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RM Archaeology

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[STRIPPLE STONES GEOPHYSICAL SURVEY REPORT]

Summary report on geophysical survey (electrical resistance) carried out at Stripple Stones stone circle and henge scheduled monument, Blisland, Bodmin, Cornwall and preliminary interpretation of geophysical data.

Contractor: **Cornwall Archaeological Unit (CAU) on behalf of Attwell Associates**

Investigator: **Mr Richard Mikulski (RM Archaeology)**

Title: **Stripple Stones Community Geophysical Survey (Earth Resistance)**

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Report No: **RMArch_2015/001**

Client: **Attwell Associates**

Summary

An earth resistance survey covering an area of c.0.064 hectares was carried out at the Stripple Stones Stone circle and Henge scheduled monument ( ), over the part of the scheduled area overlain by early modern enclosure boundaries, the reported barrow site adjacent to the scheduled monument and the proposed new course of the boundary. A low resistance anomaly probably representing the henge ditch and high resistance anomalies possibly representing the outer bank of the henge, an early modern stone trackway and the edge of the stone circle were detected, although the last of these anomalies may simply represent tumble from the early modern boundary wall. Several other low resistance anomalies are noted, which may or may not represent evidence for a previously unknown prehistoric enclosure at the site.

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Introduction

RM Archaeology in conjunction with Cornwall Archaeological Unit, carried out, with the permission of English Heritage and landowners, Mr and Mrs Mansfield of Hawks Tor Farm, Blisland, Bodmin, PL30 4DJ, an earth resistance survey over part of the Stripple Stones Stone circle and Henge on Hawk's Tor Moor, North Cornwall, a scheduled ancient monument: number CO124; HER#1965; MCO18462; EH reference HA 1006693.

The survey covered that part of the monument area enclosed by early modern enclosure boundary walls to the northwest and southwest, in addition to the proposed site of a reported round cist cairn or barrow immediately adjacent to the monument on its east side, within the enclosed field.

The survey was carried out using a TR Systems TR/CIA resistance meter on March 16th 2015 at which time the surveyed areas consisted of short cut grassland pasture with patches of waterlogged marshy ground close to the western enclosure boundary wall.

The geophysical survey was carried out by volunteers including local residents using community earth resistance equipment (kindly provided by the CBA Southwest), supervised by the author, a professional archaeologist with experience of this kind.

Rationale

The objectives of the geophysical survey were to add value to the project by enhancing the archaeological record and to aid decisions relating to the management of the monument.

Site Location

The field covered by the geophysical survey is situated 415m to the southeast of Hawk's Tor, in the parish of Blisland, North Cornwall (Figure 1).

The site of the scheduled monument area is centred at SX1435 7521.

Figure 2 shows the scheduled monument area, along with the approximate positions of the geophysical survey areas, covering the henge and the proposed barrow site.

Site Description

The solid geology comprises granite (igneous) bedrock, overlain by peat/peaty loam.

Ground conditions at the time of the survey were quite wet, with small parts of the primary survey area completely waterlogged.

The enclosed land on which the geophysical survey was carried out, consisted of grassland pasture. There was evidence of recent livestock movement (cattle) within the survey area, but the area was free of livestock at the time of the survey.

The enclosure walls were undergoing a phase of repair as part of a Higher Level Stewardship scheme at the time of survey and consequently new stone had been brought up into the enclosed field and stockpiled at regular intervals along the boundary walls. Some of these stock piles limited the siting of the survey area grid and one impinged upon the primary survey area itself.

Historical and Archaeological Background

The National Monuments Record provides a description of the site and its history:

"A stone circle-henge situated on a shelf on a gentle south-west facing slope, and lying largely in open moorland, but with about one fifth of the perimeter in enclosed pasture. First recorded in 1879 (Lukis & Borlase, 1885) and partially excavated in 1905 ([h1], St. Gray, 1906). Scheduled in 1929. The site is marked on OS maps and was surveyed by the OS at 1:2500 in 1973. In the 1980s it was surveyed from the air and on the ground by the RCHME ([h4, h5, b11]).

This monument has been described by several sources. According to Barnatt, it is the only circle-henge in south-west England and though ruined, it is interesting because of a number of unique features. The circle was originally ovoid in plan and measured 46.3m by 43.3m. It now consists of four upright stones and the remains of nine others. Their height varies from 1.0m to 2.74m. There is a large recumbent centre stone, which would have stood about 2.9m high. The stone circle is surrounded by a low fragmentary bank, 3.0m to 4.5m wide and up to 0.5m high, with an internal ditch. The bank probably originally had an outer diameter of 73m by 70m, with a causewayed entrance, 2.7m wide, on the WSW side. Barnatt found no indications of astronomical alignments, but thinks it may be related to the "sacred hill" of Hawks Tor (Barnatt, 1982). The circle was already ruined when first documented (Lukis & Borlase, 1885) and in 1885 further damage was done when a field was laid out over the north east side of the site. That part of the bank and ditch lying within the field was almost totally ploughed away.

Gray's partial excavation of the site (St. Gray, 1906) revealed the following: several of the stones had fallen because they were poorly set; two hollows were found which may have been stoneholes; the centre stone had fallen to the north and there were four pits of unknown use nearby; the ditch was originally 2.9m to 4.9m wide and up to 1.3m deep and at the entrance the north terminal became shallower and turned outwards; there was originally a berm of 1.5m between the bank and the ditch. The only finds in the whole excavation were three flint flakes, a fragmentary ox bone and pieces of oak from near the bottom of the north ditch. The monument has remained largely undisturbed in recent years and is in good condition except for some damage to the hedge from cattle trampling ([h2 - h5])."

(Heritage Gateway, 2015)

Methods

Survey

A survey grid was first laid out using measuring tapes, with the aid of a total station. Geophysical survey over the area of the scheduled monument consisted of a 40 metre by 20 metre area, organised into two 20 metre by 20 metre grids, situated as close to the field boundaries in the northwest corner of the field as possible.

Technical Synopsis

Earth resistance of the soil is dependent on the moisture content and distribution within the soil. Buried features such as walls can affect moisture distribution and are usually more moisture resistant than other features such as the fill(/s) of a ditch. Typically, a stone wall will produce a high resistance response, with the moisture retentive infill of a ditch producing a low resistance response. Variations in resistance across a localised survey area are measured in ohms (Ω), the SI unit for electrical impedance or resistance.

