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**Truckle Hill Roman Building, North Wraxall, Wiltshire.
Report on geophysical survey, September 2005.**

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TRUCKLE HILL ROMAN BUILDING, North Wraxall, Wiltshire

Report on geophysical survey, September 2005.

Summary

During excavations to quarry stone rubble, the remains of a Roman building were discovered in a small valley immediately beneath Truckle Hill in Wiltshire. A rapid building recording exercise was carried out by Wessex Archaeology and the surviving wall footings were found to be remarkably well preserved. Subsequently, the English Heritage Geophysics Team was requested to carry out a geophysical survey in the immediate vicinity to determine whether any further Roman remains might be present. A second aim of the survey was to identify areas likely to be free of archaeological features from which material could be excavated to cover the exposed remains, thus protecting them from weather damage. An earth resistance survey was conducted and this appears to have detected a number of potential additional Roman features including a second building. However, it has been possible to suggest two areas where excavation is unlikely to disturb significant archaeological features.

TRUCKLE HILL ROMAN BUILDING, North Wraxall, Wiltshire

Report on geophysical survey, September 2005.

Introduction

During 2004 the well-preserved remains of a Roman building were discovered at Truckle Hill near North Wraxall in Wiltshire during quarrying for stone rubble by the landowner. The English Heritage Geophysical Survey team was asked to carry out a geophysical survey of the site between the 21st and 23rd September 2005 with the aim of locating any further Roman remains and identifying areas from which spoil could be extracted to cover the exposed wall footings, thus protecting them from frost damage over the winter. Prior to this survey, Wessex Archaeology had been contracted to undertake rapid building recording of the exposed remains (Wessex Archaeology 2005) and the current report includes background information drawn from this earlier investigation.

The newly discovered building (NGR 383700 176240) lies in a narrow, steep sided valley that runs approximately north-west to south-east. The course of a stream runs along the valley floor although it was dry at the time of the survey. The bottom of the valley is grass-covered with woodland on its upper slopes and a series of transverse ridges suggestive of landslip slope down from the south-western edge of the valley. The exposed remains lie on top of one of these ridges (Figure 1) which appears to have been modified for the purpose, a level terrace having been created at its higher end with the spoil from the cut used to make a platform in front of this to the east. The site is close to Truckle Hill Roman Villa (Wiltshire Scheduled Monument 878) which lies approximately 100m up-slope to the south-west on the edge of the plateau forming Truckle Hill. This substantial villa was excavated in 1859-60 by G. Poulet Scrope (1862) although there is no evidence that he investigated any remains in the valley in which the recent discovery lies.



Figure 1:
The location of the exposed building, terraced into the steep east-facing slope of the narrow valley (viewed from the northwest).

The geology of the area consists of Acton Turville beds which are predominantly limestone with some alluvial cover on the valley floor (British Geological Survey 1970). However, the geological map notes evidence for landslip within the valley and

this is borne out by the topographic evidence noted above. Soils in the area are of the Elnton 1 association being shallow well drained brashy calcareous fine loamy soils developed over limestone (Soil Survey of England and Wales 1983). The weather was dry and sunny during the first two days of the survey. Prolonged showers occurred on the 23rd September but, perhaps owing to the well drained soils, the increased moisture had little effect on the earth resistance measurements recorded.

Method

During their rapid building recording, Wessex Archaeology left two semi-permanent markers, 30m apart, in the ground to the east of the excavated Roman structure to denote the location of their site grid. These were relocated and used as the baseline for the geophysical survey grid. This grid consisted of thirteen 30m by 30m squares although all were truncated by boundaries at the sides of the valley. It is depicted in Figure 2 superimposed on the Ordnance Survey (OS) map of the area at 1:2500 scale. Where possible, grid marker points were established using a Trimble kinematic differential global positioning system and the locations of Wessex Archaeology's markers were also measured in this way. However, the steeply sloping, wooded sides of the valley restricted satellite visibility and a number of marker positions had to be established via taped offsets. Subsequent processing of the GPS data revealed discrepancies between its calculated absolute positions and the Ordnance Survey mapping data for the area, so offsets to the boundary fences have been used to position the survey data on the OS map. For this reason, an error margin of +/-1m should be allowed for in the positioning of geophysical anomalies shown, especially in areas distant from the excavated remains.

An earth resistance survey covering 0.6ha was undertaken over the survey grid using a Geoscan RM15 earth resistance meter connected to a twin-electrode array with a 0.5m mobile electrode separation. Individual readings were recorded at 1.0m intervals on traverses 1.0m apart and the resulting data is shown as a greyscale image superimposed over the base OS mapping data in Figure 3. A trace plot of the raw data is shown at 1:1000 scale in Figure 4A together with a greyscale image in Figure 4B. Extreme values caused by poor electrical contact were removed using an adaptive thresholding 1m radius median filter (Scollar *et al.* 1990, p492) before further processing to produce the plots depicted in Figure 5. Figure 5A shows data after the application of a 1m radius edge-preserving smoothing algorithm to reduce the effect of measurement error caused by variations in contact resistance. Figure 5B shows the data after the application of a 1.5m 2nd derivative Gaussian steerable filter (Freeman and Adelson 1991) to accentuate linear features with widths around 1.5-2m. Both plots in Figure 4 are again at 1:1000 scale. False colour plots of the data after spike removal are presented in Figures 6A and 6B with different plotting parameters (upper and lower limits of the data range) selected to emphasize higher and lower resistance anomalies respectively.

