# Resistance Survey at Torpel Manor Field, July 2014

**Helen Goodchild, Aleks McClain and Steven P Ashby**

## Summary

This report outlines a geophysical survey of the medieval settlement site of 'Torpel Manor' in Bainton CP, in the City of Peterborough. The work was conducted as part of a programme of archaeological research being undertaken on the site of Torpel Manor Field, Bainton, Cambs, led by the authors.

## Project background

The site consists of a single field presently under pasture, and measuring roughly 3.4ha in area, centred at TF11140540 (fig 1). Its boundaries consist of fencing and hedges with some sections of rubble stone banks beneath. The site is bounded to the east by King Street (the B1443, and a former Roman road). Land to the north, south and west is under cultivation, while to the immediate north the site is bounded by a metalled paddock area, on which the newly constructed Interpretation Centre now stands.

Earthwork preservation in the survey area itself is very high, with a relatively low level of modern interference or agricultural improvement, other than a small paddocked area at the north end of the field. This contrasts with the situation in all surrounding fields, which have been levelled by agricultural improvement (Fradley et al. 2013). The local geology consists predominantly of limestone of the Cornbrash Formation, with a small intrusion of the Kellaways Clay Member in the south-east corner of the field (British Geological Survey 2014).


Figure 1. Location of the survey area showing bedrock geology (British Geological Survey 2014, Ordnance Survey 2014). Contains Ordnance Survey data © Crown copyright and database right 2014.

## Previous Work and Findings

As the site had not previously been subject to any substantive level of research, an analytical earthwork survey was conducted in November 2012 (Fradley *et al.* 2013). This survey allowed us to better characterise the topography of the site, to construct a tentative three-phase chronology for the features recorded, and to inform the planning of future work, including geophysical investigation on the site, and wider landscape survey (fieldwalking and test-pitting) beyond the scheduled area. In August 2013, we undertook a fluxgate gradiometry survey on the site (Goodchild et al. 2014), which identified a number of linear anomalies, often associated with upstanding earthworks, as well as a number of more irregular patterns that were difficult to interpret in isolation. This survey also allowed us to isolate particular areas of the site as potential targets for future electrical resistance survey.

Neither of these surveys provided clear evidence for the remains of the historically-attested Torpel House, a lost postmedieval structure for which the field under survey was considered a possible location. It was recommended that resistance survey, which would identify structural features more clearly than gradiometry, be targeted on key areas (particularly the potential structure(s) on the mound), in order to establish any surviving building layouts. The areas targeted for resistance survey are highlighted in fig 2.

## Objectives

The objectives of the survey were to build on the earthwork and fluxgate gradiometry surveys, and in detail:

- To determine whether linear earthwork features conceal subterranean wall footings
- To clarify the complex organisation of earthworks to the north of the mound (Area A)
- To clarify the pattern of settlement and activity on the mound in the south-east of the field (Area B).
- To investigate the possibility that the remains of the post-medieval Torpel House are to be found on the field.

## Methods

Based on the results of topographic and fluxgate gradiometry survey (Fradley et al.2013; Goodchild et al. 2014), photographic evidence (Google Earth), and knowledge of analogous sites, it seemed likely that ditches and pits, and the remains of walls and hearths might be preserved below the ground surface. Given the success of the fluxgate gradiometry survey in characterising the subsoil archaeology of visible earthworks, but its failure to identify new features in topographically uniform areas of the site, it was decided to undertake electrical resistance survey on targeted areas of the site.