The twin probe configuration applied during this survey is favoured for archaeological prospection and can produce responses to features up to 1 metre in depth with a mobile probe separation of 0.5 metres.

Equipment Configuration, Data Collection & Survey Detail

The earth resistance survey was carried out using a TR Systems Ltd. TRCIA Resistance Meter, with a Twin Probe array (owned by the CBA Southwest). The standard mobile probe frame for the TRCIA instrument was used with its 0.5 metre electrode separation. Readings were recorded at 1 metre intervals, with a traverse separation of 1 metre.

It was recognised that the proximity of the survey area to the granite outcrop of Hawk's Tor and probable shallow depth of topsoil would likely produce a high background resistance and consequently the earth resistance meter sensitivity was set to 2000 ohms, following the high readings obtained when initially setting up.

Data Processing and Presentation

Data logged by the resistance meter was downloaded using both the generic software supplied with the TR Systems resistance meter and with the *Snuffler* software (freely available online). All processing of data was carried out within the *Snuffler* software. Raw data was analysed and displayed within the report as well as processed data. The following processing has been carried out on data in the survey:

- Raw earth resistance data have been processed using the standard *Snuffler* Display processes and display types, after despiking and interpolation to enhance any possible archaeological anomalies.

- Data have been "despiked" in order to remove unexplained and likely spurious high contact responses.

The main form of data display used in this report is the greyscale plot. For each survey area, both 'raw' and 'processed' data have been presented, followed by an abstracted interpretation plot. Anomalies are abstracted using colour-coded lines and polygons. An abstracted interpretation is provided for all geophysical anomalies located by the survey. Separate abstracted interpretations of each anomaly in the primary survey area are included in the illustrations section to permit a rapid assessment of features within this area.

Volunteers

Survey tasks were divided between the volunteers who then rotated through the tasks at regular intervals in order to provide them with the fullest experience of the survey work and to ensure all participants' attention remained focussed as much as possible. The two main survey roles are described below:

1. *Resistance meter operator*

   The individual manually operating the meter at the time of survey. This individual logs each reading on the meter as the survey progresses and also calls out each logged reading to the hard copy data recorder accompanying him/her.

2. *Hard copy data recorder*

   An individual recording all resistance readings on a hard copy pro forma (see appendix), as each logged reading is called out by the resistance meter operator. This task has several purposes:

   - ➔ It provides a back-up hard copy of data
   - ➔ It provides immediate feedback on the progress of the survey and any mistakes or issues (i.e. you do not have to wait until data is downloaded)
   - ➔ It helps volunteers to gain a better understanding of the principles of this survey technique and that the raw data is number-based
   - ➔ It provides a role for an additional volunteer

In addition, two or three other volunteers were tasked with managing the various wires which form part of the equipment for the survey. One volunteer typically managed the remote probe wire by ensuring it remained laid out completely uncoiled, out of the way of the resistance meter as the survey progressed, typically staying close to the resistance meter operator and hard copy data recorder and adjusting the remote probe wire as necessary.

Two other volunteers were responsible for moving the guide wires (which mark out the lines of several traverses) once a set of traverses had been completed, although this task could also be carried out by any of the previous roles as well.

Once the first grid was completed, the hard copy data demonstrated that a mistake had been made towards the end of the grid. However, this was quickly rectified by a rapid repeat of the affected traverses and the data was later able to be combined using the *Snuffler* software. This experience served to highlight the problems/issues when carrying out a geophysical survey of this type and the need to maintain focus and carry out regular checks on the data recording.

Results and Discussion

Figure 3 shows the raw geophysical data from the survey as visualised initially using the *Snuffler* software. Figure 4 shows a smoother image of the same data which has been despiked and interpolated using *Snuffler* (v.1.13) software. (N.B. the blocked red area represents null readings due to an obstacle).

Although it is not as obvious as one might expect, the Henge ditch does appear relatively well-defined particularly to the north (bottom left hand corner of grid 1). However, the easternmost part of the ditch and outer bank are much less well-defined. While it's possible the outer bank could be represented by the outer edge of the ditch (e.g. to the north), it's unfortunate that those areas where the ditch appears most obviously are also where there is considerable tumble from the enclosure period boundary walls.

There is an area of higher resistance which might correspond with the position of the outer bank on the east side of the henge (close to the centre of grid 1), yet it appears almost as a discrete, sub-circular form and it appears to be of a distinctly lower resistance to the areas adjacent to the boundary walls, though this difference could well be due to the stone tumble from the walls.

The two concentrations of very high resistance along the inside of the western enclosure boundary wall, correspond roughly to the positions of the two orthostats of the stone circle shown enclosed by the wall on St. George Gray's plan (St. George Gray, 1906).

There is also evidence of two (?) possibly distinct small areas of low resistance, which appear to the southeast, outside the henge (just right of centre of grid 2).

Interpretation

The Henge Area

One interpretation of the results might suggest there has been considerable disturbance to the eastern side of the henge in this area.

An alternative explanation is that the soil conditions/high surface moisture content meant that areas of low resistance were 'drowned' out in the readings and visualization process.

A third possibility is that the outer bank of the henge (possibly along with the ditch as well) is non-continuous or segmented with perhaps a significant portion of the henge left open on the east/northeast aspect, possibly representing another entrance. This could explain the relatively well-defined areas of high resistance close to the boundary walls which might represent termini of outer bank segments. However, this does not explain the area of raised resistance in between these on the east side of the henge; and the area of high resistance to the southwest (bottom right of grid 2) is more likely to relate to the reported early modern trackway, especially given its well-defined eastern edge.

The relief plot in figure 5 does appear to demonstrate the line of the henge ditch well, with some of the outer bank also possibly evident, particularly towards the southeast side of the henge, especially in grid 2. A distinct area of low resistance is also evident on the edge of the stone circle, just inside the enclosure boundary wall (left of centre bottom, grid 1), although it's possible this might simply be an artefact of two areas high resistance either side of it.

Historical records (e.g. St. George Gray, 1906) also show a post-enclosure trackway running parallel along the inside of the western boundary wall (aligned approximately northwest-southeast). While there was concern that such a trackway might have destroyed or at least mask the ditch and bank of the henge, it does not on the whole appear obviously present, except towards the southern corner of grid 2, where it may be the more likely cause of high resistance readings in this area, rather than the outer bank of the henge (see figure 7).

