-meadows (Smith forthcoming). Additionally, earthworks identified as fishponds provide an additional use for the site. These accounts are partial however, and it is likely that this landscape served more varied and complex capacities we do not understand yet. Unexpected discoveries of hemp pollen from fishponds at Ellerton Priory reveal the potential of these features to yield fascinating insights into undocumented aspects of the past (Geary et al. 2005: 319). The survival of shells recovered from crumbling wall sections (Smith and Graves 2017) together with the natural propensity of the landscape to flood, all suggest that there is the high potential for the survival of organic remains both atop the rocky outcrop and in the immediate landscape. The recovery of faunal and palaeoenvironmental remains have the potential to further understandings of the extent of the ecological management of the landscapes by bishops.

2 AIMS AND OBJECTIVES

2.1.1 The overarching aim of the archaeological excavation is to define and characterise the physical extent of the Site through a programme of non-intrusive investigations (desk-based assessment and geophysical survey) to inform intrusive excavation, obtaining baseline data that will facilitate its future management, research, presentation and enjoyment in line with the recommendations made in the North East Regional

Research Framework (Petts and Gerrard 2006). This research has been structured as community-based research projects, providing a range of opportunities to participate. The project model is framed as overarching aims and key questions/objectives that provide a framework for the methods, stages, products and tasks allowing opportunity for iterative, adaptive approaches in agreement with all stakeholders.

2.1.2 The geophysical magnetic survey will address questions associated with Aim 1 of the Project Design (DigVentures et al. 2019):

Aim 1 – Identify the physical extent and character of the archaeological remains on the site with a programme of desk-based research and remote sensing

2.1.3 These activities will build on previous geophysical and topographical surveys (see Smith and Graves 2017). A new programme of geophysical (magnetometry/ GPR/resistivity), topographic and remote sensing (LiDAR) surveys of the earthworks and landscape comprising the Middleham Castle, and its environs will inform the placement of trial trenches designed to characterise features identified through these surveys. These approaches will add to our understanding of the site by addressing the following questions:

- Q1: In light of current findings from projects at similar sites, do any outstanding research objectives from previous research or earlier phase of remote sensing still remain to be addressed?
- Q2: Can the layout of the site and associated sub-surface archaeology be established by remote survey?
- Q3: Can we identify any phasing in the topographic or remote sensing anomalies indicative of an extended period of use?
- Q4: Can we establish the current risk to the archaeological remains from cultivation and natural erosion?

3 METHODOLOGY

3.1 Community geophysical magnetic survey

3.1.1 Geophysical survey will be undertaken with a team of community volunteers, who will be trained in the use of the equipment as well as carrying out data collection for use in deciding the location of excavation trenches and in final reporting.

3.1.2 The geophysical survey and training will take place on one day where two sessions will be offered for community participation; 9.30am-11.30am and 1.30pm-3.30pm. Each 2-hour session will begin with an introduction to geophysical survey, then participants will undertake data collection in their field under supervision. The equipment used for data collection (see details below) has been selected because it allows live viewing of collected data, as such those collecting the geophysical survey data will see the results of their work immediately, and will be talked through interpretation of geophysical survey results using their own data. Each session could accommodate up to 6 community volunteers.

3.1.3 An area of 3ha be subject to geophysical magnetic survey at Middleham Castle, Figure 1. The area at Middleham Castle measures approximately 200m x 150m and is located to the south of Bishop Middleham on earthworks identified as the remains of the castle (Figure 1).

3.1.4 The geophysical magnetic survey will be undertaken to the specifications provided by Historic England (2015), the NERRF (Petts and Gerrard 2006) and the EAC (Schmidt et al. 2016) using the equipment and methods detailed below.

3.1.5 To carry out the magnetic survey Phase Site Investigations Ltd will use a MACS (multi-sensor array cart system). The MACS utilises eight Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The gradiometers are carried on a non-magnetic cart and usually have a spacing of 0.5m, although other intervals can be adopted. Readings are generally taken generally at between 10cm and 15cm intervals, depending on the speed the cart is pulled at. A MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The survey will be referenced direct to Ordnance Survey (OS) National Grid and so temporary survey stations (wooden stakes) will not be established unless specifically asked for prior to the commencement of the survey.

