Appendix 2

REPORT ON A GEOPHYSICAL SURVEY AT ROBERT MILES JUNIOR SCHOOL

SUMMARY

A geophysical survey was undertaken by Grantham Archaeology Group (GAG) within the grounds of the Robert Miles Junior School, Bingham prior to the excavation. A preliminary visit and evaluation took place on 11th June followed by an earth resistance survey of an area measuring 20 metres square centred on the test pit but extending to around 30 metres long the western side of the area on 3rd July.
The results were used to inform and assist with an excavation strategy planned by the Bingham Heritage Trails Association (BHTA).

There are many high resistance amorphous anomalies present in the dataset which are likely to be the result of near-surface geomorphological variations, buried services, landscaping, tree roots and their associated de-watering. Overall, however, the survey failed to reveal any potentially archaeologically significant anomalies.

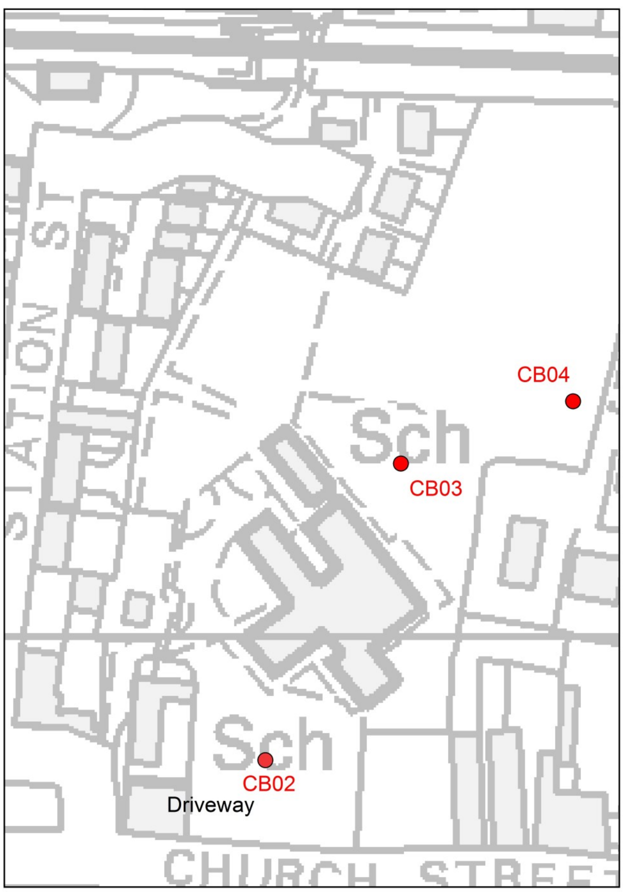

Fig 1. Showing a map of the school site and the locations of the three test pits dug in the grounds. CB02, is the pit around which the larger excavation was sited.

1. Introduction

As part of the BHTA project "The Roots and Development of Bingham" funded by the HLF, GAG carried out an earth resistance survey in the grounds of Robert Miles Junior School, Bingham, Nottinghamshire. The survey was in support of a proposed excavation of 4 x 7 metres around the site of a 1-metre test pit dug in May 2012 and the purpose of the survey was to help site the larger excavation.

Figure 1 shows the location of the test pit in the school grounds.

The site works and reporting conform where practical, to current national guidelines, as set out in the Institute for Archaeologists '*Standards and guidance for archaeological evaluations*' (IfA 2001) and the English Heritage document '*Geophysical Survey in Archaeological Field Evaluation*' (English Heritage 2008).

2. Site location and description

The site comprises of a small sub-rectangular area of land south the of the main school buildings. It is laid to rough grass with mature and young trees surrounding it. Grid positions indicate a service pipeline to the west of the area .

3. Planning background

The works lie outside the normal UK planning system.

4. Methodology

4.1 A Level II Evaluation survey using earth resistance was chosen as the most appropriate type of survey for the sites. Although there can be no preferred recommendation of which technique to use until the merits of the individual site have been assessed, magnetometer survey should usually be the prime consideration (English Heritage 2008). On this occasion earth resistance was deemed the most suitable for a rapid assessment of the site, as the close proximity of the school buildings would have interfered too much with magnetometer data.

4.2 The response of the local geology to resistance surveying is difficult to quantify as there are many variables that can affect the survey although generally they respond reasonably well (Clark, A 1990, Gaffney and Gater 2003).

4.3 Although the geology of the area is common such information can be of limited use when investigating urban sites. The adverse effects of landscaping, buried services, introduced materials, terracing and the consolidation of ground can be considerable on the results.

4.4 The basis of earth resistance surveying is that electric currents are fed into the ground and the resistance to the flow of these currents is measured. Where they 'meet' buried wall foundations high resistance readings are (usually) recorded, while if silted-up ditches (which tend to be wetter than the surroundings) are encountered, low resistance readings ensue. By mapping zones of high and low resistance it is possible to identify, for example, the layout of buildings or the size and orientation of a ditched enclosure. The interpretation of resistance data is more difficult than magnetic data as there are more variables that can alter the moisture in the ground, which can in turn alter how features respond to resistance surveying.