The two small, discrete (circular?) areas of low resistance and their apparently associated curvilinear features of low resistance in grid 2 appear most obvious in figure 6; as does the distinct area of high resistance, just right of centre in grid 1 (see figure 16 also). These anomalies could potentially represent some sort of enclosure, most likely of prehistoric date, but this cannot be certain without investigation. Professional assessment of the raw geophysical data is recommended in this case.

The Cist Cairn/Barrow site

Unfortunately there was only time to complete just over half a 20m x 20m grid over the assumed location of the round cist cairn/barrow reported by St. George Gray (1906), although prior to survey this was thought enough to cover most of the area under investigation.

The results below do show an area of high resistance in the area thought most likely to represent the remains of a barrow. This area of high resistance could potentially represent the remains of a round barrow, although its make-up is inconsistent, given there are clearly areas of low resistance within it, although St. George Gray states a cist had already been exposed if not excavated within the barrow. The area was, as cited by St. George Gray in 1906, already 'heavily distributed' and has subsequently been cultivated on a number of occasions. The current landowners run an extensive beef enterprise and the field has in modern times been used to feed and out winter cattle which has added to the challenge of interpreting features on the ground.

St. George Gray (1906: 42) reports that: “A trench, 2.5 feet wide, was also cut down to the iron layer across the mound N. and S. on the W. side, but no relics were found.” If the site of the survey is correct, it’s possible the discontinuity within the area of high resistance might represent this in-filled trench.

Conclusions

It seems likely that the large curvilinear elements of low resistance close to the enclosure wall to the west represent at least remnants of the henge ditch, if not two termini and a possible entrance to the eastern side of the henge.

There are several anomalies which appear to coincide with this potential entrance. A large, sub-circular area of high resistance just east of this discontinuity in the henge ditch appears quite well-defined and could potentially represent an archaeological feature (e.g. a round cairn), if it is not simply a geological outcrop. Alternatively, this area could represent a remnant of the outer bank, though its isolation would need explaining. Another discrete low resistance anomaly in the area of the potential entrance, but this time apparently inside the henge ditch, also bears consideration. It's possible this may represent a socket hole for one of the fallen/lost(?) circle stones.

Unfortunately, there is too much variation and/or possible disturbance evident in the geophysical data to be certain of any of these latter interpretations at present.

The outer embankment of the henge is not so obviously preserved and this corroborates St. George Gray's (1906) observation on this side of the henge: that the outer bank had all but disappeared, presumably having been ploughed out.

The apparent set of low resistance anomalies just outside the henge to the southeast are intriguing and could represent an archaeological feature such as a prehistoric enclosure of some sort, although this is by no means certain.

While it is not possible to definitively say what each of the anomalies identified during the geophysical survey represent, their archaeological potential should be considered in the future management of the scheduled monument and immediate surrounding area.

Recommendations

With only two grids surveyed in the primary area, it is difficult to state confidently whether some of the results show geological or artificial features or indeed if the soil conditions/high moisture content of the ground have affected the readings adversely.

Further geophysical survey work could be beneficial in helping to identify/clarify the nature and extent of potential features described in the current results.

In particular, a greater area of survey (which was not possible in the single day allowed for in this case) focussing on the possible location(s) of the suggested barrow site, might well help confirm its location and therefore resolve the apparent incongruity between the OS location and that reported during its excavation.

Additional survey of the area with the possible set of low resistance anomalies to the southeast of the henge is also recommended.

References

Barnatt, J. 1982. *Prehistoric Cornwall: The Ceremonial Monuments*.

Gray, H. St. G 1906. On the Stone circles of East Cornwall. In *Archaeologia*, Vol. 61, Issue 1: 1 – 60

Heritage Gateway, 2015. Cornwall & Scilly HER: The Stripple Stones (HER#1965). Available online at: http://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MCO18462&resourceID=1020 (accessed 31/03/2015)

Lukis, W. C. and Borlase, W. C. 1885. *Prehistoric Stone Monuments: Cornwall*.