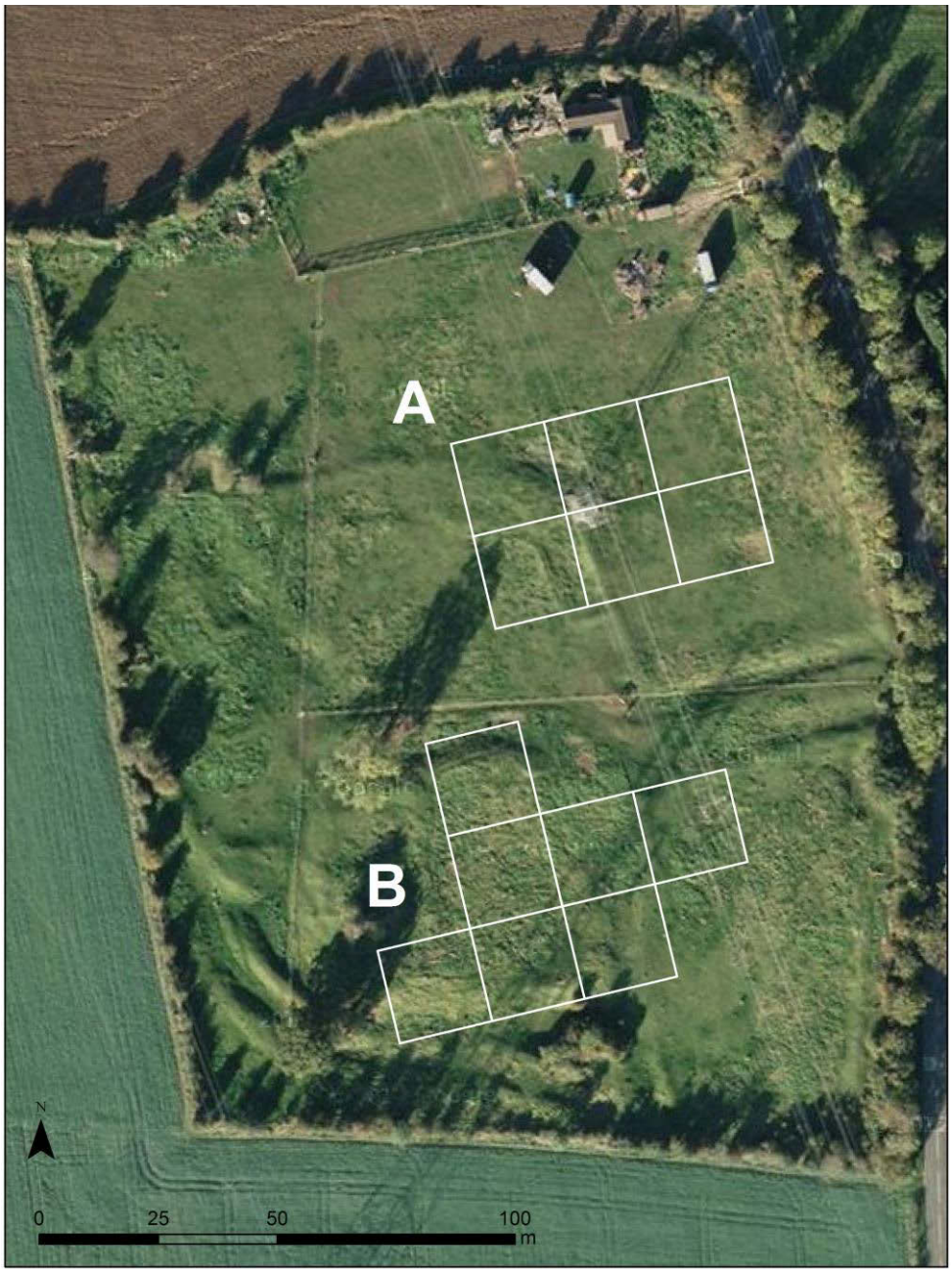


Figure 2. Areas highlighted for targeted resistance survey (satellite imagery from *Google Earth*; data overlay by Helen Goodchild).

The electrical resistance survey was undertaken over two days in July 2014, using a Geoscan RM85 Resistance Meter. The survey covered approximately ½ a hectare of the field, utilising grids of 20x20m at a resolution of 1x0.5m samples, and data was collected in a zig-zag traverse scheme. The results were processed in the Geoplot software package and basic processing functions were applied as in Table 1.

| | |
|---|---|
| Clipping | Clipping improves data display and statistical calculations by removing outlying high or low values from strong ferrous responses. |
| Despike | Despiking locates and removes random spurious readings in resistance data, or iron spikes in gradiometry data, and replaces with the mean of surrounding pixels. |
| Interpolation | Interpolation can also be used to give a smoother appearance to the data and can improve the visibility of larger, weak archaeological features. However, it does this at the expense of increasing the number of data points and is purely a cosmetic change |
| High pass filter | High pass filtering helps to remove geological background, by filtering out the stronger, large scale, gradual changes in value across the site. |
| Low pass filter | Low pass filtering can help to enhance archaeological responses by emphasising small scale changes in the data, reducing local variability, and smoothing the results. |