Anomalies of interest detected during the earth resistance survey were also scanned with a Bartington 601B fluxgate gradiometer to investigate the possibility of associated magnetic anomalies. Such anomalies may indicate the presence of fired clay or ceramics or anthropogenically modified soil. However, the steep topography at the site precluded the recording of measured grids with the gradiometer. Where

relevant, results of the magnetometer scans are mentioned below but no graphical representations are presented.

Results

Earth resistance survey has responded well to subsurface features at the site and measurements vary across a wide range between 12 and 201 Ohms. The mean site resistance measurement is 45.44 Ohms with a standard deviation of 24.77 Ohms. However, correlation with the observed surface topography appears to be weak suggesting that the anomalies recorded are likely to reflect subsurface features. An interpretation plan of significant geophysical anomalies is presented in Figure 7 and numbers in square brackets below relate to annotations on this plan.

The most notable high resistance anomalies surround the excavated Roman building, particularly on its south and east sides. Here, measurements are consistently above 100 Ohms (often greater than 150 Ohms) and are almost certainly responses to buried masonry. However, even after directional filtering (Figure 5B) it is difficult to determine a clear ground plan, so it is probable that any surviving footings are overlain by significant quantities of rubble. Measurements indicate that the excavated structure is likely to extend a further ~5m to the south [1] and magnetometer scans over this area also produced a number of strong anomalies (~15-30nT) suggesting that furnaces for the building's heating system may have been located here. A further, smaller, extension to the building has apparently been detected to the east [2] along with two potential small, discrete masonry structures [3a and 3b]. A weaker earth resistance anomaly (50-70 Ohms) suggests a possible additional discrete structure to the north-west [4].

Immediately to the north, a weak linear low resistance anomaly [5a] runs in a north-easterly direction down the slope forming the south-west side of the valley, appearing to start at a point level with the apsidal end of the excavated structure. It is possible that this is a response to a drainage channel associated with the site's water supply. A pair of similar anomalies may be discerned on a parallel alignment some 45m up the valley to the north-west [5b] beginning at the western edge of the survey and running about half-way down the slope before disappearing. Between [5a] and [5b] a number of fainter linear anomalies have been detected, both positive and negative. Most prominent is the positive anomaly running south-west to north-east at [6]. The surface topography in this area consists of an approximately circular depression between two ridges sloping downwards from the western side of the valley. Hence, despite there being no clear indications of additional Roman structures here, evidence for some form of contemporary landscaping may be present.

At the northern end of the valley lies a mound similar to that on which the excavated Roman remains are situated but smaller in size. Very high earth resistance readings (often significantly greater than 100 Ohms) have been detected on its eastern side [7] similar to those surrounding the known structure. Thus, it is likely that an additional Roman building measuring perhaps 6m by 15m is situated here. Again, high-pass linear filtering has failed to reveal a definite plan, suggesting that quantities of loose rubble may overly any surviving wall footings. Magnetic scans made in this area revealed a number of discrete anomalies ranging from 15-40nT, possibly suggestive of anthropogenic activity. A depression in the surface topography visible on the top of

the mound immediately west of [7] might suggest the presence of an associated landscape feature.

A broad (~4-5m wide) linear low resistance anomaly [8] with resistance values typically between 20 to 30 Ohms may be discerned intermittently along the length of the valley. In places it is flanked by two linear high resistance anomalies (typically 50-60 Ohms; [9]) and the three anomalies appear to run along the valley floor, immediately east of the base of the mound upon which the excavated Roman structure lies. They may also run to the immediate east of the northern mound at [7] and, as they do not appear to exactly coincide with the line of the modern vehicle track along the valley floor, they might be associated with an earlier, possibly Roman, route. However, as these anomalies run parallel to the valley floor, it is also possible that they have a geomorphological cause.

Several other anomalies have been marked on Figure 5 in addition to those discussed above. It is possible that these also indicate the presence of further Roman remains but their cause is less certain and the associated variations in soil moisture may be due to the proximity of animal burrows or the transpiration of nearby trees.

Conclusions

The earth resistance survey has been successful in detecting probable further Roman remains at Truckle Hill and the site of at least one potential additional structure has been located as well as evidence suggestive of landscaping and a possible road running along the base of the valley. It appears that the entire head of the valley may have formed a managed landscape in Roman times, perhaps similar in character to the nearby site at Nettleton (Wedlake 1982) about 1.5km to the north-west, albeit on a smaller scale.

A primary objective of the geophysical survey was to locate areas where the probability of encountering further Roman remains is low, as there is a requirement to quarry spoil from a position near the excavated remains to cover and thus protect them over the winter months. Two possible areas have been indicated in Figure 8. At the southern edge of the geophysical survey area the ground rises up onto a large ridge that slopes down from the south-western edge of the valley (location A in Figure 6). The earth resistance survey has not located any distinct anomalies in this area and there are no measurements of a magnitude suggestive of buried masonry. To the north, at location B in Figure 6, a smaller ridge slopes down into the valley on a similar alignment. Evidence for buried masonry in this area is again absent, although there is some indication of one or more possible ditch-type anomalies in the vicinity. Nevertheless, the geophysical evidence does not suggest the presence of any substantial Roman remains. As geophysical methods are never 100% successful in detecting buried archaeological features, it is suggested that test pits be opened in one or both of these areas as a final check before extracting spoil from either of them.

Surveyed by: P Linford
A Payne

Date of survey: 21-23/09/2005

Reported by: P Linford
A Payne

Date of report: 28/09/2005

Geophysics Team,
English Heritage.