Illustrations

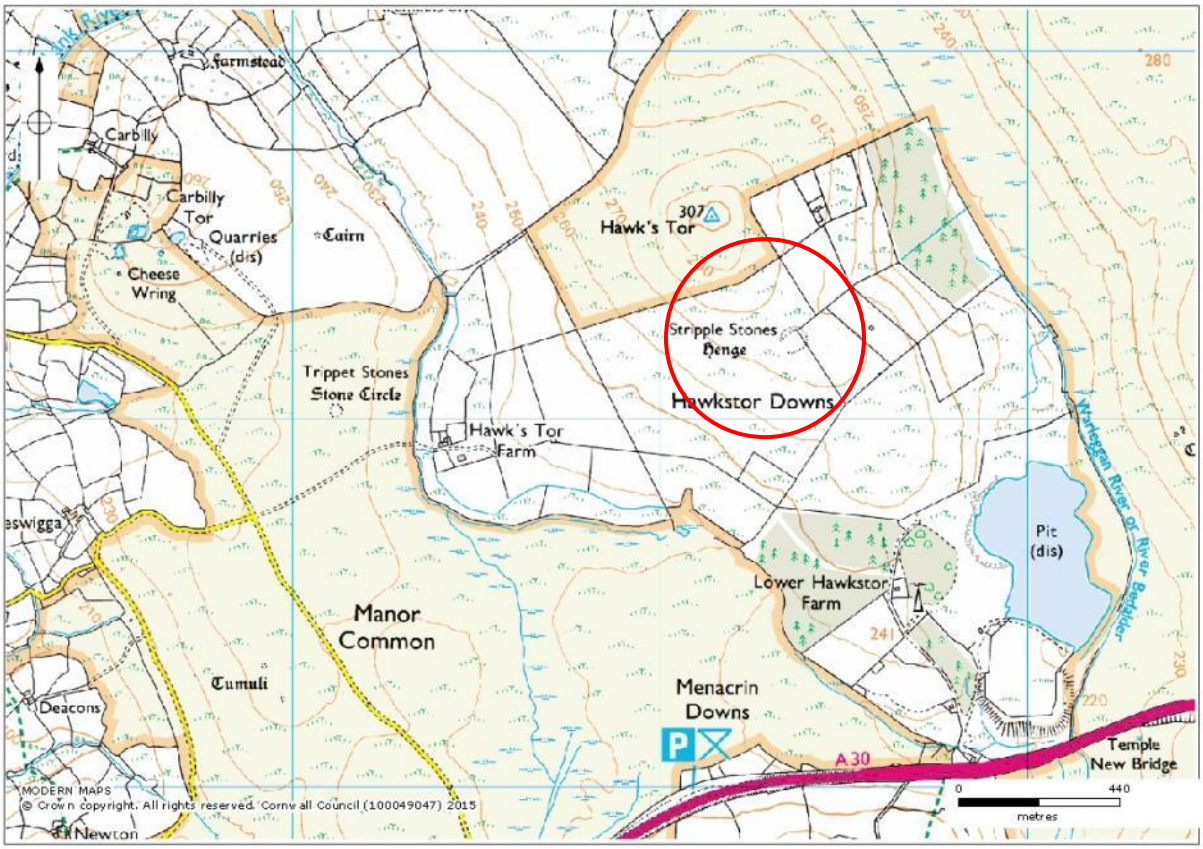


Figure 1: OS map showing location of Stripple Stones site in relation to A30 and other known sites nearby.

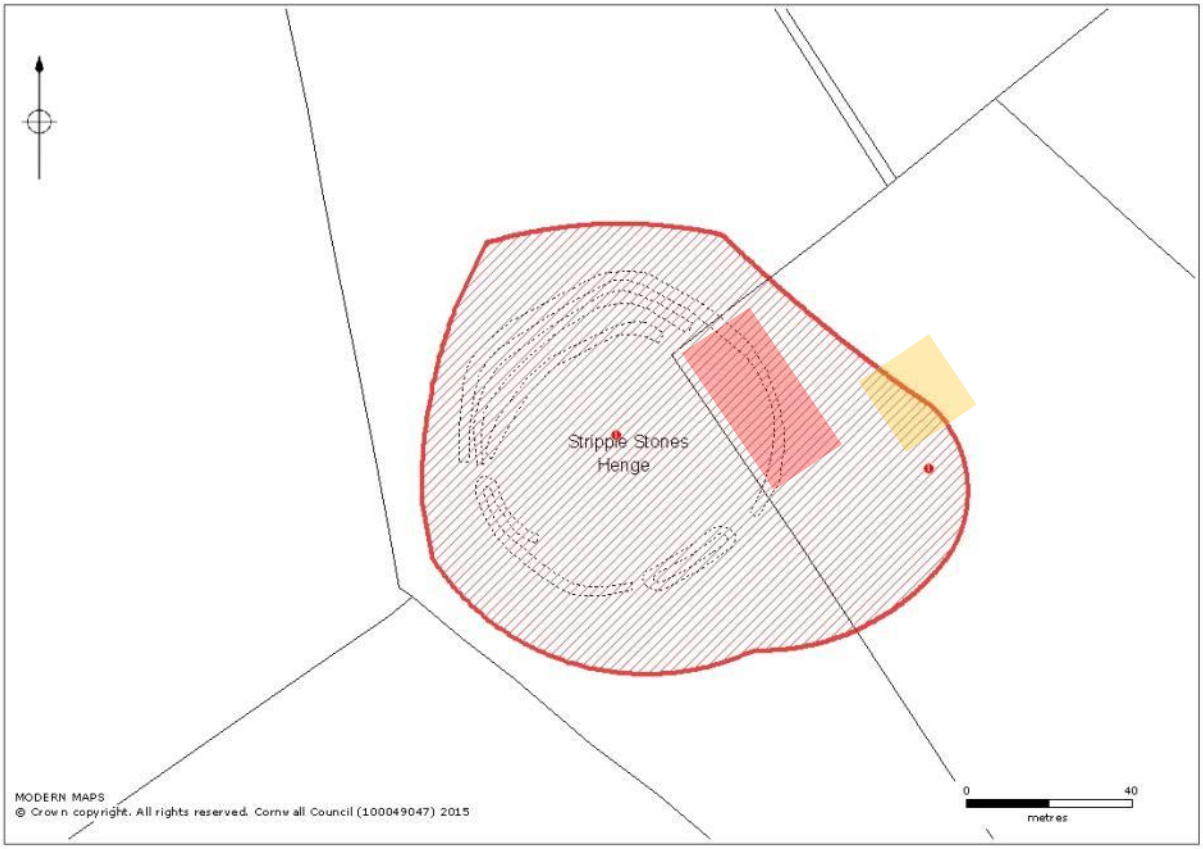
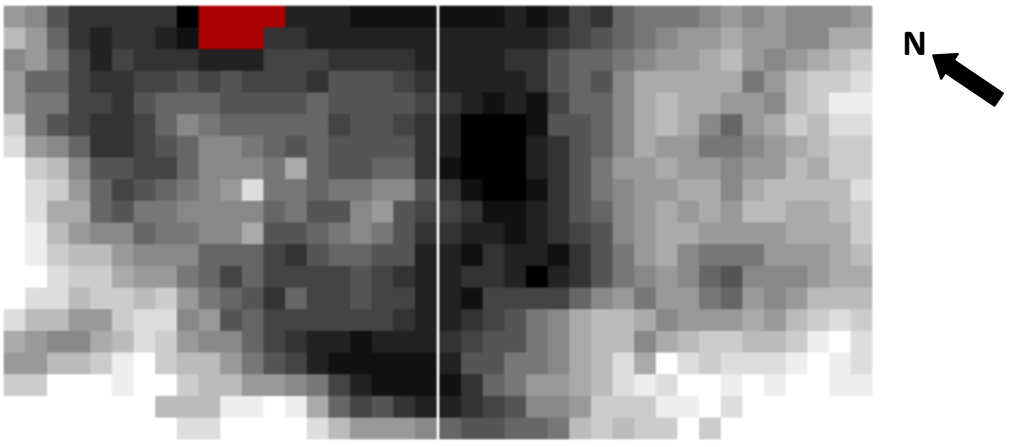


Figure 2: Map showing location of scheduled monument area and approximate location of survey areas, covering the henge (red) and proposed cist cairn/barrow site (orange).



Grid 1 Grid 2

Figure 3: Stripple Stones Electrical resistance raw data, 280 – 382 Ohm, white high. Survey carried out 16/03/2015.

