Chalk, Cherries and Chairs– Grim's Ditch Geophysical Survey Outreach Project

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In 2019, the Chilterns National Landscape Partnership launched the Chalk, Cherries and Chairs Landscape Partnership Scheme (CCC), funded primarily by the National Lottery Heritage Fund and the HS2 Community and Environment Fund. One of the projects within CCC explored 'The Mystery of Grim's Ditch'. Its aim was to uncover the secrets of this ancient earthwork across the Central Chilterns, Buckinghamshire, where it is a designated Scheduled Monument. The project engaged with residents of and visitors to the Chilterns through a number of events and activities, including a geophysical survey with Aylesbury Young Archaeologists Club (YAC), Chiltern YAC and Buckinghamshire New Shoots.

Site Background:

Grim's Ditch is a series of discontinuous linear earthworks believed to date to the Iron Age, which extend across the Chilterns from Bradenham to Berkhamsted, and into both Hertfordshire and Oxfordshire. In Buckinghamshire, the earthworks mainly consist of a single bank and ditch, with the bank on the north side of the ditch (Buckinghamshire County Museum Archaeological Service 1997, 1).

The LiDAR data gathered as part of Chiltern Conservation Board's "Beacons of the Past" Project and from the Environment Agency (2017) indicated a slight linear feature, along with field boundaries, which may suggest the earthwork continued across the Missenden Valley, north-west of Road Farm (centred at SP 88150 02941), and beyond the surviving ditch and bank earthworks (Figure. 1).

In 2021 AOC Archaeology Group (AOC Archaeology 2021) was commissioned to undertake magnetic gradiometer survey and an earth resistance survey in the fields to the north-west of Road Farm. A relatively well-defined SW-NE, linear trend and associated magnetic disturbance was suggested to be associated with Grim's Ditch, however there was also the possibility that it was part of a former land division. The Earth Resistance survey detected a broad band of high resistance, which again had the possibility to be related to a possible bank.

Methodology:

Earlier in the project, both branches of Buckinghamshire Young Archaeologists Club had been visited by Lucy Lawrence, Buckinghamshire County Archaeology Officer, where information about Grim's Ditch was shared, and discussions lead by YAC members raised questions about the potential purpose and function of the monument. Based on the success of these sessions, it was suggested an open survey weekend could be undertaken, offering young people the opportunity to carry out the geophysical survey themselves. On this basis, the CCC partnership invited the Aylesbury and Chiltern branches of YAC, along with the Buckinghamshire New Shoots participants (another CCC initiative teaching practical conservation skills to young people aged 14–18), to undertake the geophysical survey.

The surveys were carried out over two days on the 16th and 17th of September 2023 with instruction and supervision by competent operators and archaeologists. In the week leading up to the survey the weather was predominantly dry, with a number of short sporadic showers.

The aims were as follows:
- Gather further evidence for the presence of Grim's Ditch north-west of Road Farm.
- Evaluate the effectiveness of four different geophysical methods.
- Introduce the different geophysical techniques to a new audience.

To compliment the work previously undertaken, the survey was focussed on the area of the AOC Archaeology Group surveys where the two anomalies had been detected. The geophysical methods undertaken;
- One hectare (ha) Frequency Domain Electromagnetics (FDEM);
- Four Electrical Resistivity Imaging (ERI) profiles;
- Eleven Ground Penetrating Radar (GPR) profiles;
- Nine Transient Electromagnetics (TEM) profiles.

Figure 1: LiDAR imaging with known route of Grim's Ditch and study area highlighted.

Results & Conclusions:

The FDEM results were dominated by the presence of medieval ridge and furrow (Figure. 2), on a similar alignment to the projected path of Grim's Ditch. Anomaly RES1 was only present in the north-east half of the survey area and corresponded with the projected path of Grim's Ditch. However, it cannot be considered to be the monument from these results alone. The FDEM data was inverted to determine if the response from Grim's Ditch could be enhanced by constraining the geological interface. Unfortunately, the results were not overwhelmingly successful.