**Table 1. Processes applied to the geophysical data (after Geoscan Research, 2005)**

The work was undertaken by a team from the Department of Archaeology, University of York, comprising Helen Goodchild, Steve Ashby and Aleks McClain. The project was directed by Ashby and McClain, with the survey designed by Goodchild and Ashby, and undertaken by Goodchild, Ashby, and McClain, with the assistance of a small number of trained volunteers. Results were processed and interpreted by Goodchild. The report was prepared by Ashby, McClain, and Goodchild. Unless otherwise stated, all illustrations are by Goodchild.

All surveys undertaken as part of the Torpel Manor Archaeological Research Project have been undertaken in accordance with English Heritage guidelines (David et al.

2008). The data have been archived locally and on central University servers, which are protected by systematic tape back-up.

## Results

Resistance dataplots are presented in fig 3, and interpreted in fig 4. The two areas surveyed are discussed in turn below.

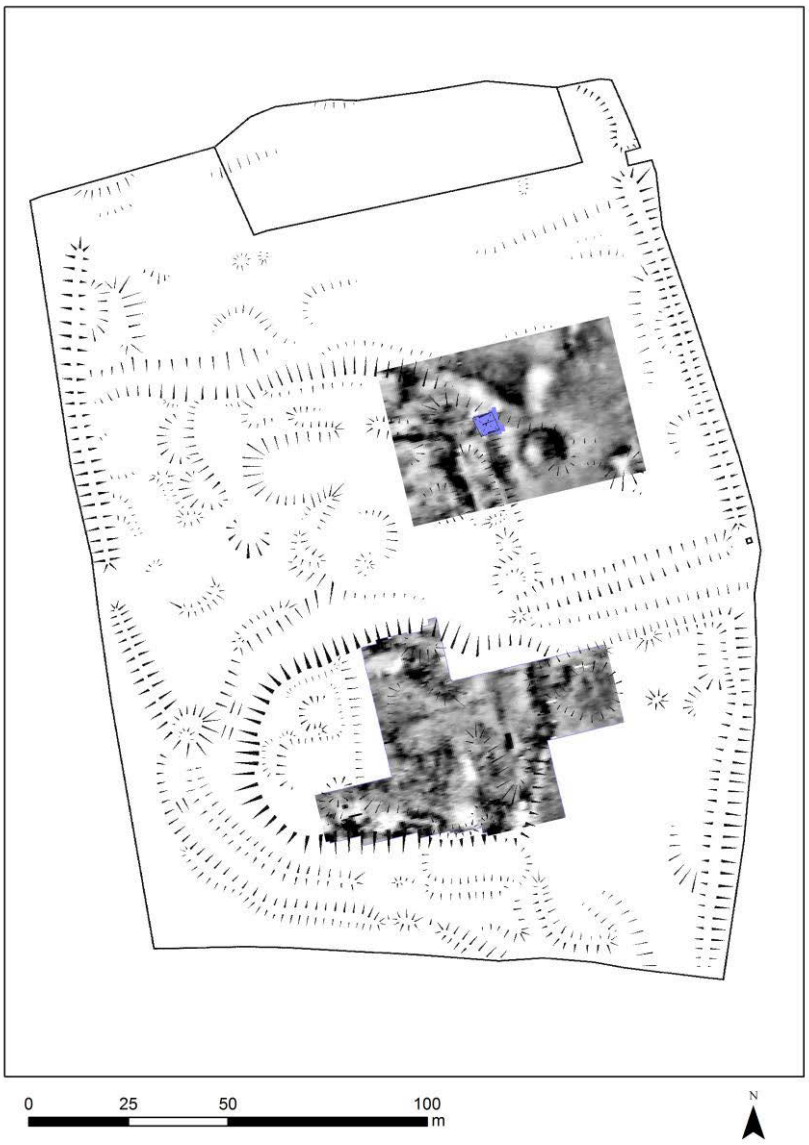


**Figure 3 Electrical resistance dataplots and topographic survey data (Goodchild, after Fradley et al. 2013)**

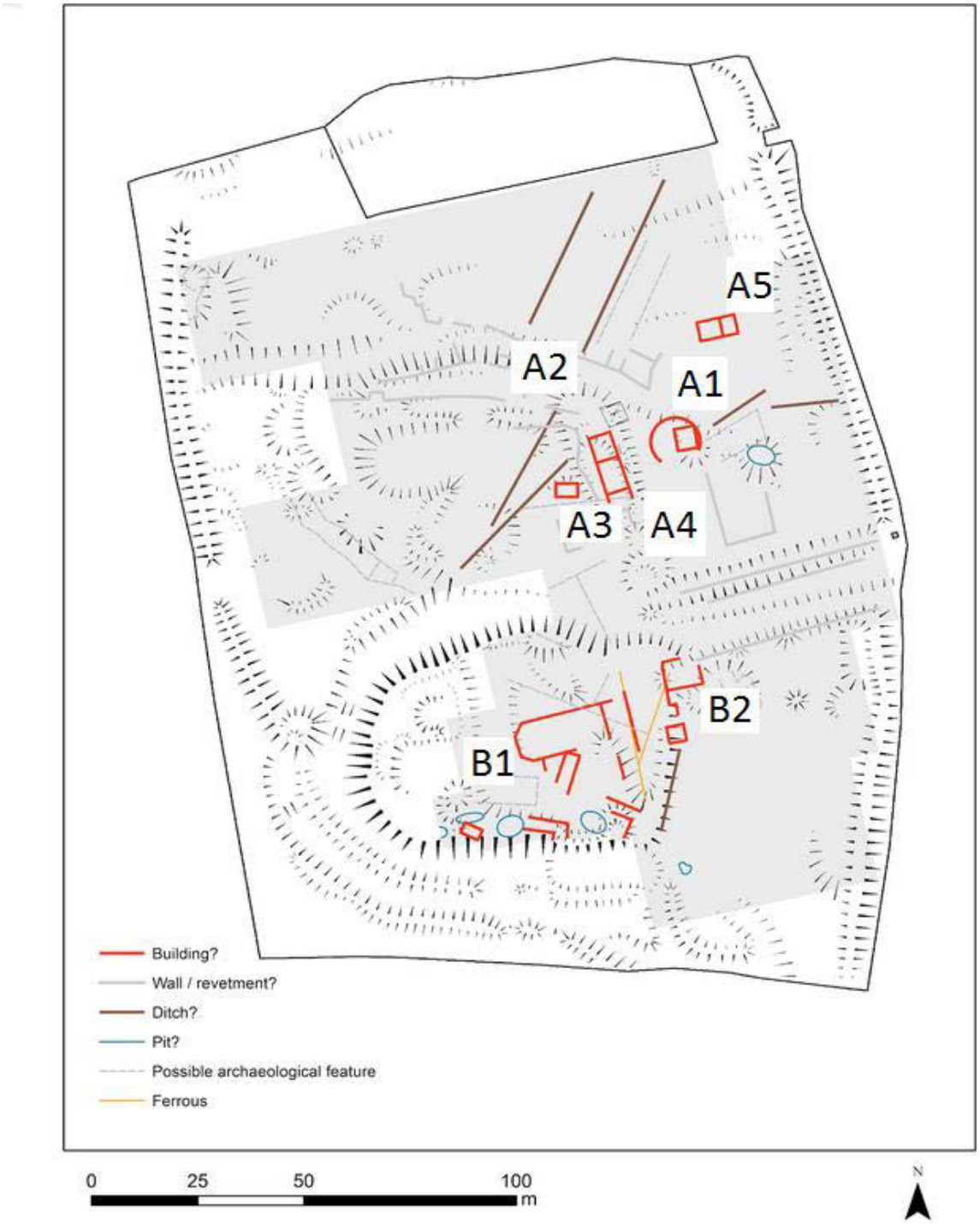


**Figure 4 Interim Interpretation of electrical resistance survey (Goodchild, after Fradley et al. 2013)**

## Area A (North)

In Area A, we noted the following features:

**A1: A sub-circular, high-resistance anomaly, encircling further internal high and low resistance anomalies.**

This large, subcircular feature (11.5m diameter), appears to consist of a band of high-resistance material, with a c. 5m-wide internal feature on its eastern side. This latter feature corresponds with a visible depression in the land surface, but the remainder of the anomaly is not apparent as a topographically-visible feature. Indeed, from the surface section of the field it appears rather unpromising, and the results come as something of a surprise.