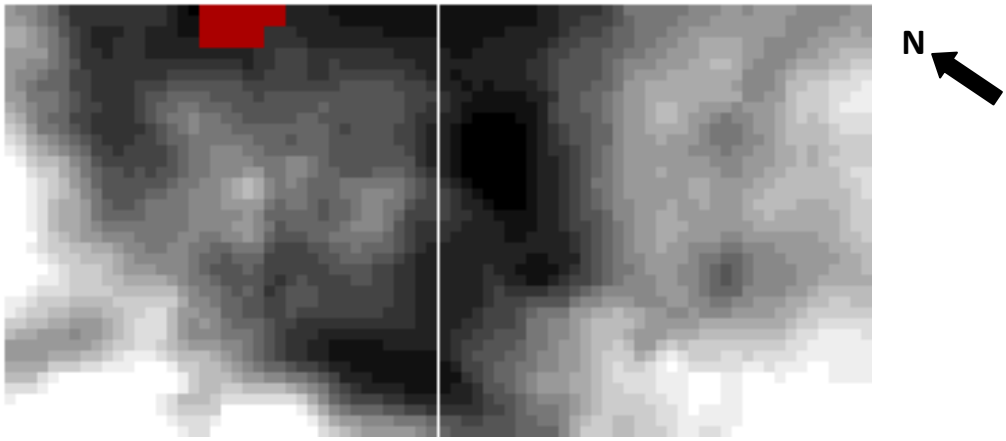


Figure 4: Electrical resistance data, despiked & interpolated (*Snuffler* Process 1)

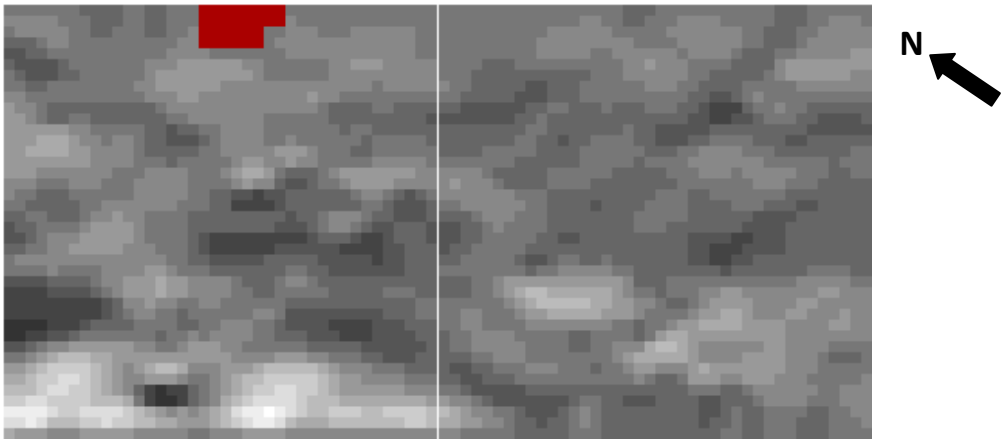


Figure 5: Despiked & interpolated data (*Snuffler* Process 2 (relief plot))

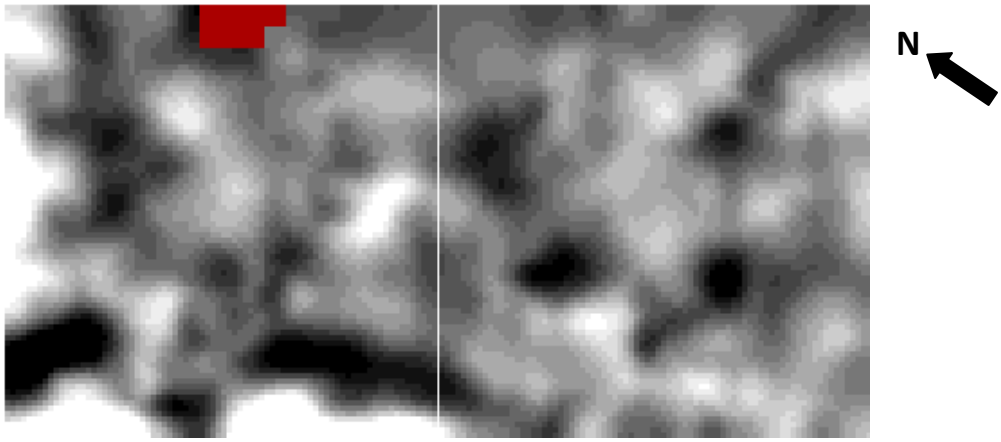


Figure 6: Despiked and interpolated data, with geology removed (*Snuffler* Process 1, Display 1)