List of enclosed figures

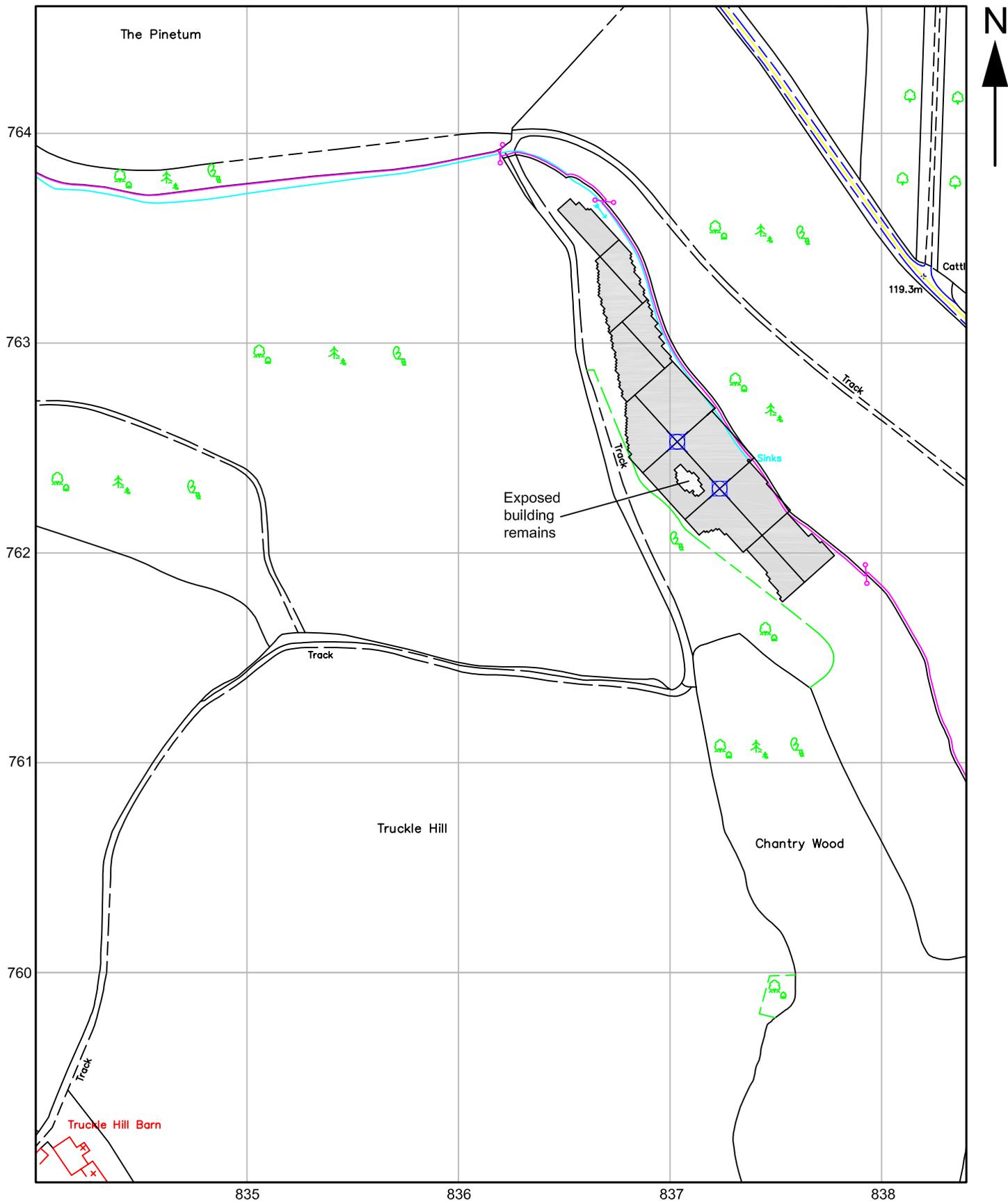
- Figure 1* Photograph of the Roman remains at Truckle Hill with earth resistance survey in progress.
- Figure 2* Location of the geophysical surveys superimposed over the base OS map (1:2500).
- Figure 3* Linear greyscale image of the earth resistance data superimposed over the base OS map (1:1250).
- Figure 4* (A) Trace plot and (B) linear greyscale plot of the earth resistance data (1:1000).
- Figure 5* Linear greyscale plots of the earth resistance data after application of (A) an edge preserving smoothing filter and (B) a 1.5m steerable filter (1:1000).
- Figure 6* False-colour plots of the earth resistance data after removal of outlying values (spikes) in the data range (1:1000)
- Figure 7* Graphical summary of significant earth resistance anomalies superimposed over the base OS map (1:1250).
- Figure 8* Suggested areas for test quarrying indicated on a linear greyscale image of the earth resistance survey (1:1250).

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TRUCKLE HILL, NORTH WRAXALL, WILTSHIRE

Figure 2 : Location of Earth Resistance Survey, September 2005



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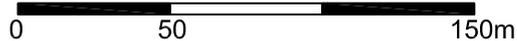


