HERITAGE NETWORK

TILE KILN FARM SANDPIT
Sible Hedingham, Essex

(HN402)

Geophysical Survey Report

REGISTERED IFA ORGANISATION

THE HERITAGE NETWORK LTD
Registered with the Institute of Field Archaeologists as an Archaeological Organisation
Archaeological Director: David Hillelson, BA MIFA

TILE KILN FARM SANDPIT
Sible Hedingham, Essex

HN402

Geophysical Survey Report

Prepared on behalf of Phillip W Keen Ltd

by

Mark J Noel, PHD FRAS

Report No.180

January 2003

12 ROYSTON ROAD, BALDOCK, HERTS. SG7 6NT
TELEPHONE: (01462) 893288 FAX: (01462) 893562

Contents

Acknowledgements

The fieldwork for this project was carried out by Dr Mark Noel. The report was written by Mark Noel and edited by David Hillelson.

The Heritage Network would like to express its thanks to Pat Chillingworth, Peter Brett Associates; Paul Walker, Fenn Wright; and to Swithain Waterer, for their co-operation and assistance in the execution of this project.

Summary

Site name and address:	Tile Kiln Farm, Sible Hedingham, Essex.		
County:	Essex	**District:**	
Village/town:	Sible Hedingham	**Parish:**	Sible Hedingham
Planning reference:	n/a	**NGR:**	TL 788 317
Client name and address:	Phillip W Keen Ltd, c/o 16 Westcote Road, Reading, RG30 2DE		
Nature of work:	Sand quarry	**Present land use:**	Arable
Size of affected area:	3.6ha	**Size of area investigated:**	3.6ha
Site Code:	n/a	**Other reference:**	HN402
Organisation:	Heritage Network	**Site Director:**	David Hillelson
Type of work:	Monitoring & recording	**Finds location/Museum:**	n/a
Start of work	13/01/2003	**Finish of work**	14/01/2003
Related SMR Nos:	6849	**Periods represented:**	n/a
Previous summaries/reports:	n/a		

Synopsis: In order to advise a planning application for the proposed extension of a sand quarry at Tile Kiln Farm, Sible Hedingham, Essex, the Heritage Network was commissioned by the owners to undertake a geophysical survey in order to investigate the presence of potential archaeological features across the site. In particular there was a suggestion that the remains of pottery kilns might be present on or in the vicinity of the site.

A number of geophysical anomalies were located across the site which are consistent with soil-filled ditches or ceramic land drains, and activity which may be modern in origin. No anomalies which might be consistent with the presence of kilns, or intensive occupation were recorded.

1 Introduction

1.1 This report was commissioned by Peter Brett Associates on behalf of Phillip W. Keen Ltd, as a preliminary archaeological field evaluation of a proposed extension to a sand quarry located at Tile Kiln Farm, Sible Hedingham, Essex. The work has been undertaken on the recommendation of the Heritage Conservation Branch of Essex County Council in order to advise the determination of the planning application for the extraction works.

1.2 The research was carried out by GeoQuest Associates on behalf of The Heritage Network Ltd (HN), and in accordance with a specification agreed through discussion between David Hillelson of the Heritage Network and Mark Noel of GeoQuest.

1.3 The study area lies on land to the SE of Tile Kiln Farm, which is located about 2km S of the village of Sible Hedingham (NGR: TL788317) (see Figure 1). The purpose of the survey was to test for subsoil archaeological features which may be affected by a proposed southward expansion of an existing sandpit. A total area of about 3.6ha was mapped using a fluxgate magnetometer, within a single arable field.

1.4 The study area comprises the northern part of a field of cereal stubble bounded to the N by buildings within Tile Kiln Farm and an existing sandpit, to the W by the A1017 highway, and to the S and E by further fields and woodland. Hedges and wire fences comprised the majority of the field boundaries, with earth bunds extending part way along the southern limit of the existing sandpit (Figure 1). No traces of ridge and furrow cultivation or other significant earthworks are visible in this field, although a small area of recent topsoil disturbance is present in the SE quarter of the area investigated (Figure 1). A system of ceramic land drains, which convey groundwater N towards the existing sandpit, is thought to be in place beneath this field (S. Waterer, *pers. comm*.).

