DigVentures

Carlatton Cairn

Archaeological Geophysical Survey Report

Kimberley Teale

Carlatton Cairn

Archaeological Geophysical Survey Report

Prepared on behalf of:

Fellfoot Forward Landscape Partnership Scheme

Compiled by:

Kimberley Teale

DigVentures
Witham Studios #5
Hall Street
Barnard Castle
County Durham
DL12 8JB

hello@digventures.com
0333 011 3990
@thedigventurers

Purpose of document

This document has been prepared as a survey report for an archaeological geophysical survey undertaken at Carlatton Cairn in Cumrew, Cumbria. The survey and subsequent report have been undertaken on behalf of the Fellfoot Forward Landscape Partnership Scheme as part of a community archaeology project to gain a better understanding of the landscape around Carlatton Cairn. The purpose of this document is to provide a comprehensive account of the geophysical survey, with specialist assessment of the geophysical results and recommendations for further investigation.

DigVentures accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

Copyright

Project summary

OASIS ID:	digventu1-515641
DV project code and type:	FFF22 - CLT22 – Archaeological Geophysical Survey
National Grid Reference:	NY 53242 51944
County:	Cumbria
Title:	Carlatton Cairn: Archaeological Geophysical Survey Report
Author(s):	Kimberley Teale BSc ACIfA ISAP
Origination date:	13/05/2023
Circulation:	Fellfoot Forward Landscape Partnership
Project team:	Kimberley Teale and Jodie Hannis
Reviewed by:	Jodie Hannis
Approval:	Brendon Wilkins BSc MSc MIAI MCIfA

Acknowledgements

We'd like to begin with a thank you to the team at the Fellfoot Forward Landscape Partnership Scheme for facilitating the survey as part of the community archaeology engagement programme, specifically to Fiona Knox and Lizzy Benn for their support throughout the project, aiding with site visits and landowner permissions. We would also like to extend our gratitude to Mr Robert Mitchell (landowner) for allowing us to conduct the investigations at Carlatton cairn, and Holly Mitchell for her ongoing help and enthusiasm. Thanks are also due to our team of volunteers who assembled on our community survey day; Joy Davies, Liz Laidler, Catherine Reding, David Vose, Helen Richards and Bruce Bennison.

Thanks must go to our community of Venturers, without whom this work would never have taken place: Robert Beech, Bruce Bennison, Andrew Blomley, Nic Broomhead, Hilary Fawcett, Martha Fisher, Stevie Fisher, Sandie Fisher, Michael Fitzmaurice, Clare Furlong, Janet Herring, Stephen Higgs, Peter Houldey, Liz Kerrey, Colette Lawlor, Caroline McNiven, John Pickin, Caroline Steven, Joan Sutherland, Malcolm Thomas, Heather Tipler, David Vose, Maralyn Wade, Duncan Wise and Justine Wise.

Final thanks goes to the schoolchildren from Richard Rose Academy and their teacher Miss Aurelia and William Howard School and their teacher Ms Brereton.

The geophysical survey was managed and undertaken by Kimberley Teale and Jodie Hannis.

Non-technical summary

DigVentures was invited to undertake a community-based archaeological research project at Carlatton Cairn, Cumrew, Cumbria, by the North Pennines AONB Partnership's *Fellfoot Forward Landscape Partnership Scheme*, through Cumbria County Council and the National Lottery Heritage Fund. This report details the results of a geophysical magnetometer and earth resistance survey undertaken across 0.9Ha of land in the Stone Rose Meadow adjacent to Carlatton Cairn, an assessment of potential and any recommendations for further work at the site.

This report conforms with current best practice and to the guidance outlined the Management of Archaeological Research Projects in the Historic Environment (Historic England 2015), the Chartered Institute for Archaeologists (2014), and the Europae Archaeologiae Consilium (EAC) Guidelines for the Use of Geophysics in Archaeology (Schmidt et al. 2016).

A community geophysical survey was undertaken on the 5th of April and the 1st of July 2022, within the Stone Rose Meadow adjacent to Carlatton Cairn. The survey encompassed a survey experience day for volunteers and school children.

The survey discovered a spread of magnetically enhanced material across the southern half of the meadow, which corresponded with rectilinear high and low resistance anomalies which are suggestive of building remains. It is likely that the destruction of these possible buildings has contributed to rubble being spread through the field through ploughing.

It is not thought that these possible buildings are related to Carlatton Cairn, and likely date from the medieval period onwards, perhaps relating to a farmstead or ecclesiastical buildings.