GEOPHYSICAL SURVEY AREA

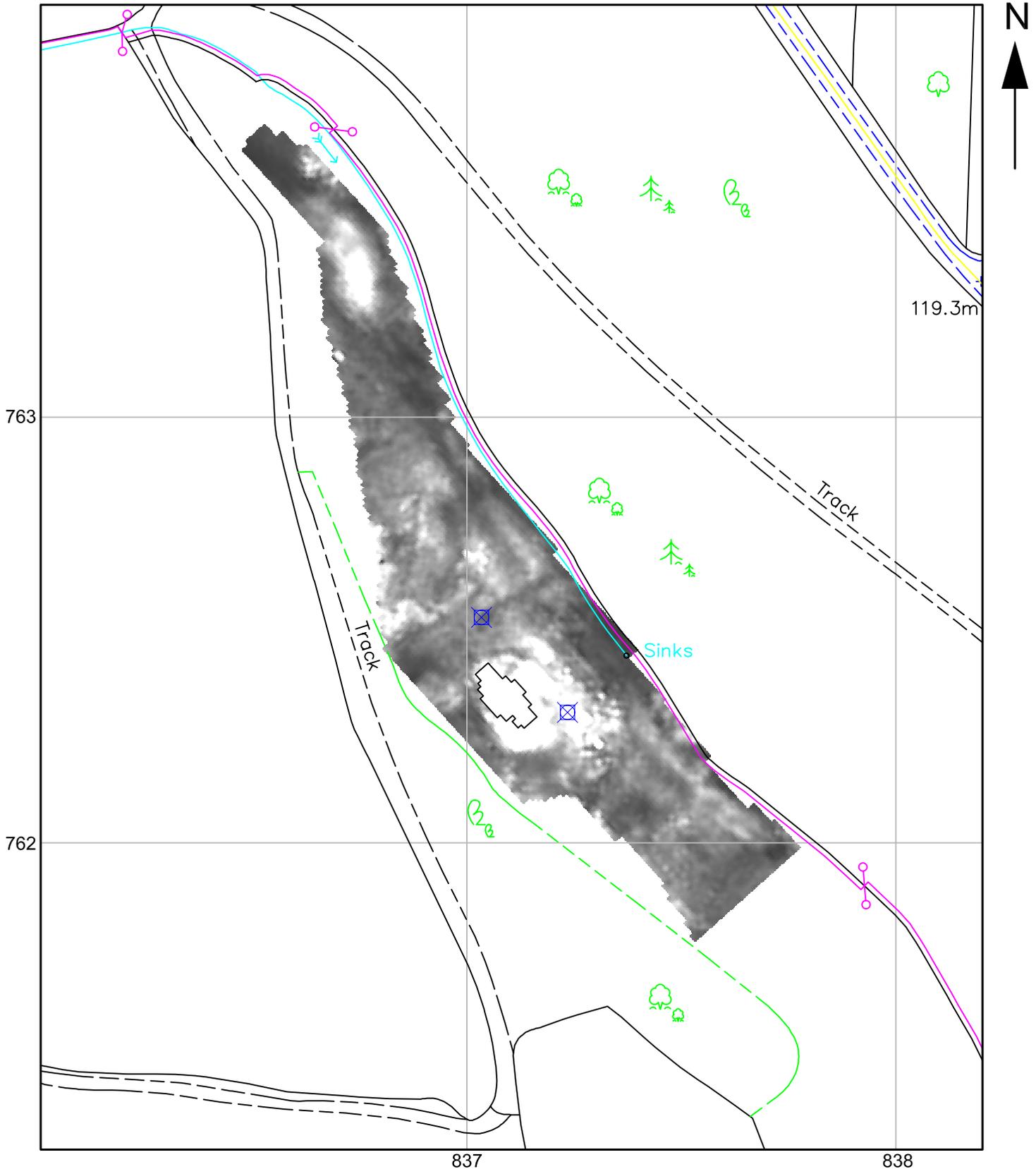


WESSEX ARCHAEOLOGY GROUNDMARKS

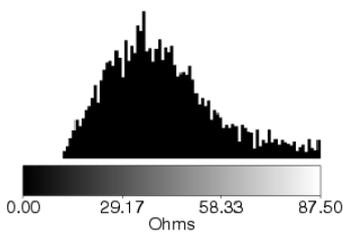
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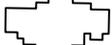


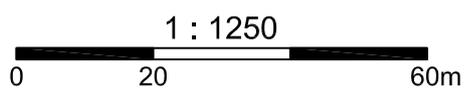
TRUCKLE HILL, WILTSHIRE, Earth Resistance Survey, Sept 2005
 Figure 3 : Linear greyscale plot of raw data on base OS mapping