1.5 Information contained in the Essex Sites and Monuments Record refers to a number of archaeological finds within a 1km radius of the study area. These include the footings of an undated building exposed when draining an adjoining field in *circa* 1900 (SMR 6917), sherds of medieval pottery (SMR 6849), worked flints (SMR 6844) and a group of 5 medieval pottery kilns near Hole Farm, about 600m NW. Hence, there exists some potential for the survival beneath the site for features dating from the prehistoric to medieval periods.

2 Geophysical Survey

2.1 Most of the prehistoric, Roman and medieval features which may exist in the study area are likely to occur as pits, ditches and post holes infilled with topsoil having an enhanced magnetic susceptibility compared to the enclosing subsoil. In contrast, any *in situ* wall footings, roadways and yards will be manifest as volumes with a reduced magnetic susceptibility, particularly in this instance where the local geology appears to comprise Pleistocene glacial sands overlain by boulder clay. These observations suggest that geomagnetic survey (using a fluxgate gradiometer) is likely to be the most sensitive and efficient technique for archaeological prospection in this instance. The magnetometer will also be particularly suited to the detection of the thermoremanent magnetisation within fired structures, such as hearths and kilns.

2.2 Measurements of vertical geomagnetic field gradient were recorded over the area shaded brown in Figure 1 using a Geoscan FM36 fluxgate gradiometer. A zig-zag traverse scheme was employed and data were logged in grid units of 20x20m at 1.0x0.5m intervals, thus providing 800 measurements per grid (Appendix A). Owing to the presence of mud and open field drains close to the quarry edge (blue shading, Figure 1), it was not possible to carry out detailed gridded survey in this region. Hence, a geophysical 'scan' was instead performed in an effort to identify magnetic anomalies of potential archaeological interest. During this investigation the fluxgate gradiometer was carried along linear transects spaced 5m apart over all accessible parts of the soil-stripped region near the quarry edge. Colour-coded flags were used to mark on the ground the positions of significant positive and negative magnetic anomalies, plus any zones of 'noisy' geophysical terrain.

2.3 Geophysical 'scanning' revealed that the mean amplitude of most geomagnetic anomalies was near the single-point detection threshold of the fluxgate gradiometer (typically ±1.0nT/m). As expected, the strongest magnetic field anomalies were encountered close to the soil bunds, open drains and vehicle tracks (and also due to ferrous and brick litter). As a consequence, the scan was judged unlikely to have been effective in recovering geomagnetic anomalies of archaeological interest in the area of highly disturbed topsoil bordering the quarry edge, and further archaeological evaluation by trial trenching may therefore be prudent in this zone.

2.4 Data acquired during the detailed gridded survey were downloaded on-site into a portable graphics computer for quality checks and initial processing. These data were subsequently transferred to a laboratory computer for final processing, interpretation and archiving.

2.5 The GeoQuest InSite® software was used to process the geophysical data and thus convert the field readings into continuous tone grey-scale images. During this process a low-pass filter was applied in order to suppress high frequency noise or 'speckle' in the images caused by surface topography and topsoil magnetic susceptibility variation. Anomalies of archaeological interest are rendered more visible after applying this algorithm. In Figure 2 a convention has been used that shows positive magnetic anomalies as dark grey and negative magnetic anomalies as light grey. Technical details of the data processing algorithms are given in Appendix B.

2.6 An archaeological interpretation of the geophysical survey is presented in Figures 3 and 4. A key defines the colours and fill styles used in these drawings, while feature codes **f1**, **f2**, etc, are included in Figure 4 for reference in the discussion below.

3 Interpretation

3.1 In Figure 2 it can be seen that geomagnetic anomalies within the study area are extremely weak, with the strongest field gradients being recorded close to the soil bunds and over disturbed ground near the edge of the sandpit. However, a very low density scatter of small-scale magnetic dipoles is present (**f1**), facilitating the detection of subtle anomalies of possible archaeological interest (see Figure 4).

3.2 **f2**: A weak positive magnetic lineation, of branching form, has been detected close to the NW edge of the survey block. The polarity and style of this anomaly are consistent with a soil-filled ditch (or ceramic land drain), which may correspond to a former field boundary.