Table of contents

1 INTRODUCTION 6

1.1 Project background 6

1.3 Site location, topography and geology 6

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND 7

3 PROJECT AIMS & OBJECTIVES 8

3.1 Project aims 8

4 METHODOLOGY 8

4.1 Introduction 8

4.2 Magnetometer survey methodology 8

4.3 Earth Resistance survey methodology 8

4.4 Data processing – magnetometer data 9

4.5 Data processing – earth resistance data 9

5 GEOPHYSICAL SURVEY RESULTS AND DISCUSSION 10

5.1 Data presentation 10

5.2 Results – Magnetometer survey (Figures 3 – 4) 10

5.3 Results – Earth Resistance survey (Figures 5) 10

6 CONCLUSIONS AND RECOMMENDATIONS 11

7 BIBLIOGRAPHY 11

List of figures

Figure 1. Site location 13

Figure 2. Historical maps showing Grey Yauds Stone Circle 14

Figure 3. Raw unprocessed gradiometer survey data and minimally processed gradiometer survey data - greyscale plot 15

Figure 4. Processed gradiometer survey data - greyscale plot and interpretation of the data16

Figure 5. Processed and filtered gradiometer survey data – greyscale plot 17

1 INTRODUCTION

1.1 Project background

1.1.1 DigVentures was invited to undertake a community-based archaeological research project at Carlatton Cairn, Cumrew, Cumbria (hereafter "the site"; Figure 1) by the North Pennines AONB *Fellfoot Forward Landscape Partnership Scheme*. This project sits within the Fellfoot Forward project *Uncovering the Past* which has involved building three community-researched Village Atlases, an ongoing oral history project, community geophysical surveys and a community excavation at Long Meg and her Daughters Stone Circle. The geophysical survey was undertaken with community volunteers as part of a wider investigation at the cairn which also involved an archaeological excavation and condition survey (Jackson, N. 2023).

1.1.2 This report details an assessment of the results of a geophysical magnetometer survey undertaken at Carlatton Cairn and the Stone Rose Meadow on the 5th of April and the 1st of July 2022. The report conforms with current best practice and to the guidance outlined the Management of Archaeological Research Projects in the Historic Environment (Historic England 2015), the Chartered Institute for Archaeologists (2014), and the Europae Archaeologiae Consilium (EAC) Guidelines for the Use of Geophysics in Archaeology (Schmidt et al. 2016).

1.2 Fellfoot Forward Landscape Partnership Scheme

1.2.1 The Fellfoot Forward Landscape Partnership Scheme, developed with local communities and organisations and led by the North Pennines AONB Partnership, is a major scheme to conserve, enhance and celebrate the natural and cultural heritage of a special part of the north-west of England. The scheme was awarded funding from the National Lottery Heritage Fund in 2020.

1.2.2 The works encompassing the scheme intend to forge creative connections between people and the landscape, conserve habitats and key species, and celebrate this beautiful area with its communities. The projects have involved citizen science; community archaeology; woodland creation and management; protecting grassland and meadows; restoring peat; conserving historic buildings; new and revitalised walking, cycling and riding routes; enhanced interpretation and information for the local community and visitors; opportunities for local schools and youth groups to engage with their local heritage; and a host of public events and learning.

1.2.3 It is intended that the scheme will provide a huge boost for the area, allowing greater access to restored heritage sites and promoting a deep understanding of the Fellfoot landscape's special cultural history. Working with partners and local communities, the ultimate aim of the scheme is to strengthen the visitor economy, providing a better future for residents and businesses.

1.3 Site location, topography and geology

1.3.1 Carlatton Cairn is located between the villages of Cumwhitton and Cumrew, 13km south-west of Carlisle (NGR NY 53242 51944; Figure 1). The cairn is just to the north of Cairn Beck and sits in open farmland at 142.8m above sea level. The cairn measures

around 20 meters in diameter and has sustained modern damage in the north-west quadrant, and a pile of concrete has also been deposited on the cairn.

1.3.2 The geophysical surveys focused on an angular shaped field approximately 75m south-west of Carlatton Cairn. Measuring 2Ha in size, the field is notably level and set at a lower point in the landscape at 138m elevation. The shape of the field is like a quadrant of a circle, and it was decided to focus the survey within this field to see if we could find the answers to its unique shape and appearance. The field is bounded by drystone walls to the south, and agricultural fencing and hedgerow to the north, east and west. It is surrounded by open farmland and currently resides as a pasture field.

1.3.3 The geology of the site consists of sedimentary St Bees sandstone formed during the Triassic period, with Quaternary Devensian glaciofluvial superficial deposits of sands and gravels (British Geological Survey, 2023). The soils recorded at the site are described as freely draining slightly acid sandy soils (Soilscapes, 2023). Gradiometer survey typically provides a good to average result over sedimentary deposits and results can be variable (David *et al*. 2008). Both the gradiometer and the earth resistance survey results presented in this report were of a good quality and had not been affected in a detrimental way by the local geology.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Archaeological background

2.1.1 Carlatton Cairn (Historic England Research Records Monument No. 12589) can be seen marked on the earliest ordinance survey maps of the area as a tumulus (Figure 2). Carlatton is recorded as 'the earthwork remains of a Bronze Age round cairn, enlarged by the addition of stone from surrounding field clearance…it is 32m in diameter and averages 1.0m in height' (Historic England, 2023).

2.1.2 The surrounding landscape contains many other prehistoric monuments. Located 2.6km to the west of the site are the cairns on Cardunneth Pike (SM1007232) in Cumrew Fell and Cardunneth Pike. These are the remains of a group of round cairns dating to the Bronze Age. The group contains at least eight cairns, which vary in diameter from 2.5m to 20m. The largest of this group is similar in size to Carlatton cairn. Another possible cairn was known in the area, Cumrew cairn, located 3km to the southeast of the site, to the south of Cumrew. Unfortunately, within the last decade this potential cairn has been destroyed and the field ploughed, as can be seen on satellite imagery.