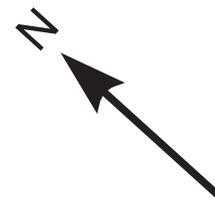
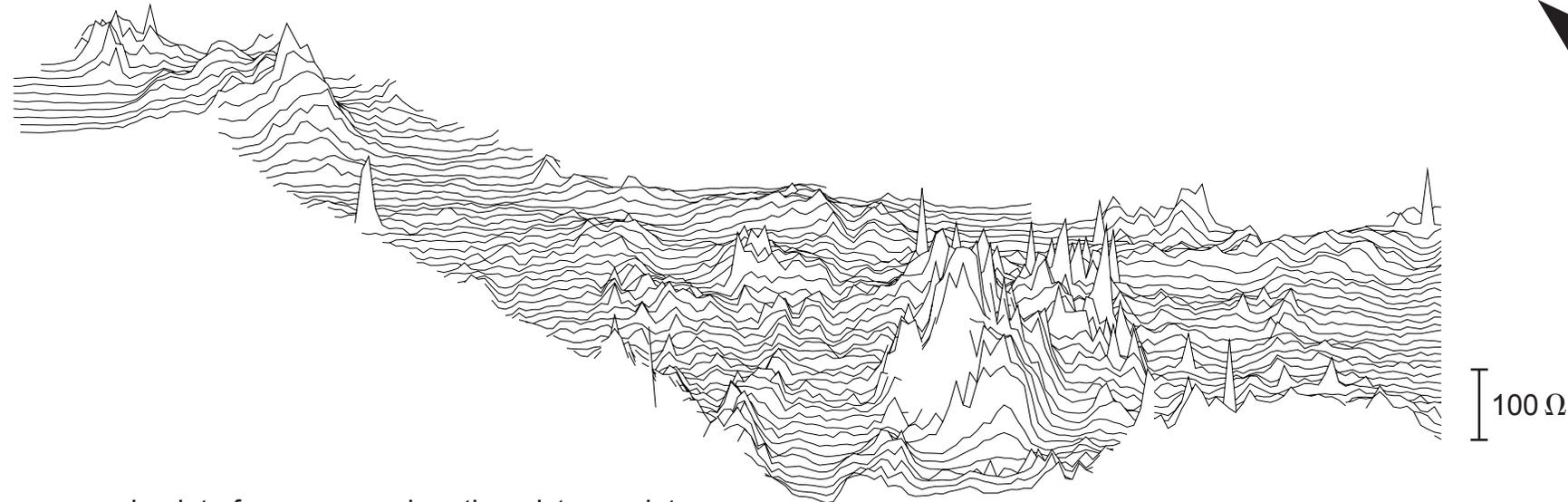
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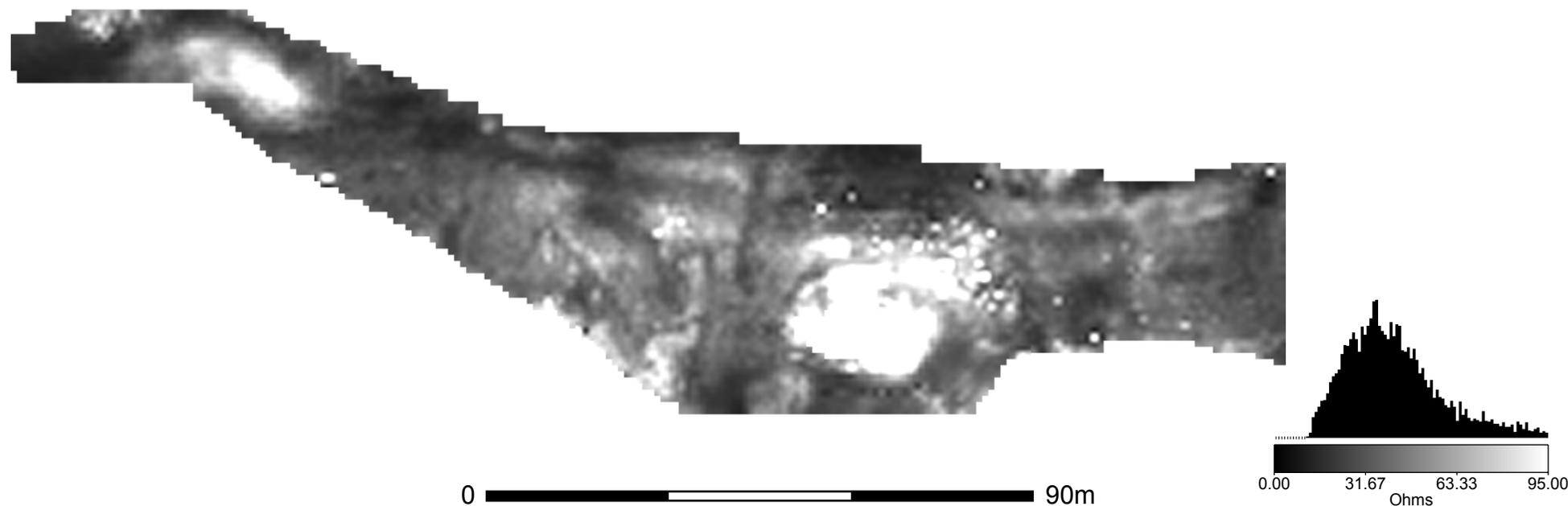
-  Wessex Archaeology groundmarks
-  area of exposed Roman building



A) Traceplot of unprocessed earth resistance data (hidden lines removed)