3.1.6 Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features several metres to reduce the detrimental effect that these surface magnetic features have on the data. The Foerster gradiometers have a resolution of 0.2 nT but the stability of the cart system significantly reduces noise caused by instrument tilt and movement when compared with a traditional hand-held gradiometer system and the increased data intervals provide a higher resolution data set. The sensors have a range of ± 10,000nT.

3.1.7 The data is downloaded from the instrument at the end of each day's survey, usually using bespoke software specific to that instrument. The data is then imported into a gridding and interpolation software package, such as Archaeosurveyor (DW consulting) or Surfer (Golden Software). Magnetic data rarely requires detailed processing although filtering can be applied in some cases to reduce background noise or enhance weaker anomalies. The processing steps that are used will be detailed in the technical report. A plot of the data will be exported from the gridding software, usually in bitmap or jpeg format. This will be imported into AutoCAD where it will be displayed relative to the available map detail. An interpretation of the anomalies identified in the magnetic data will be presented in AutoCAD and an accompanying technical report will also be produced (see below).

4 REPORTING

4.1 Geophysical survey report

4.1.1 The Section 42 licence will include a condition requiring submission of a full report. Therefore, a report presenting the results of the survey and their interpretation will be produced within 3 months of the completion of the survey. The report will include:

- The name(s) of the investigators / contractors, title, date, report reference number and client name;
- A summary of the results;
- Introduction - site location including a plan demonstrating that the survey has been accurately geo-located on the ground (minimum scale 1:2500), OS grid reference, SM/NHLE number, rationale, site history (summary of past work, HER records, land use history), site description (geology and soils, ground conditions and land use at time of survey), and setting out the survey objectives;
- Methodology explaining the techniques used, equipment configurations, sampling intervals, methods of data capture and processing, variables used for the above and method of data presentation;
- Greyscale plots of minimally enhanced data (raw data must be retained and archived) and processed data (with details) at minimum scale of 1:1000; Where appropriate X-Y trace plots of improved magnetic data or a sample thereof may be necessary to support the specific interpretation of anomalies identified from greyscale images. Plots should be appropriately sized for presentation, including use of A3 plots where necessary;
- Description and interpretation of results, including interpretative plans/diagrams (minimum scale 1:1000); and,
- Conclusions including an assessment of the achievement (or not) of the survey objectives, a summary of the results, implications of the survey, discussion of research value, and recommendations (if appropriate) for any further work.

5 ARCHIVING

5.1.1 The questionnaire that will be received with the Section 42 licence will be completed and appended to the survey report (Section 42 questionnaire).

5.1.2 An OASIS online record has been initiated (digventu1-348663), and a copy of the OASIS form included with the final report within three months of leaving site. Where positive results are drawn for a project, a summary report will also be submitted to DCCAS. On approval, the report will be submitted in hard copy and in digital copy to the DCC HER, with a copyright licence granted to Durham County Council to use the report for the purposes of the HER. A final copy of the report will be uploaded to OASIS.

6 PROJECT MANAGEMENT AND STAFFING

6.1 Quality and code of practice

6.1.1 DigVentures is a Registered Organisation with the Chartered Institute for Archaeologists. All senior managers are MCIfA registered. The company endorses the Code of Practice and the Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology of The Chartered Institute for Archaeologists.

6.1.2 All core staff employed by DigVentures are appropriately qualified CIfA members, and employed in line with The Chartered Institute for Archaeologists Codes of Practice. DigVentures operates a Project Management System. All projects are undertaken under the direction of the Project Manager who is responsible to a Section Head, who ensures the maintenance of quality standards within the organisation. The Managing Director has ultimate responsibility for all of the company's work.

6.1.3 The geophysical survey and community training will be provided by Phase Site Investigations with DigVentures. DigVentures will manage community participation and evaluation.

7 INSURANCE, HEALTH AND SAFETY

7.1 Policy and risk assessment

7.1.1 Health and safety considerations will be of paramount importance in conducting all fieldwork. Safe working practices will override archaeological considerations at all times. DigVentures shall undertake the works in accordance with Durham County Council Archaeology Section Health and Safety requirements and Health and Safety Plan. This document should take account of any design information pertaining to above ground hazards such as buildings and structures and below ground hazards such as services, utilities and infrastructure. Risk Assessments should also consider below ground contaminants such as unexploded ordnance.

7.1.2 DigVentures will ensure that all work is carried out in accordance with its company Health and Safety Policy, to standards defined in The Health and Safety at Work etc. Act 1974, and The Management of Health and Safety Regulations 1992, and in accordance with the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual Health and Safety in Field Archaeology (1996). Trench excavation and design shall conform to Health and Safety legislation, incorporating current best engineering practice where possible.