4.5 The basic concept of how certain high or low resistance features respond to a resistance survey are reasonably simple, for example walls, rubble spreads, trackways and made up surfaces usually respond as high resistance anomalies. Low resistance anomalies can be caused by features such as silted up ditches, pits, drains and gullies. However, as the responses rely on moisture content in the ground they vary with the seasons, so optimum conditions for a resistance survey are difficult to predict. It should be noted that geomorphological features can give both high and low responses. The variations in the general background resistance values during a survey will tend to reflect the underlying geology and soils (Scollar et all, 1990), so prior knowledge of the type of geology can be as important as the seasonal timing of the survey.

5. Summary of survey parameters

5.1 Instruments and method

Instrument:	TR Systems Earth Resistance Meter
Sample interval:	1.0 m
Traverse interval:	1.0 m
Traverse separation:	1.0 m
Traverse method:	Zigzag
Electrode spacing:	Standard 0.5 m twin electrode array

Processing software:	TR Systems ‘Resistivity’ processing software
Surface conditions:	Rough grass
Area surveyed:	623 sq.m
Surveyors	Grantham Archaeology Group
Data interpretation:	David Charles Hibbitt AIfA
Date of survey:	3rd July 2013

5.2 Data collection and processing

5.2.1 The site was marked out in accordance with the GAG document *General Procedures for Geophysical Survey*. A baseline was established along one edge of the site which resulted in survey grids aligned broadly North-South. Data was collected by making successive parallel traverses across each grid in a zigzag pattern. Several key points of the survey grids were tied in by BHTA members to wooden pegs and the location of these were recorded also by BHTA members.

5.2.2 The earth resistance survey was carried out using a TR Systems Earth Resistance Meter using the standard 0.5 m electrode array and an on-board automatic data logger.

5.2.3 The data collected from the survey has been analysed using the current version of TR Systems ‘Resistivity’ software. The resulting data set plots are presented with high resistance values as black and low resistance values as white.

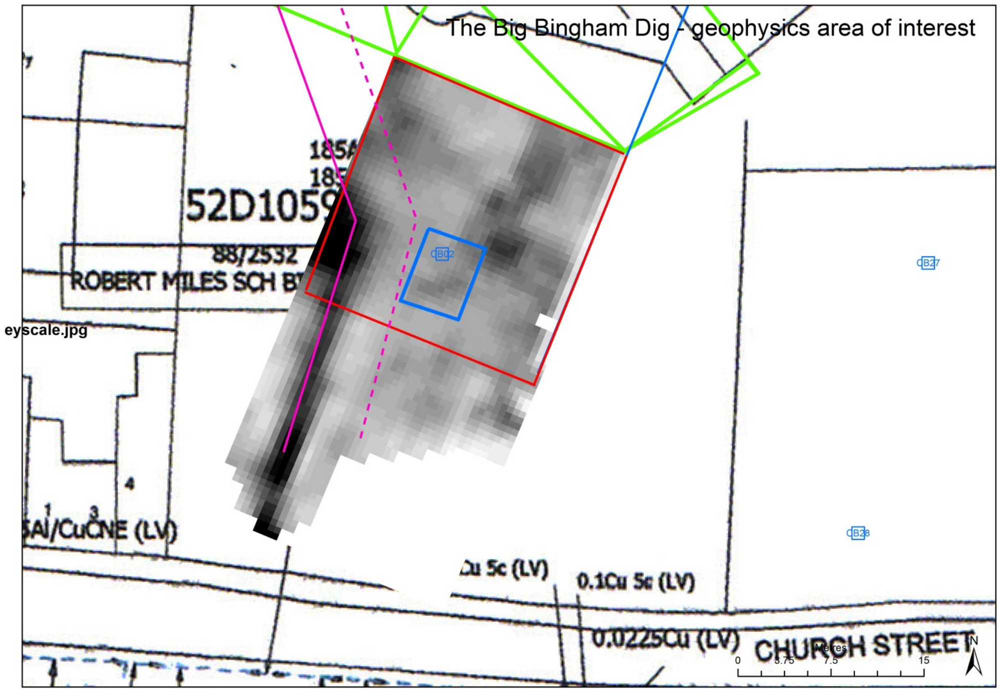

Fig 2. Showing the area surveyed and survey details. The area outlined in blue is the proposed target area for the dig. The area outlined in red is the original 20 x 20 metre survey area, but which was extended to the south. The solid magenta line to the west is the track of buried services and the magenta broken line marks the 5-metre limit within which excavations should not take place.
The resistance is measured in ohms (see the scale): dark is high, light is low. The main feature shown is the pipeline. The relatively high resistance area in the southern half of the area outlined in blue was not interpreted as significant at the time of the survey, but appears to indicate the rubble track that was laid by the contractors and was revealed in the excavation.

The earth resistance data has been subjected to processing using the following filters:

Clipping
Interpolation

5.2.4 Plots of the data are presented in raw linear greyscale and processed linear greyscale with any corrections to the measured values or filtering processes noted, and as a separate (English Heritage 2008) simplified graphical interpretation of the main anomalies detected.

6. Results

Unfortunately the site has not responded particularly well to earth resistance surveying. No potentially archaeologically significant anomalies have been identified. Several areas of high contact resistance and interference from buried services have produced spurious anomalies. Thus, little can be said about this area based on the geophysical results.

Figure 2 shows the geophysical results.

7. Conclusions

It is disappointing that the survey failed to reveal any potentially archaeologically significant anomalies. However, this is not entirely unexpected, given the location and the potential for considerable extraneous interference. Therefore the survey supplied little additional information to the project.

9. References

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