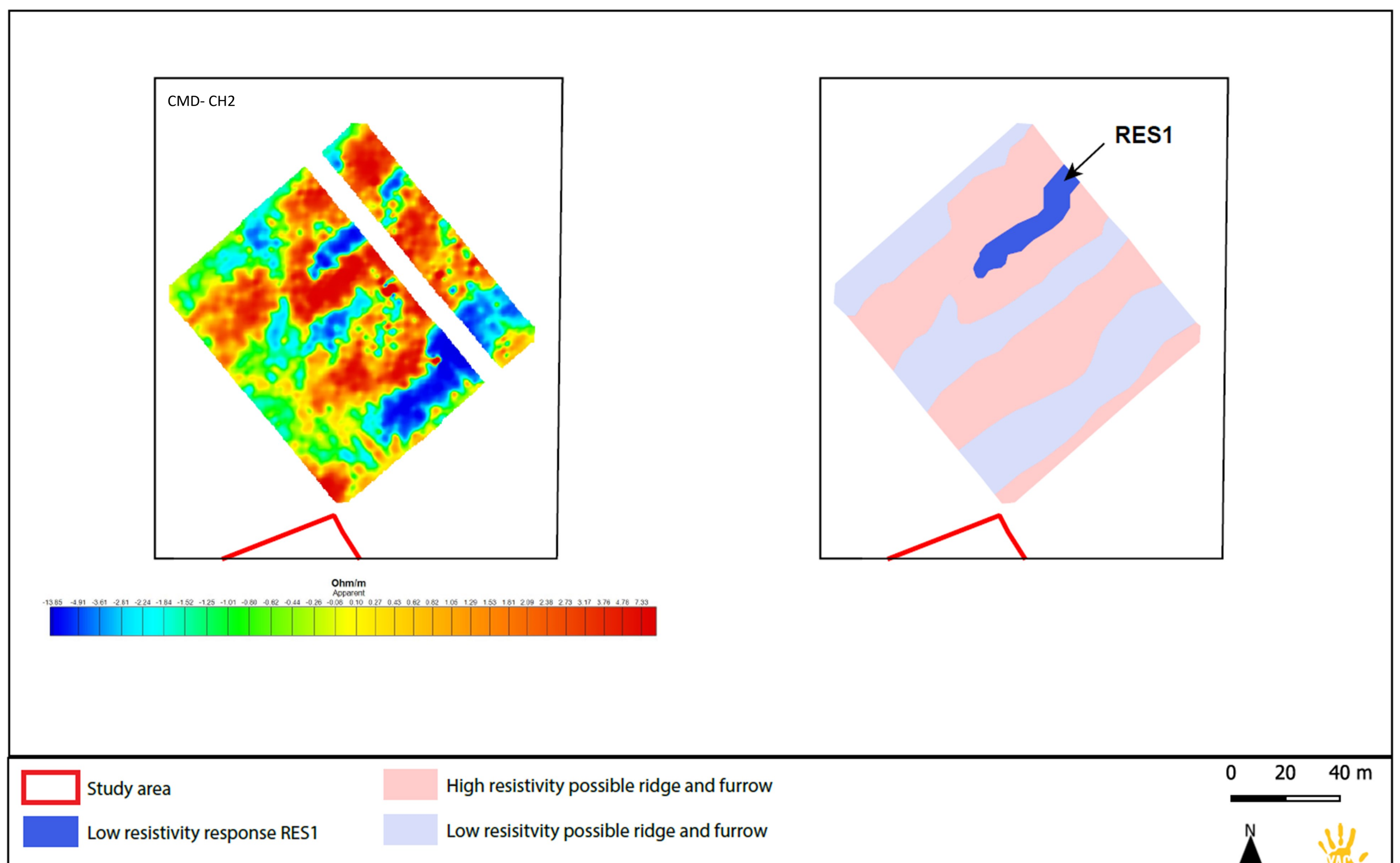

Figure 2 : Fequency domain electromagnetic resistiviy interpretation

The results of the ERI survey confirmed the presence of a substantial c.10–14m wide ditch which followed the projected path of Grim's Ditch and cut into the chalk bedrock (Figure. 3). The survey also identified the ditch extending a further c.110m to the south-west into the neighbouring field, which was not previously known.

The portable TEM system used was able to resolve the width and depth of the ditch cut, as the ditch was clearly cutting into the bedrock (Figure.3). In such an instance TEM could be used as an alternative to FDEM or ERI, considering the scale of the moment.

One of the 300MHz (central frequency) GPR profiles presented a clear reflection inside the ditch which could represent either backfilling in two separate phases, or that the ditch was recut, representing maintenance or reuse of the boundary (Figure.3).