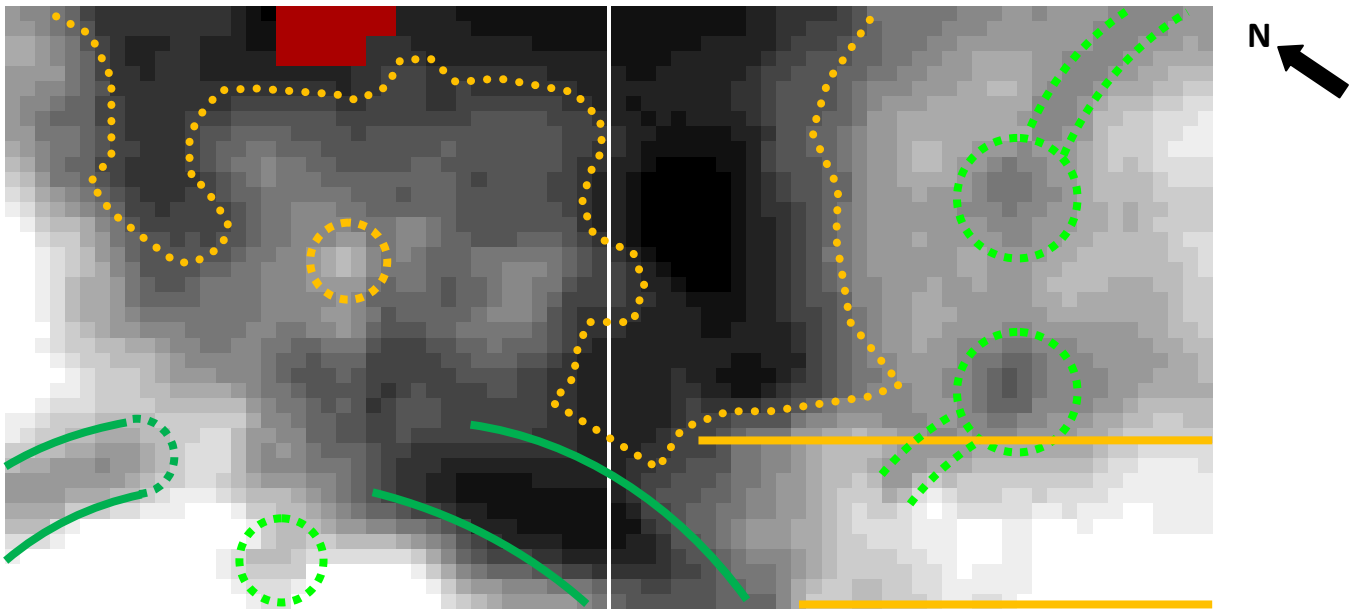
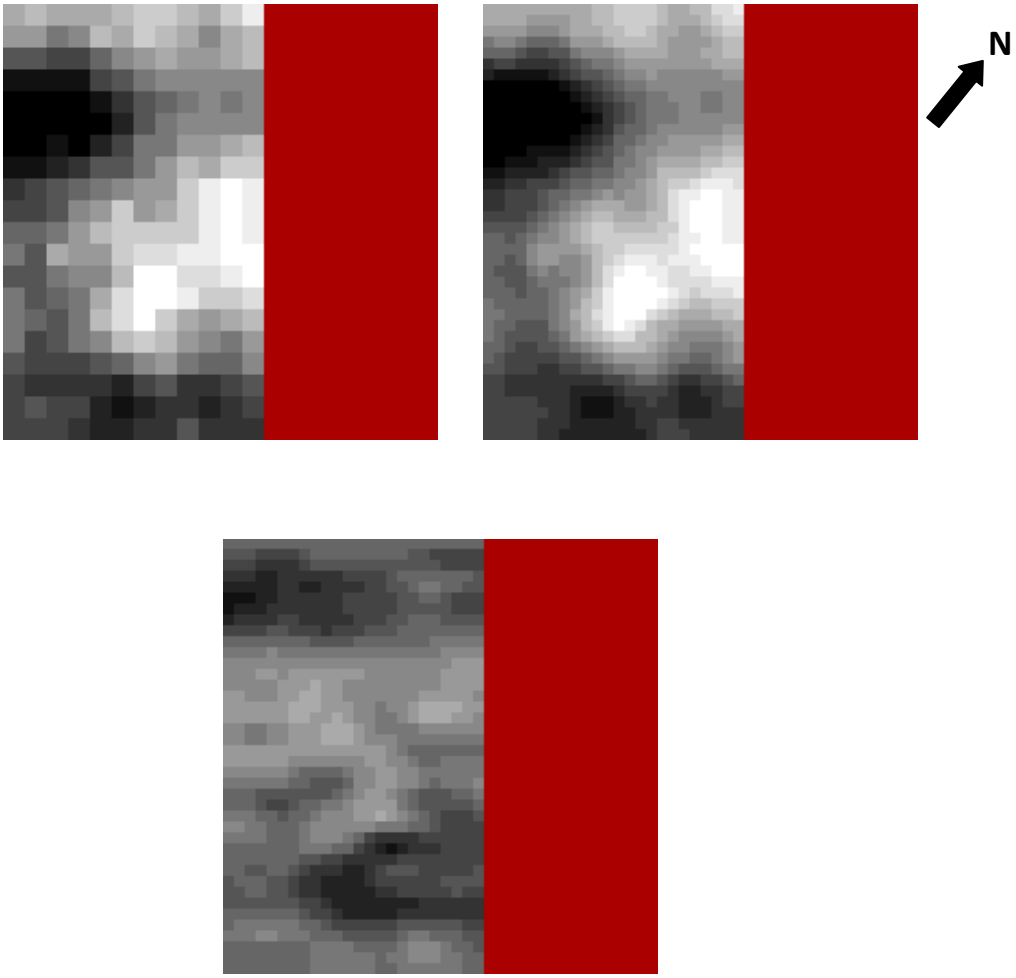


Figure 7: Geophysical plot of enclosed area of henge with preliminary annotated interpretation (see key below).

	Type of Anomaly	Interpretation
	Low Resistance, Curvi-Linear	Archaeological Ditch? (Probable Henge Ditch, Possibly 2 termini)
	Low Resistance, Curvi-Linear	Archaeological Enclosure Ditch?
	High/Low Resistance Boundary	Geological?/Area of disturbance?/ alternatively 'drowned' out readings?/Archaeological structure? (Possible round cairn?)
	High resistance, Linear	Archaeological structure? (Probable early modern trackway?)
	Low Resistance, Discrete(?) areas	Archaeological features? (Possible discrete pits/postholes?)
	High Resistance, Discrete(?) area	Geological/Archaeological Structure?

N.B. The majority of anomalies identified above are planned separately in figures 13 - 17, to show them in relation to the recorded topography of the scheduled monument. An alternative interpretation for the high/low resistance boundary is suggested (that of a possible round cairn) in figure 14.



Figures 8 - 10: (Clockwise from top left): Electrical resistance raw data, (297 - 371 Ohm, white high) from the proposed barrow site location; Despiked and interpolated (*Snuffler* Process 1, Display 1); Despiked and interpolated (*Snuffler* Process 2, Display 1).