3.3 **f3**: About 40m SE of feature **f2** a further positive linear magnetic anomaly has been mapped. In this case the feature is seen to define an acute angle, with the northern limb possibly connecting with part of feature **f2**. Again, possible interpretations include a minor silted ditch or tile land drain. The narrow wavelength of the geophysical anomaly (*circa* 1.5m) implies that the source is within about 1.0m of the ground surface.

3.4 **f4** & **f5**: Within the central part of this area the survey has detected a pair of intersecting negative linear anomalies, each of which can be traced for a distance of about 70m. The most likely source of these anomalies is a pair of shallow plastic or gravel land drains, although an archaeological feature such as a path or wall footing cannot be ruled out. Trial trench evaluation of these targets may be required to fully establish their physical character.

3.5 **f6**: A 20m long positive magnetic anomaly has been detected entering the survey block at a point on the SW margin. Extension of the geophysical survey to encompass the remainder of the field might provide the basis for a detailed characterisation of the source. On the basis of existing information, however, it is suggested in Figure 4 that the anomaly corresponds to a further silted ditch or land drain.

3.6 **f7**: A linear band of magnetic dipoles and isolated positive anomalies appears to have located beneath the narrow strip of land enclosed by the eastern soil bund and the field boundary. The most likely interpretations for this anomaly group might include material with high susceptibility accumulated by ploughing up to the field margin, or soil compaction and material deposited along a footpath or vehicle track (brown line, Figure 4). Alternatively, the geophysical feature may reflect a former field boundary of archaeological or historical significance.

3.7 **f8**: An intense and compact positive magnetic anomaly in the extreme northern corner of the survey area (adjacent to a soil bund) may provide evidence for a soil-filled pit or site of a recent bonfire.

3.8 No further geophysical anomalies of archaeological interest have been detected in the area investigated.

4 Conclusions

4.1 The present geophysical survey was carried out with the purpose of informing a programme of archaeological investigation aimed at mitigating the effects of a proposed sand quarry on the heritage resource of the area.

4.2 The geophysical survey took the form of a geophysical 'scan' of a muddy disturbed area bordering the existing sandpit, together with detailed gridded survey over the remainder of the proposal area. Geomagnetic anomalies were found to be extremely weak in this instance, reflecting a very low contrast in magnetic susceptibility between materials infilling cut features and the natural undisturbed subsoil. Most anomalies were therefore below the detection limit of the simple 'scanning' survey, only becoming visible within the block of detailed gridded data.

4.3 Several geophysical anomalies have been detected in the study area of a character consistent with silted ditches although, in this instance, they might reflect ceramic land drains. Further direct investigation by trial trenching of these and a number of other targets identified by the survey may be advisable.