2.1.3 Further to the Cumrew cairns, various standing stones are located nearby, including one only a kilometer away to the south and to the south of the Cairn Beck, and another in Carlatton Demesne, just over a kilometer to the northwest of the site (Figure 2).

3 PROJECT AIMS & OBJECTIVES

3.1 Project aims

3.1.1 The overarching aim of the geophysical survey is to better understand the extents and below ground remains relating to the Stone Rose Meadow located to the south-west of Carlatton Cairn. As the site has never before been investigated using geophysical survey or excavation, a full non-invasive magnetometer and earth resistance survey was planned as part of a community led survey experience day.

4 METHODOLOGY

4.1 Introduction

4.1.1 An archaeological geophysical magnetometer and earth resistance survey was undertaken across 0.9Ha of land within Stone Rose Meadow. The survey was led by an accredited geophysical surveyor and was undertaken by volunteers from the Fellfoot community and DigVentures wider community, as well as local school children.

4.1.2 The weather was very wet and overcast, and there were no obstructions during the survey.

4.2 Magnetometer survey methodology

4.2.1 Magnetometer survey is generally considered as the quickest and most widely used geophysical survey technique for the detection of buried archaeological remains. It is efficient for detecting features that have been thermoremanently magnetised, such as kilns, as well as ditches and pits that have been backfilled, due to the relative presence or absence of enhanced magnetic material due to human activity.

4.2.2 The magnetometer survey was undertaken using a Bartington Grad601-2 magnetic gradiometer. The Bartington Grad601-2 is a dual sensor instrument, incorporating two Grad-01-1000 sensors set at 1m apart. The site was surveyed east-west in a grid-like pattern within 20m-by-20m grid squares, with readings taken every 0.25m along traverses set 1m apart in a zig-zag patterning. The gradiometer was zeroed on a magnetically quiet point within the site before survey commenced and again before the afternoon's survey. If significant drift occurred, the machine was re-balanced.

The survey grids were set out across the site following a pre-determined 30m grid array using a Trimble R10 dGPS utilizing VRS now corrections with an accuracy of <0.10m. The survey grid and intermediary survey guidelines were demarcated using bamboo canes as temporary markers which were removed following completion of the survey. Landmarks and reference points were surveyed with the GPS by way of control points.

4.3 Earth Resistance survey methodology

4.3.1 The survey was conducted using an RM15 Resistance Meter (Geoscan Research). The set-up comprised of two probes in a parallel twin electrode configuration, which are

capable of detecting archaeological remains to a depth of 1m below the surface. The survey was conducted along an east-west alignment in a zig-zag fashion across pre-determined 20m by 20m grid squares, utilising a sample interval of 0.5m with a traverse interval of 0.5m. This aimed to provide a high-resolution dataset in order to clarify the extent and nature of any archaeological remains (suitable for detection by earth resistance) which had been detected through the magnetometer survey.

4.3.2 The earth resistance data was downloaded and processed using Geoplot v4.0 (Geoscan Research) in order to produce greyscale plots of the data. The data was georeferenced in QGIS and presented in this report alongside interpretations of the data, created as lines and polygons in QGIS.

4.4 Data processing – magnetometer data

4.4.1 The magnetometer data was downloaded using Bartington's Grad601 download software and then imported into Geoplot v4.0 (Geoscan Research) for data processing. For the raw data plot, no processes were applied, and the data was exported at a scale of -1nT to 2nT. An XY trace plot of the raw data was also exported to aid in identifying anomalies for the interpretation, in particular the locations of pit like anomalies which could suggest the presence of stone sockets.

4.4.2 For the minimally processed data plot, a zero mean traverse was applied followed by de-staggering of the data to bring anomalies into alignment. The data was also exported at a scale of -1nT to 2nT.

4.4.3 For the processed and filtered data plot, a low pass filter was applied, followed by an interpolation along the X and then the Y axis. The data was also exported at a scale of -1nT to 2nT.

4.4.4 The gradiometer data was combined with the geolocation points and georeferenced in QGIS and is presented in this report as greyscale data plots. An XY trace plot of the data has also been provided. Interpretations of the data have also been created in QGIS as line and polygon data and these interpretive figures are also presented in this report.

4.5 Data processing – earth resistance data

4.5.1 The earth resistance data was downloaded and processed using Geoplot v4.0 (Geoscan Research). For the raw data plot, no processes were applied, and the data was exported at a scale of -15 to 15 ohms.

4.5.2 For the processed and filtered data plot, the data was de-spiked, and a high pass filter was applied, followed by an interpolation along the X and then the Y axis. The data was exported at a scale of -15 to 15 ohms.

4.5.3 The data was combined with the geolocation points and georeferenced in QGIS and is presented in this report as greyscale data plots. Interpretations of the data have also been created in QGIS as line and polygon data and these interpretive figures are also presented in this report.

4.6 Health and safety

4.6.1 All work was 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), and DigVentures Health and Safety Policy.

5 GEOPHYSICAL SURVEY RESULTS AND DISCUSSION

5.1 Data presentation

5.1.1 The gradiometer data has been presented as a raw data plot and a minimally processed greyscale plot (Figure 3) and a processed and filtered data plot (Figure 4). An interpretation of the data has been created alongside the processed data plot and key anomalies have been given a unique 'anomaly ID' in the illustrations and report text for the purpose of the discussion.