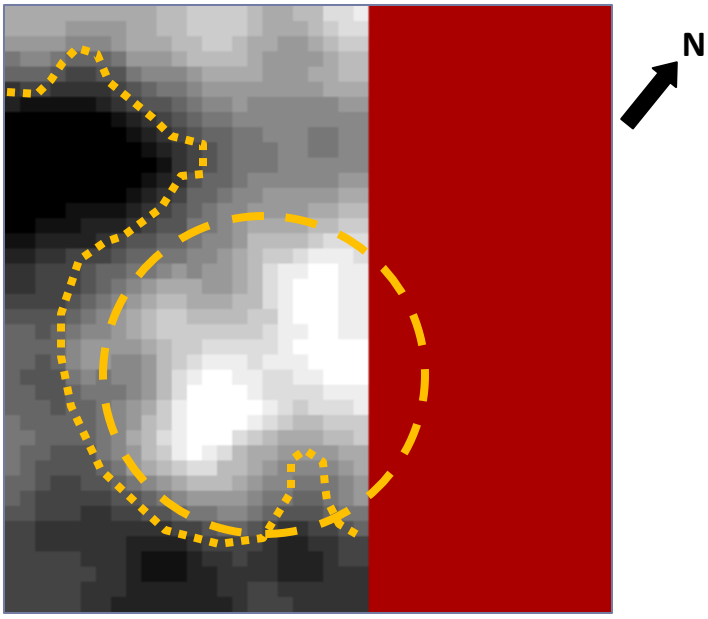


Figure 11: Geophysical plot of proposed cist cairn/barrow site with preliminary annotated interpretation (see key below)

	Type of Anomaly	Interpretation
	High/Low Resistance Boundary	Geological?
	High Resistance, Discrete(?) area	Archaeological Structure? (Heavily disturbed?)

Figure 12: Plan of scheduled area, with electrical resistance data overlay.

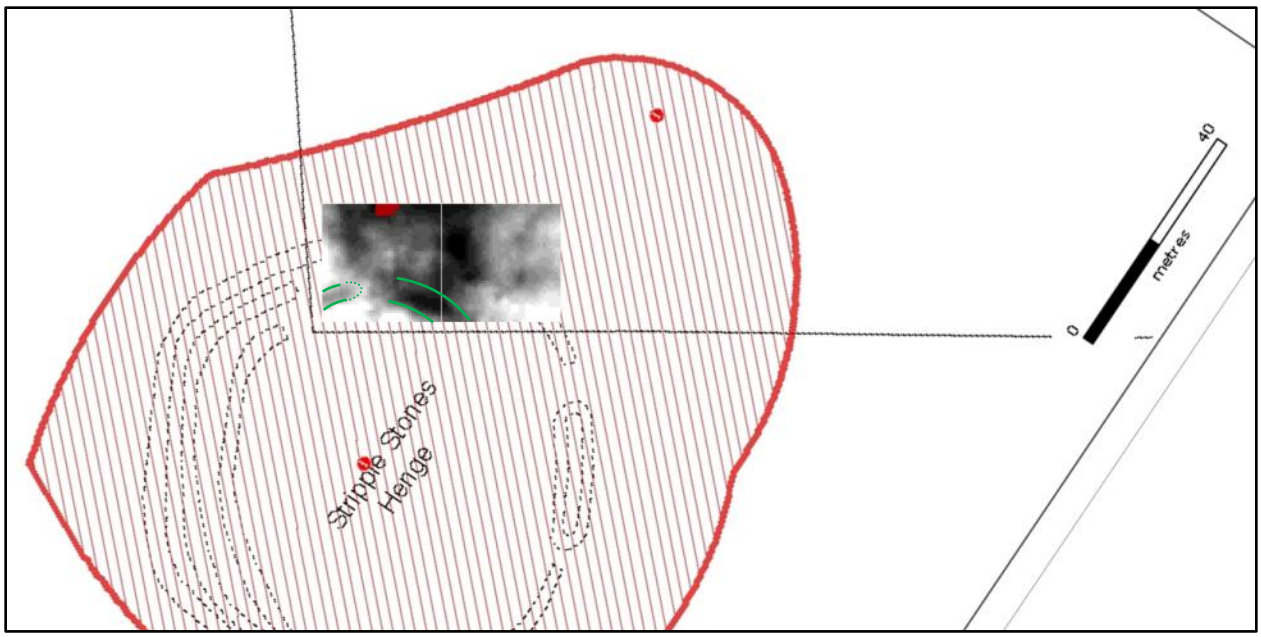


Figure 13: Interpretation of low resistance feature (probable henge ditch).

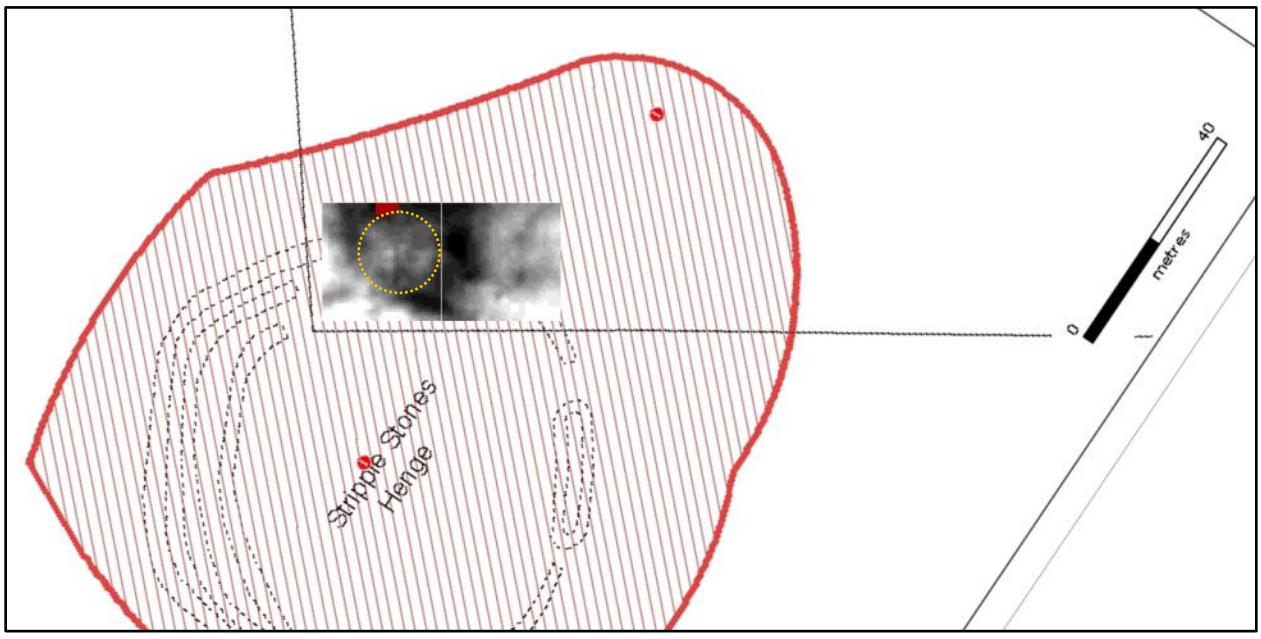


Figure 14: Interpretation of high resistance area (Geological?/possible round cairn?).