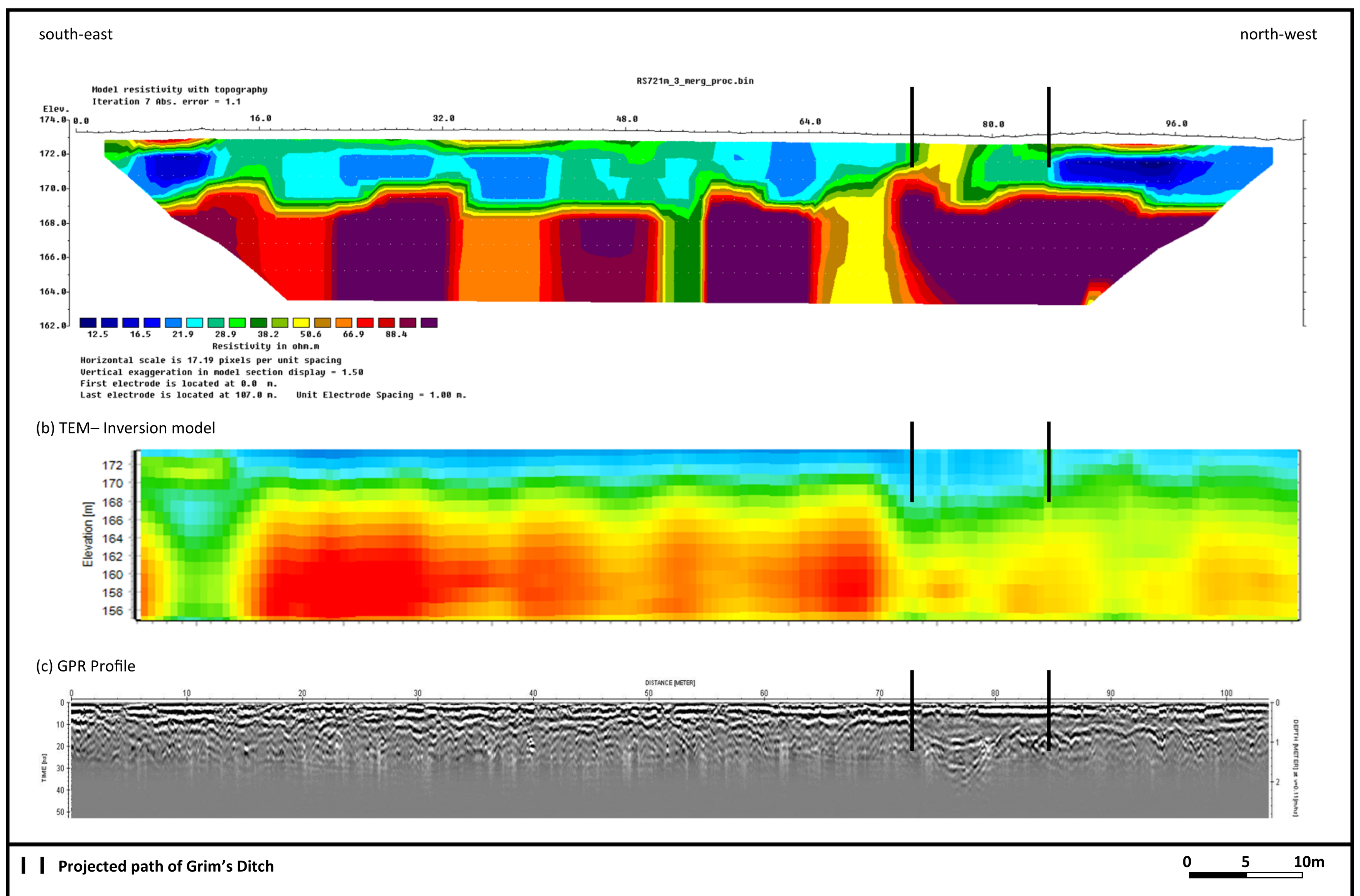

Figure 3: ERT (a), TEM (b) and GPR (c) profiles across earthwork presented in the LiDAR to the north-west of Road Farm

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References:

AOC Archaeology, 2021 The Mystery of Grims ditch, Great Missenden, Buckinghamshire: Archaeological Geophysical Survey. Unpublished report: 40169

Bartlett, A., 1998 Grim's Ditch, Buckinghamshire: Report on Archaeogeophysical Survey. pp3-4, plans 5-8

Buckinghamshire County Museum Archaeological Service, 1997 An Archaeological and Management Survey of Grims Ditch, Buckinghamshire. Unpublished report: 395

English Heritage, 1990 Record of Scheduled Monuments, Scheduled Ancient Monument no. 12004. English Heritage

Environment Agency, 2017 LIDAR Composite DSM https://data.gov.uk/dataset/0ab507af-cd91-40cb-8524-3efafc267211/lidar-composite-dsm-2017-50cm (accessed December 2023)