5.1.2 The earth resistance data has been presented as a processed data plot alongside an interpretation of the data (Figure 5). Key anomalies have been given a unique 'anomaly ID' in the illustrations and report text for the purpose of the discussion.

5.2 Results – Magnetometer survey (Figures 3 – 4)

5.2.1 The magnetometer survey did not reveal any anomalies of an archaeological or historical origin. A swathe of enhanced magnetic anomalies can be seen across the southern half of the dataset [**A**]. The anomalies are suggestive of a spread of fired or ferrous material, such as rubble or green waste, and as such it is not possible to see if archaeological remains are present in this part of the site. The spread could relate to the destruction of an historical or archaeological building, but only intrusive investigation could clarify this.

5.2.2 Bands of natural or geological variations can be seen in the north of the dataset [**B**], adjacent to an area of magnetic disturbance caused by modern magnetic fencing around the edge of the field.

5.3 Results – Earth Resistance survey (Figures 5)

5.3.1 The earth resistance survey saw beneath the rubble spread identified by the magnetometer survey, and anomalies were identified in the data that looked rectilinear in form. The anomalies in the data are, however, poorly defined.

5.3.2 In the south-west of the dataset, a low resistance rectangular anomaly is visible [**2**] measuring 4m by 3m, which is positioned to the north-west of a high resistance rectangular anomaly [**1**] measuring 2m in width and at least 4m in length. The two rectangular features sit along the same alignment and appear to be contemporary with one another, and it is thought they could relate to former buildings. Anomaly **1** also appears to comprise a further additional structure to its north-eastern corner.

5.3.3 To the east of these possible structures, further rectilinear [**3**] and curvilinear [**4**] high resistance anomalies have been identified, though they are a little more amorphous in appearance. It is possible these could also relate to buildings or structures, which could account for the spread of rubble and magnetic material identified by the magnetometer data in this part of the site.

5.3.4 In the northern half of the dataset, a wide band of high resistance [**5**] likely relates to an area of geology, as some slight topographical variations were observed in this part of the field.

5.3.5 Ephemeral areas of high and low resistance throughout the rest of the dataset likely relate to geological variations in the ground.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1.1 The geophysical surveys at Carlatton Cairn were successful and identified some possible buildings or structures in the south of the Stone Rose Meadow. A spread of magnetically enhanced material across the south and centre of the site, which likely relates to rubble and man-made materials, corresponds with rectilinear possible buildings and enclosures in the south of the field. It is possible we are seeing the foundations of some small buildings and the spread of rubble and material from their destruction across the field, having been ploughed out over time.

6.1.2 It is not thought, however, that the features found in the meadow relate to Carlatton Cairn. It is more likely that this field has been levelled and developed at a later date, perhaps from the medieval period or later, developing either a small farmstead or ecclesiastical buildings. Intrusive investigations or further geophysical survey would aim to clarify the extents and further details of these remains to better understand what Stone Rose Meadow was utilised for.

6.1.3 The main aim of the geophysical surveys was to engage the Fellfoot volunteers and local community in collecting a variety of geophysical survey data and to learn about different aspects of archaeology. The surveys were a success with the community participants, including the school children, who were able to apply their physics lessons about electricity and soil science to the practical sessions.

7 BIBLIOGRAPHY

Bartington Instruments, 2007 *Operation Manual for Grad601 Single Axis Magnetic Field Gradiometer System*

British Geological Survey (BGS), 2023, *Geology of Britain Viewer*, accessed 13.05.23: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/

CIfA, 2014 *Standards and Guidance for Archaeological Geophysical Survey*

David, A. Linford, N. Linford, P., 2008, English Heritage (Historic England): *Geophysical Survey in Archaeological Field Evaluation, Swindon*

Historic England, 2023, Historic England Research Records Monument No. 12589

National Library of Scotland map viewer, accessed 13.05.23: https://maps.nls.uk/geo/explore/side-by-side/

Schmidt, A. and Ernenwein, E., 2009 *Archaeology Data Service: Geophysical Data in Archaeology: A Guide to Good Practice*

Schmidt, A. Linford, P. Linford, N. David, A. Gaffney, C. Sarris and A. Fassbinder, J. 2015. EAC *Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider. EAC Guidelines 2, Archaeolingua, Belgium*