7.1.3 DigVentures holds public liability insurance (£5,000,000), employer's liability insurance (£10,000,000) and professional indemnity insurance (£1,000,000).

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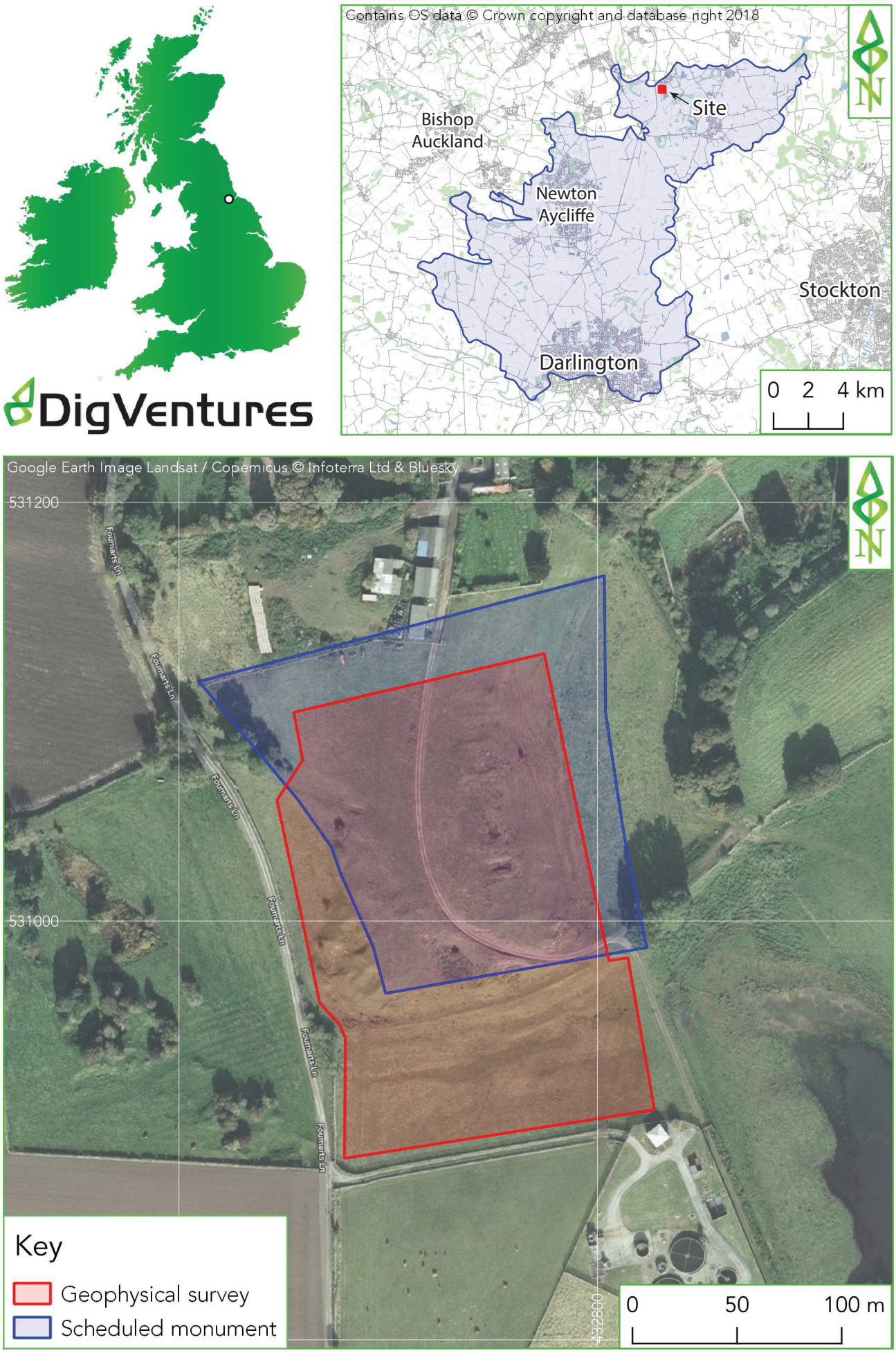

Figure 1 – Middleham Castle: location of area for geophysical survey in relation to scheduled area