CONFIDENCE LIMITS

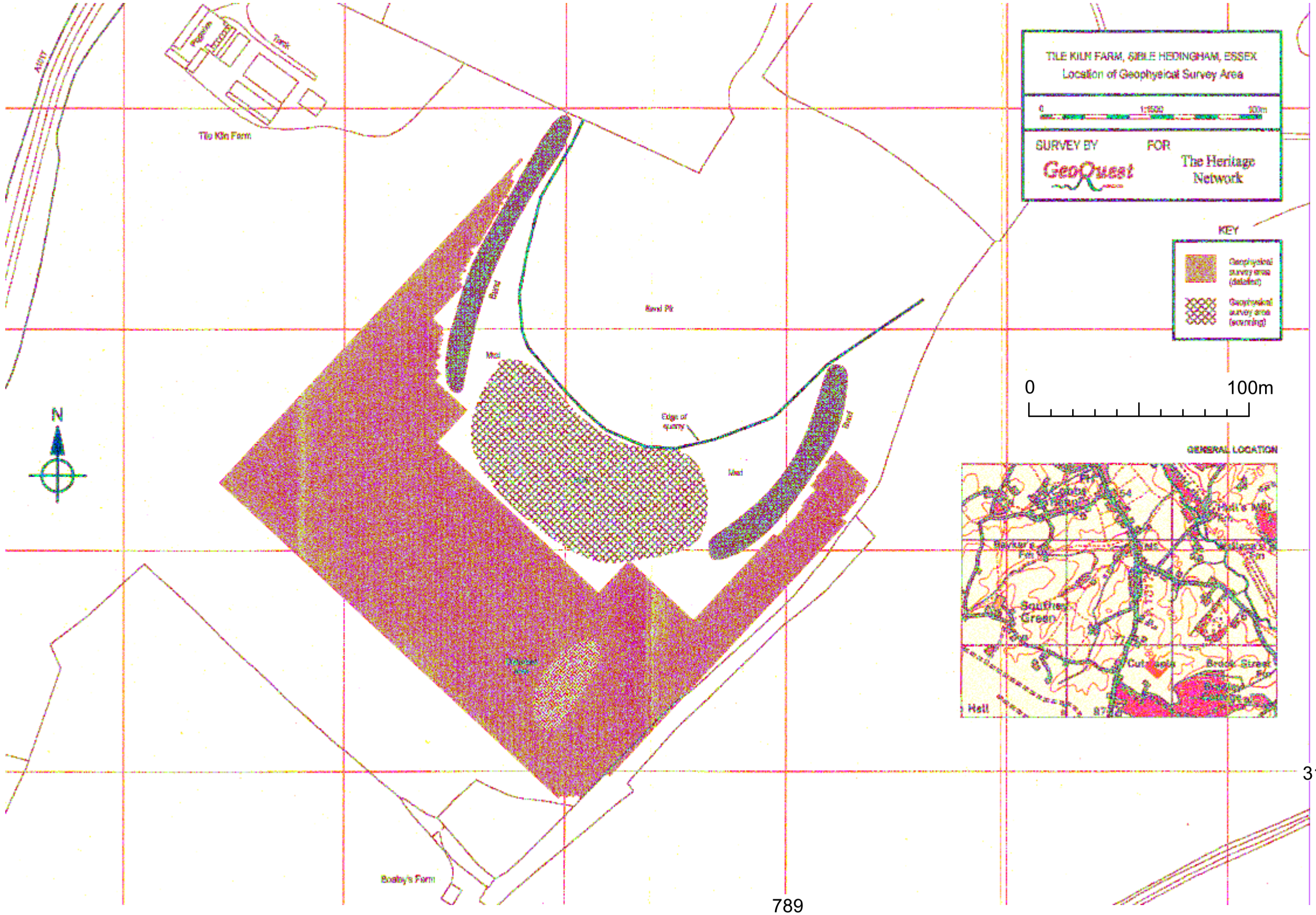
The following are the levels of confidence which we assign to features inferred from the geophysical data:

f1	Ferrous/brick debris	60%
f2	Ditch or land drain	30%
f3	Ditch or land drain	70%
f4	Land drain	60%
f5	Land drain	60%
f6	Ditch or land drain	50%
f7	Track or headland	60%
f8	Soil-filled pit	50%

Please note: Whilst every effort has been taken in the preparation and submission of this report in order to provide as complete an assessment as possible within the terms of the brief, neither the Heritage Network nor its sub-contractor GeoQuest Associates can accept any responsibility for consequences arising as a result of unknown and undiscovered sites or artefacts.

5 Illustrations

THE HERITAGE NETWORK LTD	Tile Kiln Farm, Sible Hedingham	HN402



Location of geophysical survey

Reproduced from OS mapping with the permission of the controller of Her Majesty's Stationery Office, Licence no.AL100014861

Scale 1:2000

Figure 1

THE HERITAGE NETWORK LTD	Tile Kiln Farm, Sible Hedingham	HN402

Results of geophysical survey

Reproduced from OS mapping with the permission of the controller of Her Majesty's Stationery Office, Licence no.AL100014861