B) Linear greyscale plot of unprocessed earth resistance data

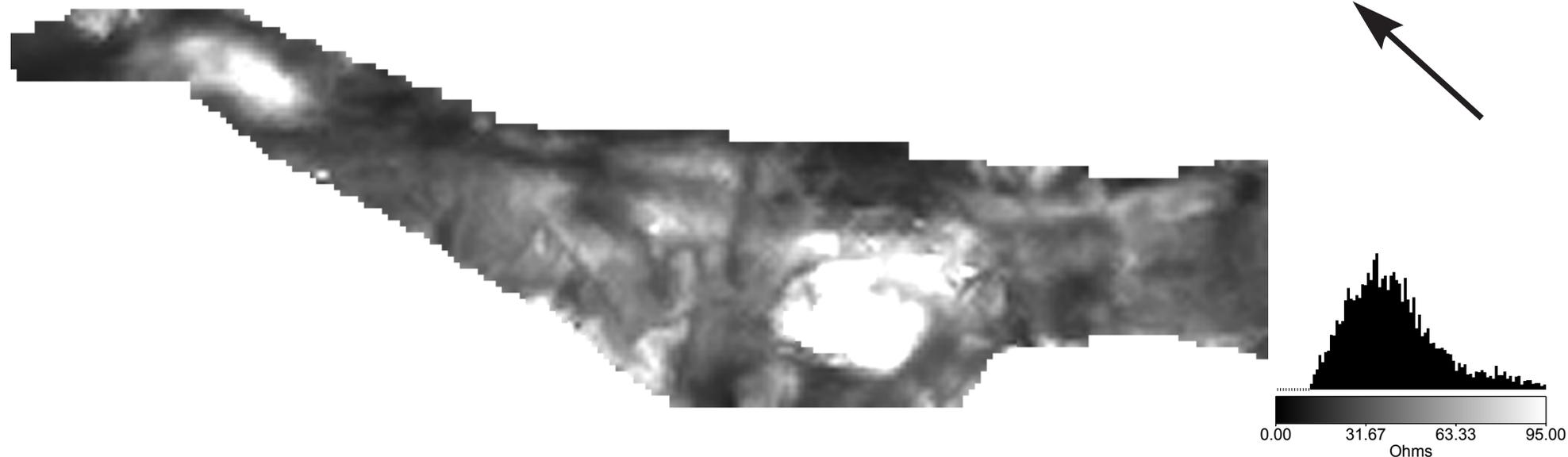


0 90m

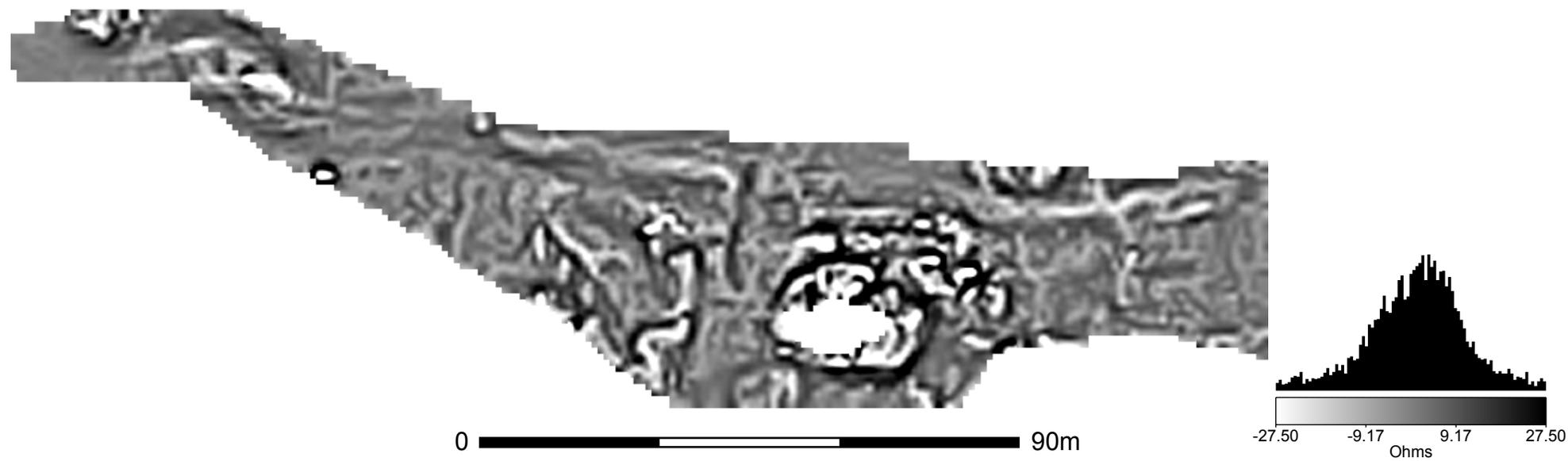
1:1000

0.00 31.67 63.33 95.00
Ohms

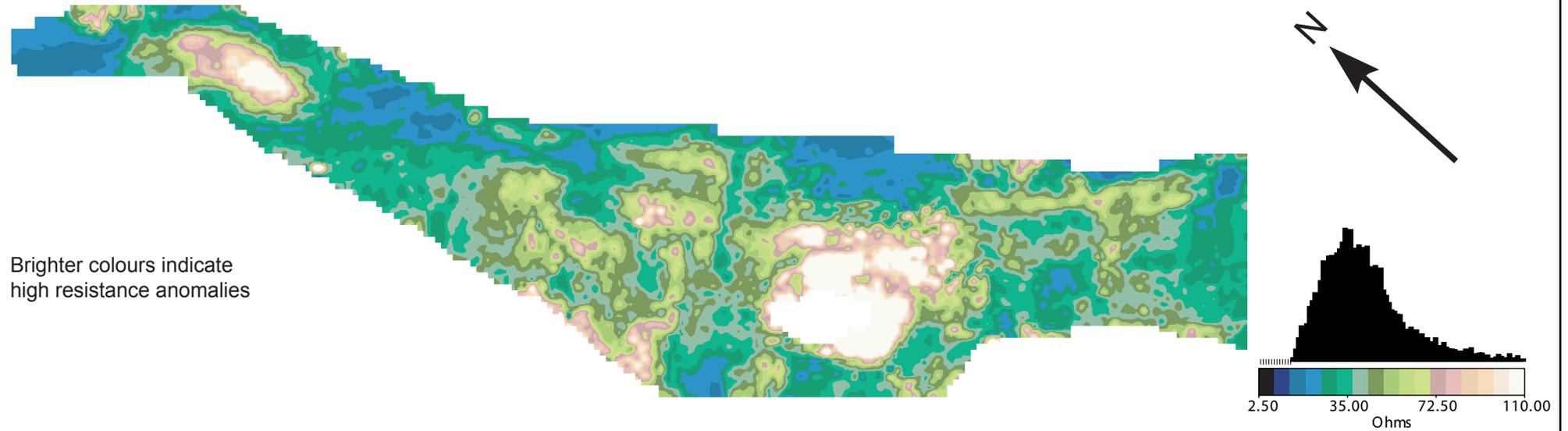
A) Linear greyscale plot of data after spike removal and smoothing with 1m edge-preserving low-pass filter