DigVentures

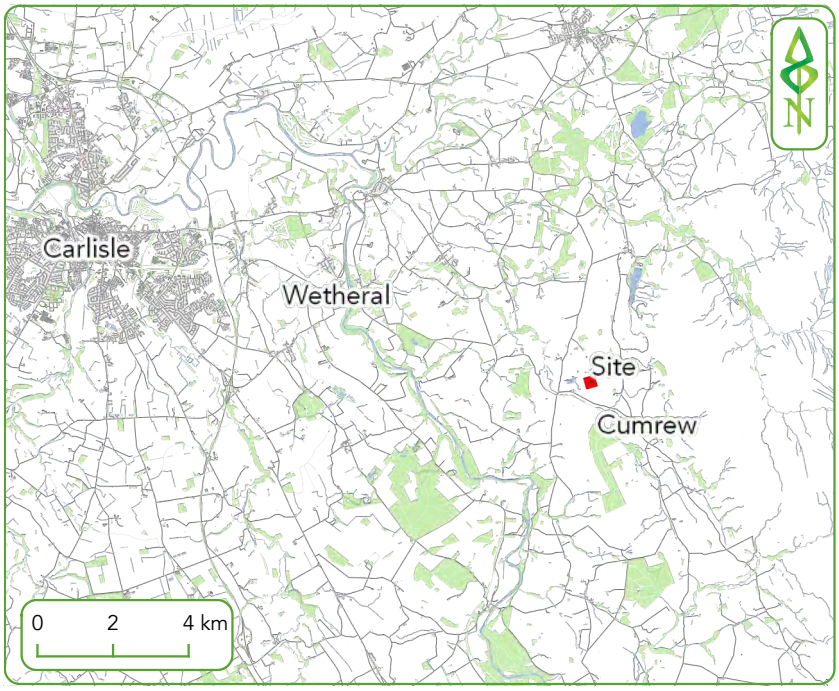


Figure 1. Site location

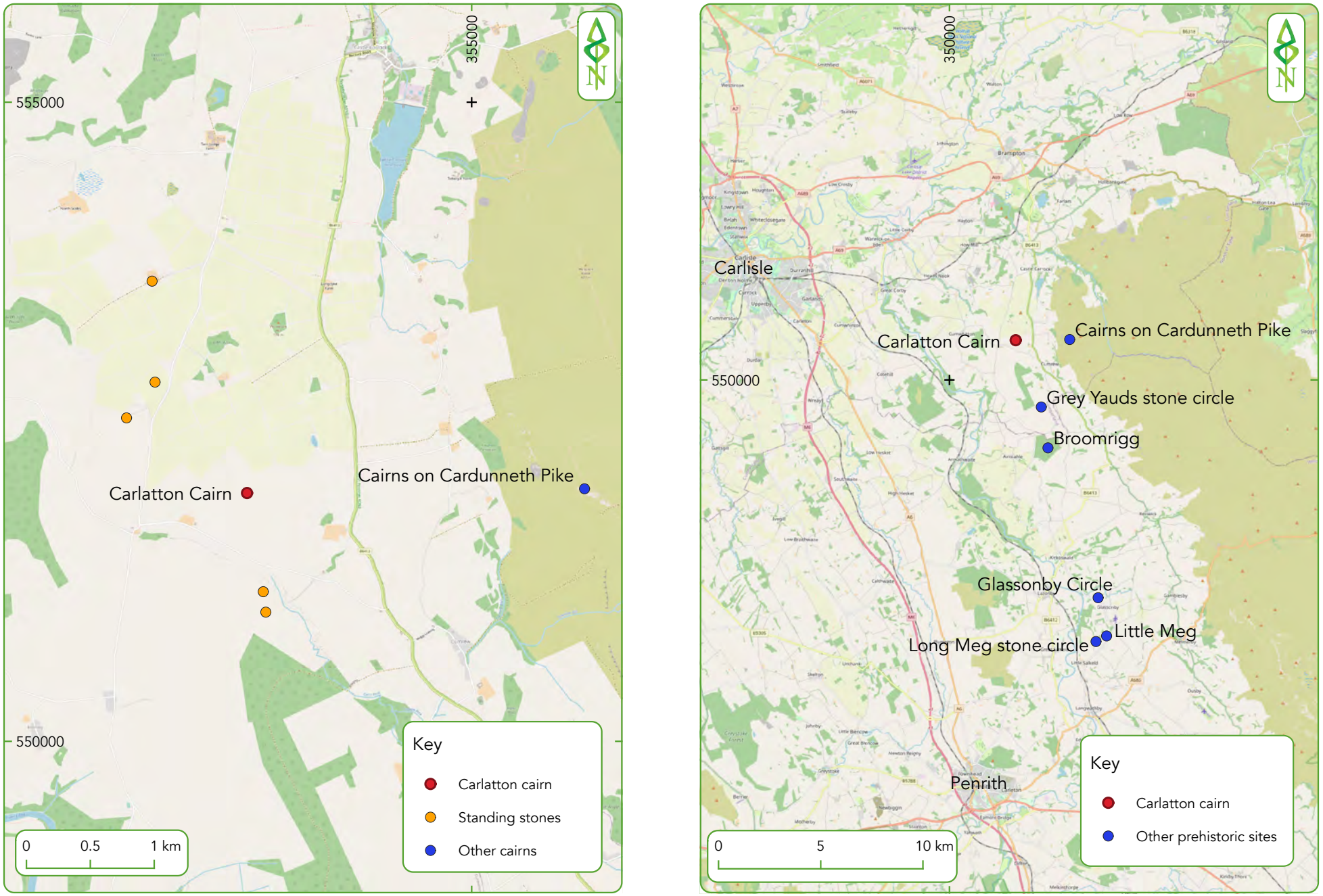


Figure 2. Left - Standing stones and nearest other cairn to site, Right - Other prehistoric sites mentioned