Scale 1:2000

Figure 2

THE HERITAGE NETWORK LTD	Tile Kiln Farm, Sible Hedingham	HN402

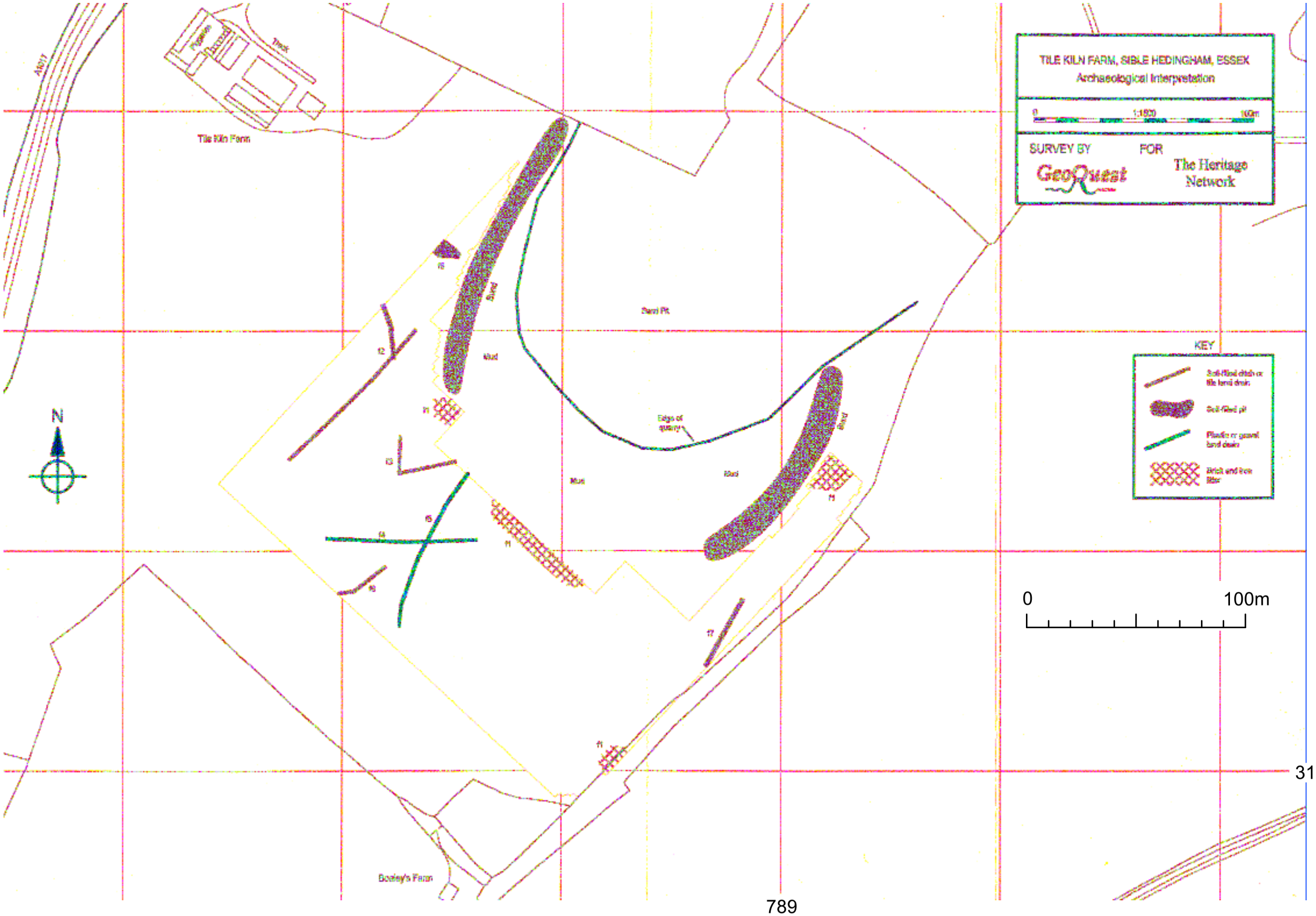
Archaeological interpretation

Reproduced from OS mapping with the permission of the controller of Her Majesty's Stationery Office, Licence no.AL100014861

Scale 1:2000

Figure 3

THE HERITAGE NETWORK LTD	Tile Kiln Farm, Sible Hedingham	HN402



Archaeological interpretation

Reproduced from OS mapping with the permission of the controller of Her Majesty's Stationery Office, Licence no.AL100014861

Scale 1:2000

Figure 4