HANNINGTON TO PITSFORD
MAINS REPLACEMENT SCHEME

Report on
Archaeological Geophysical Surveys
2013-14

Survey commissioned by:

Cambridge Archaeological Unit
Department of Archaeology
Downing Street
Cambridge CB2 3DZ

On behalf of: Anglian Water

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Hannington to Pitsford Mains Replacement Scheme
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Introduction

This report describes the findings from a geophysical survey which has been undertaken as part of an archaeological field evaluation of the route of the proposed Hannington to Pitsford water pipeline in Northamptonshire.

The survey is intended to meet requirements as stated in two briefing documents [for the Archaeological Field Evaluation, and for a Programme of Archaeological Investigation] issued by Northamptonshire County Council Planning Services [1], [2]. Some of the background information on the project as noted below is reproduced from these documents, and from the Method Statement which was prepared in advance of the survey [3].

The survey was commissioned from Bartlett Clark Consultancy, Specialists in Archaeogeophysics of Oxford, by the Cambridge Archaeological Unit (CAU) on behalf of Anglian Water Services. An initial stage of fieldwork was done on 2-6 December 2013, but permission for access to a number of fields was not confirmed at that time. One field (field 7 as numbered on the enclosed plans) was also newly ploughed, and unsuitable for detailed survey coverage. The fieldwork was therefore resumed on 6-8 January 2014. This allowed additional time for the ploughed surface to weather, and the survey was successfully completed. The full length of the route has therefore been surveyed, with the exception of road crossings and other localised obstacles.

The Route

It is stated in [2] that the proposed pipeline starts within the existing works south of Pitsford Water at SP75828 68616, and runs roughly north eastward to the reservoirs east of Hannington at SP82580 71113. The pipeline runs for 7500m and follows an existing route predominately through fields with road crossings. The proposed route follows the general line of the existing pipeline, but will avoid it and will incorporate undisturbed land.

The route was surveyed in general to a width of 28m along a strip centred where possible on the proposed new pipe location. The coverage is offset or adjusted where necessary to accommodate boundaries or other obstructions.

Topographically the route runs from the high ground at the Hannington reservoir at around 135m AOD down to around 105m AOD at the Pitsford works. The route passes through an area of localised quarrying to the south of Holcot village.

The underlying geology of the route is mainly Jurassic Lias and Inferior Oolite (Northampton Ironstone), with a variable drift deposit of boulder clay. Soils on Jurassic bedrock are usually strongly responsive to magnetometer surveys. It is possible the magnetic response may be weaker in the presence of clayey till than in areas where it is lacking, but positive

archaeological findings have been obtained in previous surveys on similar soils.

Archaeological background

It is stated in [2] that the proposed works are set within a landscape rich in archaeological activity. Recorded sites and findings include Bronze Age funerary remains, as well as Iron Age activity, and a Deer Park.

The HER contains a number of records which are adjacent or close to the proposed pipeline route. In general these are represented by cropmarks which have not been subject to any archaeological investigation and their significance or extent is therefore currently unknown.

It was expected, given the density of archaeological activity in the surrounding area, that additional findings were likely to be identified along the route, as was found to be the case.

Survey methodology

It is stated in the brief [1] that a detailed geophysical survey of the route will be undertaken using magnetometry. A full magnetometer survey meets the recommendations for an investigation of this kind as set out in the revised English Heritage geophysical guidelines document (*Geophysical Survey in Archaeological Field Evaluation, English Heritage, 2008*).

The EH guidelines recommend (p. 17) that pipeline routes should be surveyed to a width sufficient to cover the area which will be excluded from subsequent survey by the presence of the ferrous pipe. Survey coverage as undertaken to a width of 28m should meet this requirement.

A recorded magnetometer survey provides detailed direct evidence for the presence of any detectable archaeological sites or features which intersect the route, and has been used successfully as part of the archaeological assessment process on numerous previous pipeline projects.

The survey was carried out using Bartington 1m fluxgate magnetometers, with readings plotted at 25cm intervals along transects 1m apart.

The magnetometer survey was supplemented by magnetic susceptibility readings. These provide evidence of local magnetic conditions, as determined by geology and soil type, and therefore inform the interpretation of the magnetometer survey. They sometimes also indicate areas of anomalous activity which help identify settlement or industrial sites where soil susceptibility values are enhanced by the presence of burnt debris dispersed in the soil. Topsoil susceptibility readings were collected along the centre line of the route using Bartington susceptibility meters with a field detector loop.

The survey was positioned in each field by reference to OS co-ordinates measured from the digital mapping supplied by the client, and located with a sub-10cm accuracy differential

GPS system (using Omnistar satellite corrections). The OS coordinates of detected features can be read directly from digital copies of the Autocad plans.

Presentation and reporting

The results are presented as grey scale plots in figures 1-11 (at 1:2000 scale), and as graphical or x-y trace plots at 1:1250 in figures 12 to 19. The graphical plots show the readings after minimal pre-processing (zero mean baseline correction and truncation of extreme values). The grey scale plots have additionally been subject to weak low pass filtering to adjust background noise levels. The initial site plan (figure 1) shows the locations of the 1:2000 and 1:1250 figures.

The magnetic susceptibility readings are presented in the form of a graph of readings superimposed on the 1:2000 scale interpretation plans.

The interpretation of the magnetometer survey which is shown in the lower half of each 1:2000 survey plan is intended to be schematic and illustrative, and not to reproduce the detail of the grey scale plots. Potentially significant features are indicated by coloured outlines, or by broken lines. Broken lines are used to permit a simplified representation of complex features, or to represent features which are too fragmented to form a satisfactory outline. The interpretation is selective; anomalies which are strong or narrow in profile, asymmetrical, or which have a prominent negative peak are likely to be caused by buried stones, bricks or iron objects, and are either excluded or indicated as possible recent or ferrous disturbances.