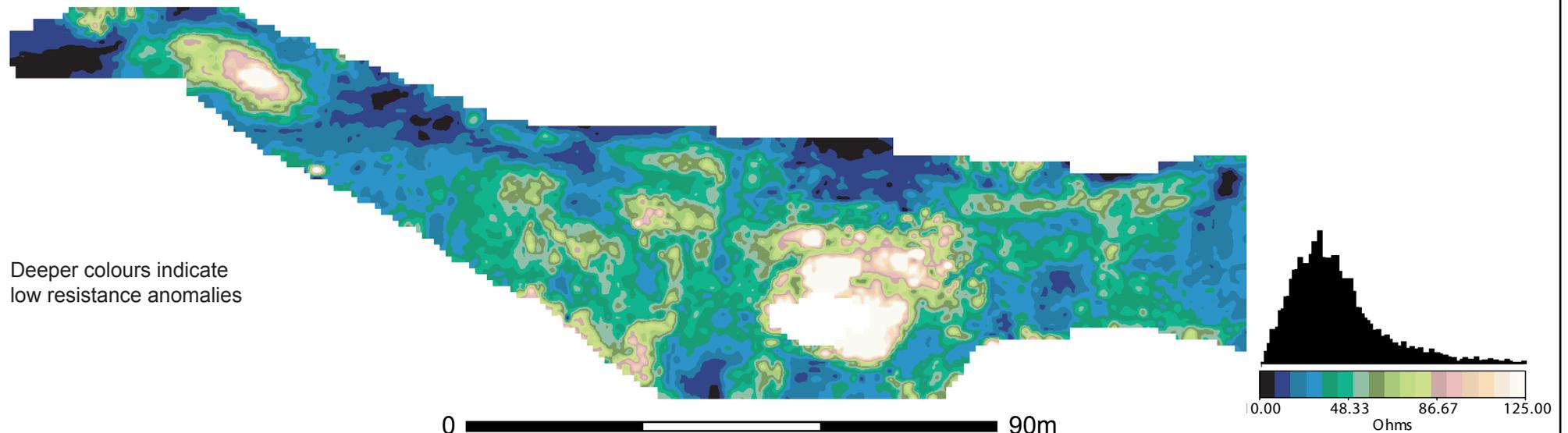
B) Linear greyscale plot of data after high-pass filtering with 1.5m 2nd derivative gaussian steerable filter



A) Linear false colour image of data after spike removal with plotting parameters selected to emphasize higher resistance anomalies

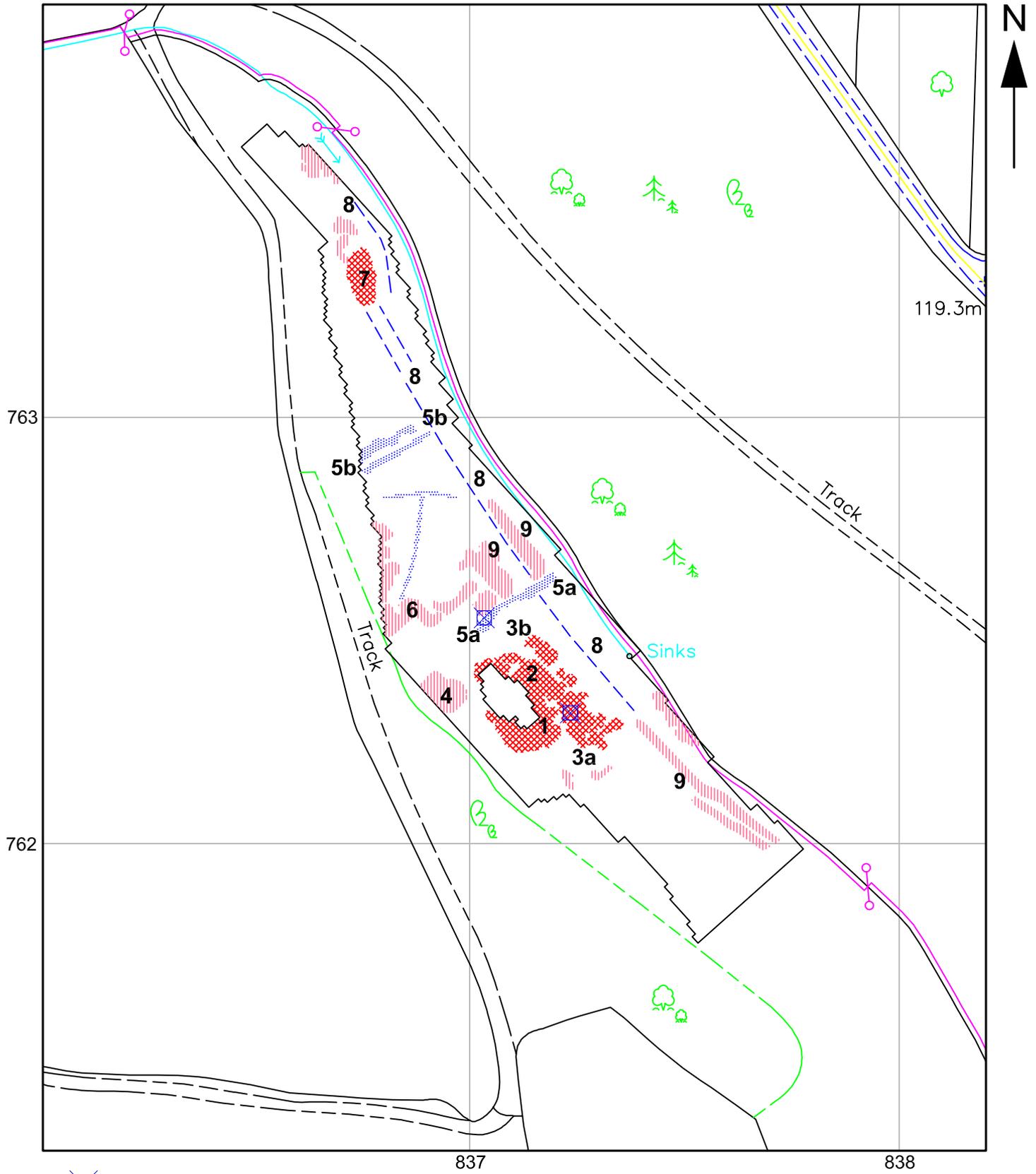


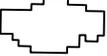
B) Linear false colour image of data after spike removal with plotting parameters selected to give greater emphasis to lower resistance anomalies