Figure 15: Interpretation of high resistance linear feature (probable early modern trackway).

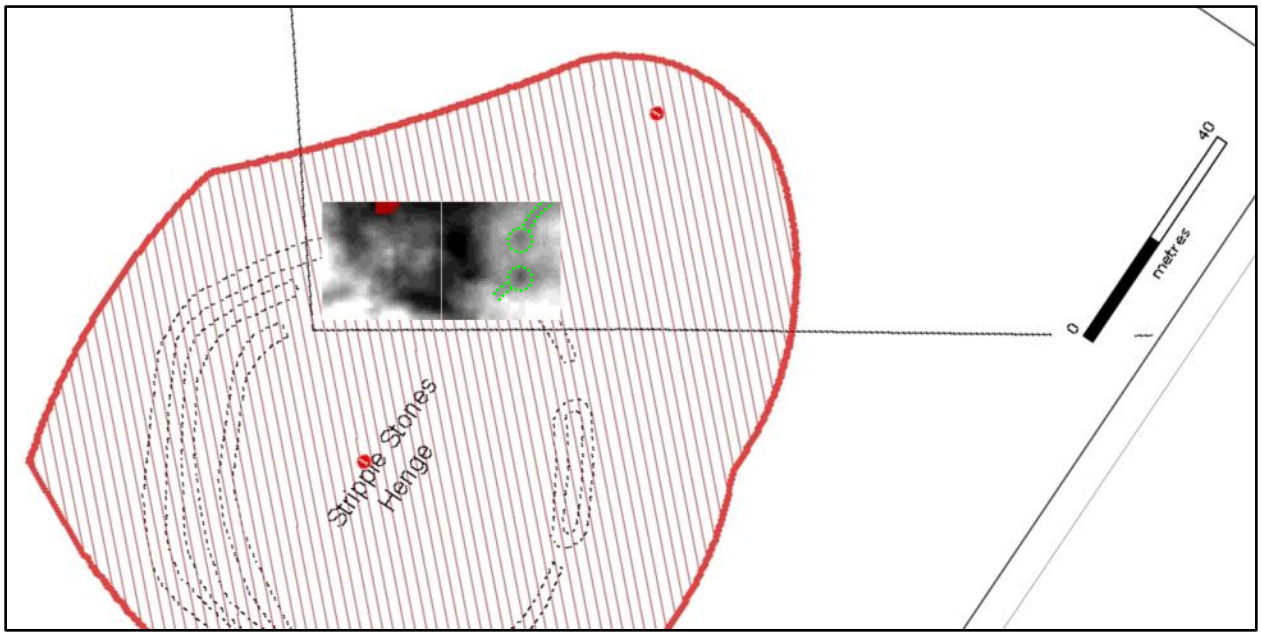


Figure 16: Interpretation plan of low resistance curvilinear and discrete features (possible prehistoric enclosure?).

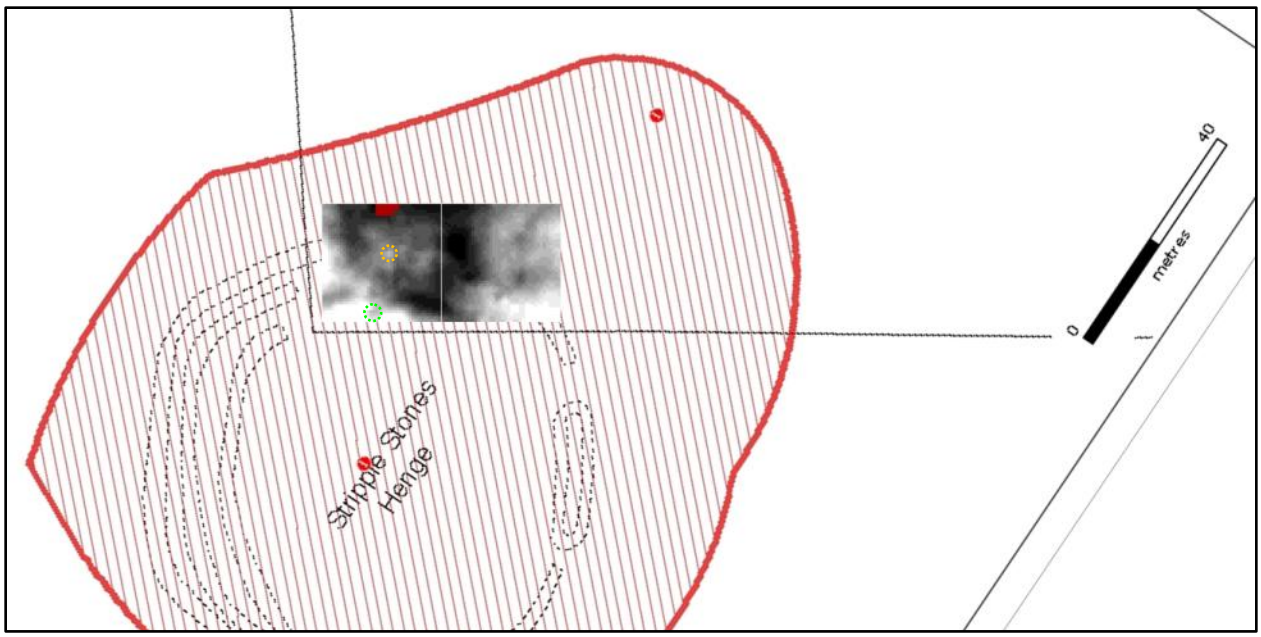


Figure 17: Interpretation plan of additional high and low resistance discrete features.

Figure 18: Google Earth Satellite image, dated 05/11/2009, showing Stripple Stones Scheduled Monument site, with enclosure boundary walls overlying northeastern/eastern aspects and area of geophysical survey (retrieved 18/03/2015)

Figure 19: Google Earth Satellite image, dated 05/11/2009, showing Stripple Stones Scheduled Monument site, with *Snuffler* relief plot of geophysical data (white high) overlaid (retrieved 18/03/2015)