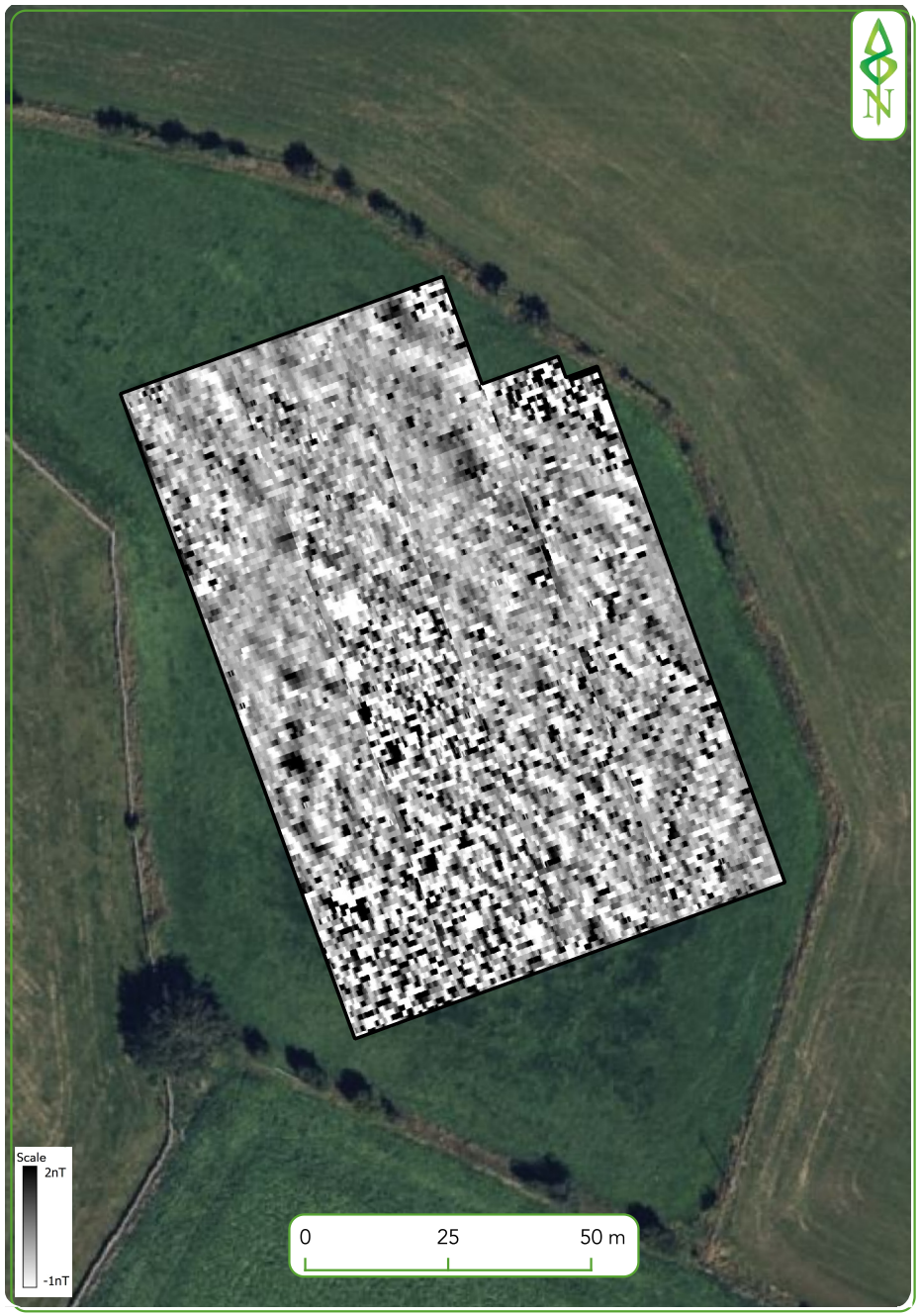
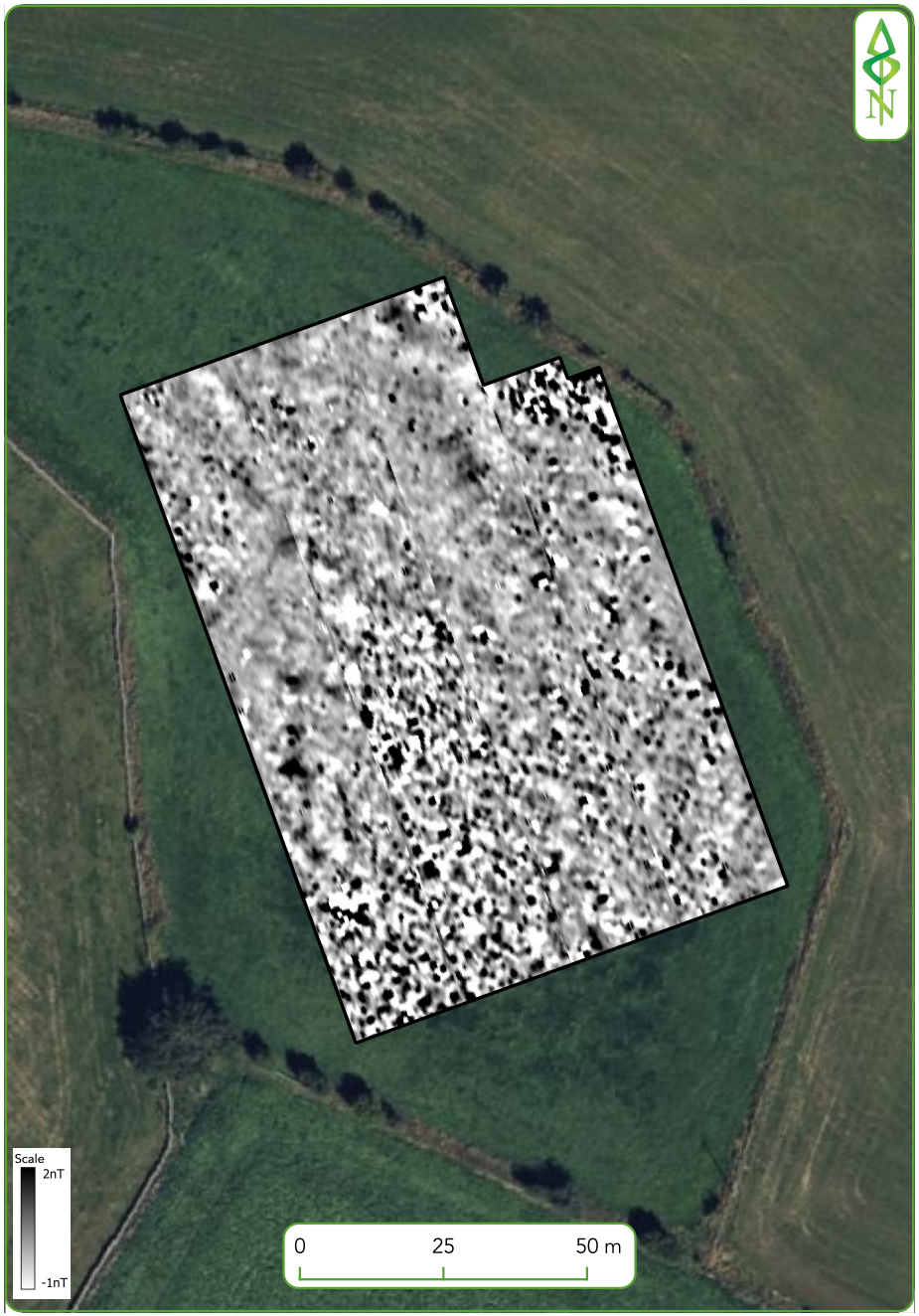