TRUCKLE HILL, NORTH WRAXALL, WILTSHIRE

Figure 7 : Interpretation of earth resistance data

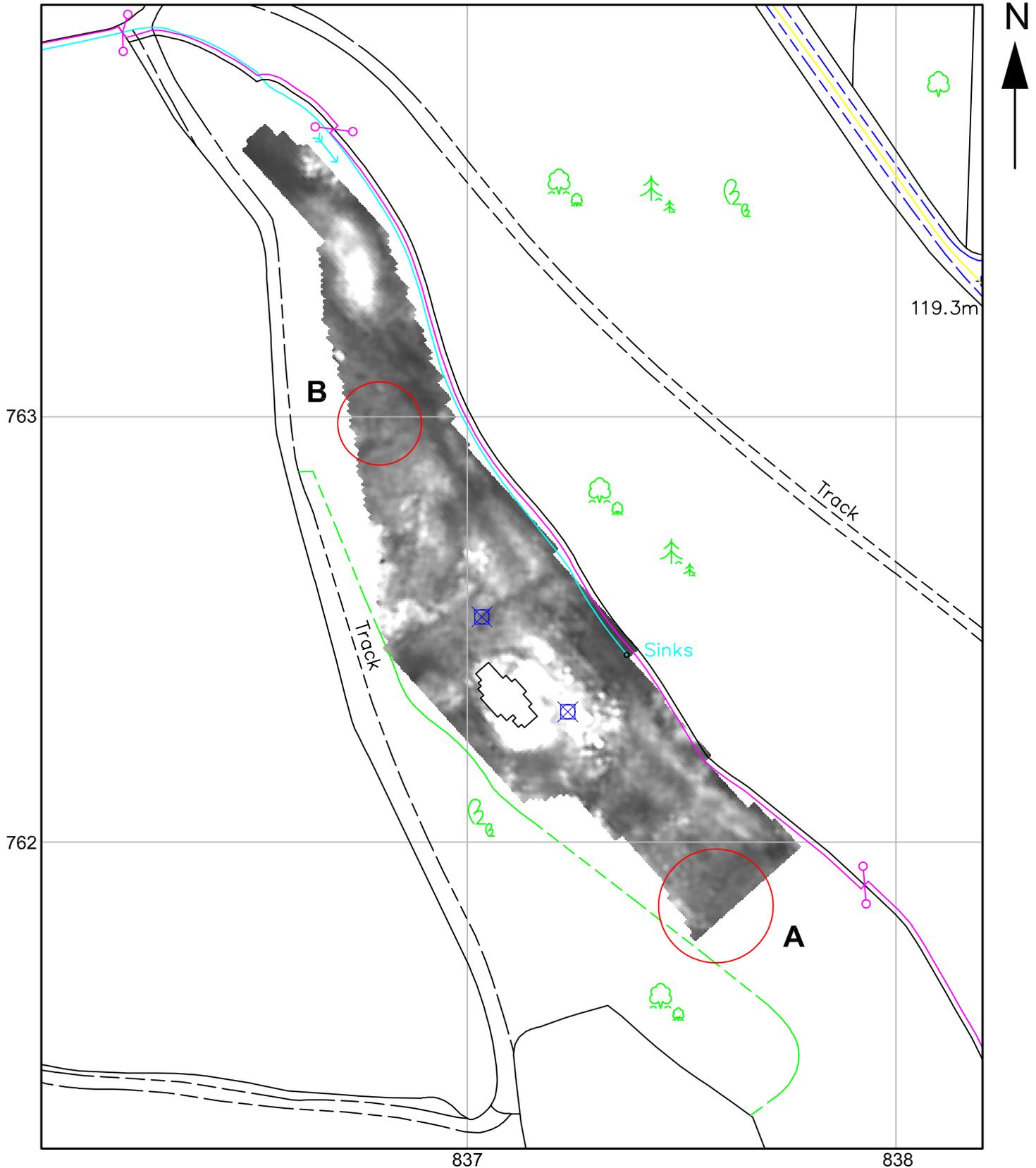


-  Wessex Archaeology groundmarks
-  area of exposed Roman building
-  pronounced high resistance areas - building rubble/buried walls
-  areas of moderately high resistance - possible building remains and road features
-  linear low resistance anomalies running downslope - ditches/drainage features
-  linear low resistance anomalies running along valley bottom - ?trackway

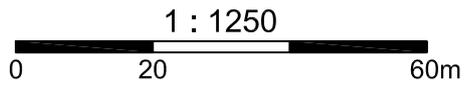
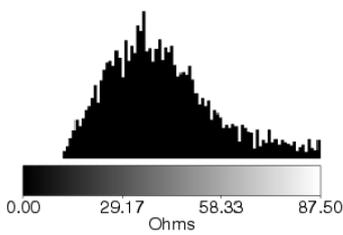
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TRUCKLE HILL, WILTSHIRE, Earth Resistance Survey, Sept 2005
 Figure 8 : Suggested quarrying areas.



-  Wessex Archaeology groundmarks
-  area of exposed Roman building
-  area of limited archaeological evidence suggested for quarrying



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