The feature is somewhat enigmatic, and further survey may help to contextualise the feature; otherwise small-scale trial excavation may help to resolve the question (noting that the site is scheduled, with many other areas of the field being characterised by excellent earthwork preservation).

### A2: A linear high resistance feature, running NW-SE, to the north of the pylon.

This feature appears to correspond to a topographically-visible ridge, and suggests the presence of wall-bases underlying the surface. A parallel low resistance band immediately on its south side is certainly related, and may indicate the presence of associated cut features (most likely a wall- or robber-trench).

The positive anomaly appears to have an opposing NE-SW counterpart. This is not evidenced in the earthworks, but both features are likely to indicate the subterranean survival of further archaeological features.

### A3: An Irregular, rectilinear high-resistance anomaly

This feature lies to the west of pylon, and is marked by a very large spike in resistance

measurement. To its west lie a number of low resistance phenomena, some of which appear to correspond with visible earthworks.

### A4: Cellular features close to the pylon

The area of the 'barn' encloses a number of low resistance anomalies, suggesting the survival of a cellular structure, perhaps preserved as robbed out walls.

### A5: A high resistance feature in the north-east of Area A.

This may be a celled structure, and it does not correspond with any previously identified earthworks. At its centre is a low-resistance spot, which correlates with a magnetic hotspot identified in the gradiometry survey. This may preserve a feature such as a midden.

Most of the anomalies lie in the north and west of Area A, with the area in the east being characterised by relatively few signs of past activity. The majority of the anomalies are irregular, but tend to follow patterns, and map well on to existing earthwork and gradiometry data. They may indicate disturbance, perhaps piles of displaced material, and it is notable that the complementary nature of the three surveys is well featured here.

## Area B (South)

### B1: Irregular Pattern of Anomalies on East-side of Mound

The resistance dataplot for Area B is dominated by a single cluster of anomalies. These anomalies seem to relate to a complex, irregular feature or features, presumably comprising building foundations. Close analysis of these anomalies allows us to isolate two clusters of possible structures, based on their alignments. This may represent a phased development.

### Group 1

One group of features is oriented WSW-ENE. It is dominated by a large (at least 20m long) rectilinear feature. Its function may be revealed via context (further resistance

survey of its environs) and comparison with contemporaneous sites, but this is the first evidence for a structure of significant size on the mound.

### Group 2

The other group of features is oriented NNE-SSW. This group lies at 90 degrees to the trackway that traverses the site, connecting the mound with the Roman road. The group also incorporates an L-shaped high-resistance feature on the south-side of the mound, which extends northwards into a round area of low resistance; it is possible that this is some form of water management feature. Three other, rather amorphous low resistance features are associated with this feature. Some align with the bank on the southern edge of the mound.

### B2: Other Features

One might also note a striking and unusual oriented feature in the north of Area B. This feature lies off the main mound on the site, and is broadly cruciform in morphology, though appears to be made up of four juxtaposed, broadly L-shaped high-resistance anomalies. The feature may be reflective of a single, cross-shaped low resistance anomaly lying between them: perhaps a pit of some description. Another possibility is that the anomalies indicate the perpendicular cutting of one linear feature by another. It is notable that this is the only off-mound anomaly that is in alignment with the other features in Group B, and it may be contemporary with those on the mound.

## Conclusions

A number of previously unknown features have been recorded:

- Large subcircular feature in Area A
- Extended, multi-celled features in Area B

In relation to the objectives outlined above:

- The earthwork complex to the north of the mound appears to consist of a number of wall-like features, many of which are rectilinear, with the notable exception of a

large, as yet uncharacterised, sub-circular feature.

- The mound itself appears to preserve evidence of activity or settlement; this seems to have taken place over at least two phases.

**Agenda for Research: Potential for Further Exploratory Survey**

Having identified particular, previously unrecognised features, and seen the resolution of data that is available at the site, the potential for further electrical resistance survey on this field is considerable. The next step, having covered much of the area of the field with fluxgate gradiometry, is to do likewise with electrical resistance. This will continue beyond the life of HLF funding, and will begin as targeted work undertaken on a goodwill basis.

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