Colour coding has been used to distinguish different effects. Magnetic anomalies of possible archaeological origin are outlined in red, and recent disturbances in brown. Possible cultivation effects are shown in green, and pipes in blue. Field drains are shown in a blue / purple.

Results

We have numbered the fields along the route in an arbitrary sequence (1-32) from west to east for reference in this report, and will comment on the findings (by groups of fields) in the same sequence.

Fields 1-6

The magnetic response in field 1 and in the western part of field 2 is dominated by the magnetic disturbance caused by the existing water pipe. This extends for about 10m+ to each side of the pipe. It appears from the location of the magnetic anomalies here, and at other locations where the survey intersects the existing pipe, (e.g. fields 6, 15, 20, 27) that the existing pipe is located between about 3m and 10m north of its position as shown on the maps.

The first archaeologically relevant findings are in fields 3-4 where various distinct linear and other magnetic anomalies suggest the presence of enclosures and settlement remains. These features are rather more irregular in plan than at other locations (e.g. field 6), and so may be

eroded by ploughing. They correspond to strong localised enhancement of the magnetic susceptibility readings, as would be expected at an ancient settlement site on a magnetically responsive soil.

Distinct linear parallel markings (as indicated in green) are visible particularly in fields 4-6, and could indicate traces of ridge and furrow superimposed on the archaeological features.

An additional group of strong magnetic anomalies indicates a further settlement site in fields 5-6. The findings include curved feature likely to indicate hut circles in field 6, where there is also a strong peak in the susceptibility readings.

Fields 7-18

Findings in field 7 include a ditched enclosure containing strong individual pit-like features, together with a system of intersecting field drains, and some possible cultivation effects. There is a further ditch perhaps associated with rather weaker nearby features in field 9, and a further group of similar findings in field 11.

There are particularly strong cultivation effects in field 11, and these remain visible until field 18. The orientation of these markings does not generally align with exiting field boundaries, and so it is likely that they represent ridge and furrow rather than modern ploughing.

Fields 19-26

The ridge and furrow weakens in fields 19-20, but returns in field 21, and is clearly visible in fields 35-26. Groups of strong disturbances could indicate a spread of modern debris near to a structure at the western end of field 25, and perhaps an infilled pit or pond in field 26.

Fields 27-32

The survey is intersected by the existing pipe, which again appears to be located 8m north of its recorded position in field 27.

Cultivation effects are visible in fields 28-29. These could again indicate ridge and furrow, although here they align with field boundaries, and so could perhaps (in part ?) result from modern ploughing.

Various field drains are visible in field 30. There are localised cultivation effects and recent disturbances in fields 31-32.

Conclusions

The survey has provided clear evidence for the presence of substantial remains of ancient settlement sites at a number of locations towards the western end of the route. These are particularly well defined in fields 3-4 and in field 6, where there are enclosure containing distinct hut circles. There is a further enclosure with internal features in field 7.

There are less concentrated groupings of possible ditches and other potential archaeological features in fields 9 and 11, but findings through the remainder of the eastern half of the route appear to be limited to indications of ridge and furrow cultivation . This is particularly well defined in fields 6, 12, 14-18, 21, 25-26 and 28-29.

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References

[1] *Brief for the Archaeological Field Evaluation of the Hannington to Pitsford Mains Replacement Scheme, Northamptonshire*. Document issued by Planning Services, Northamptonshire County Council. V2 16th October 2013.

[2] *Brief for a Programme of Archaeological Investigation of the Hannington to Pitsford Mains Replacement Scheme, Northamptonshire.* Document issued by Planning Services, Northamptonshire County Council. V2 16th October 2013.

[3] *Hannington to Pitsford Mains Replacement Scheme: Method Statement for Archaeological Geophysical Survey.* Document submitted by Bartlett Clark Consultancy to CAU; 20 November 2013.

Hannington to Pitsford Mains Replacement Scheme: Geophysical Survey
Appendix : Inventory of Selected Findings

This list notes the more significant findings from the magnetometer survey of this site. The grading (1-4) given alongside each entry refers primarily to the reliability of the geophysical evidence, but the potential archaeological relevance of detected features is also taken into account in the definitions of grades 3 and 4.

Grade 1: Distinct magnetic anomalies of probable archaeological origin.

Grade 2: Weaker or more isolated magnetic anomalies which could in part be archaeologically significant.

Grade 3: Distinct magnetic anomalies, but probably recent or natural, or of other non-archaeological origin.

Grade 4: Weaker or more isolated magnetic anomalies of probably non-archaeological origin.

This summary list includes only selected magnetic findings, particularly those which may be of potential archaeological interest. Magnetic disturbances which may be mentioned in the text or indicated on plans are not necessarily included if they appear to be of natural or non-archaeological origin.

Field		**Grade**
3-4	Irregular ditch-like features: probably settlement enclosures (but perhaps eroded by ploughing).	1
4-6	Parallel linear markings suggesting ridge and furrow.	1
5-6	Enclosures and settlement features, probably including hut circles.	1
7	Distinct rectilinear enclosure with internal features.	1
9	Ditch and possible nearby pit-like features.	1-2
11	Group of irregular ditch-like features.	2
11-21	Widespread linear markings probably representing traces of ridge and furrow.	1
25-26	Distinct ridge and furrow.	1
26	Group of strong disturbances could be infilled pit or pond.	3
28-29	Linear markings: probably ridge and furrow (but could include recent ploughing).	2
31-32	Similar to 28-29.	2