Figure 3. Raw unprocessed gradiometer survey data and minimally processed gradiometer survey data - greyscale plot



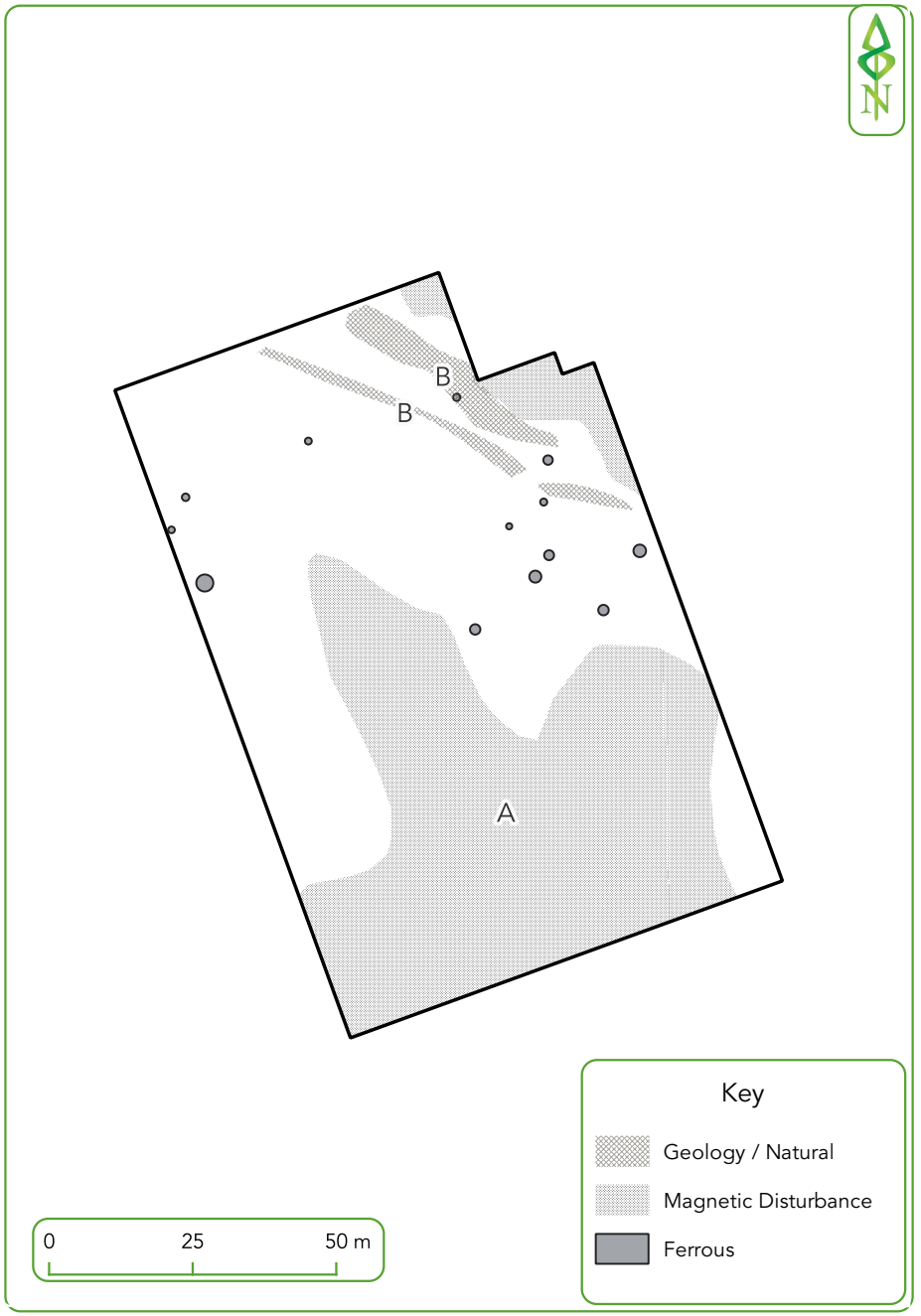


Figure 4. Processed gradiometer survey data - greyscale plot and interpretation of the data

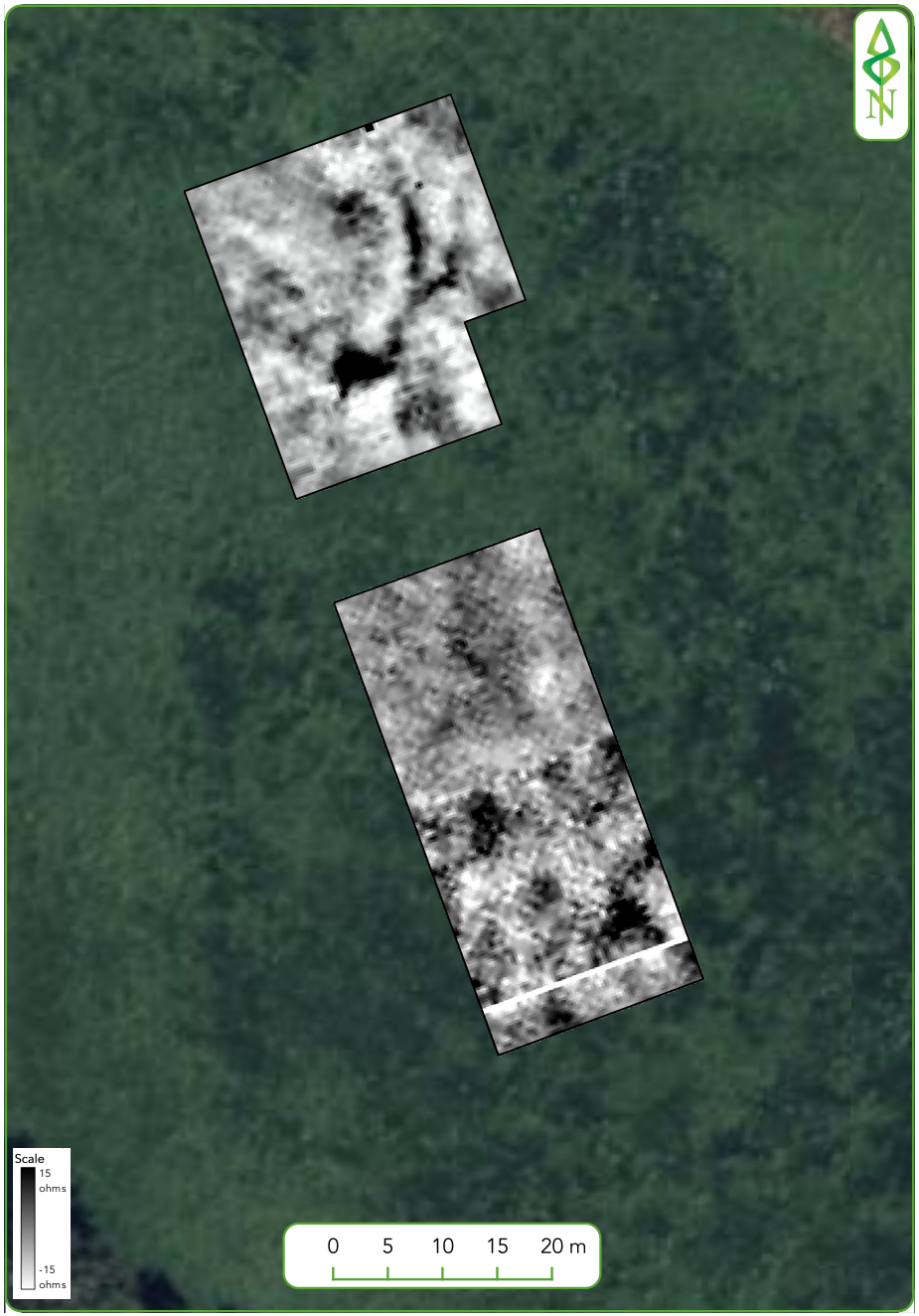


Figure 4. Processed earth resistance survey data - greyscale plot and interpretation of the data