GEOPHYSICAL SURVEYS OF LAND TO THE NORTHWEST OF CRICK, NORTHAMPTONSHIRE

> GEOPHYSICAL SURVEY REPORT CP. NO: 1495 23/06/2011



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DOCUMENT TITLE:	Land to the Northwest of Crick, Northamptonshire
DOCUMENT TYPE:	Geophysical Survey Report
CLIENT:	Gallagher Estates Ltd
CP NUMBER:	1495/11
HER:	ENN105232/5872014
PLANNING APP. NO:	-
OASIS REFERENCE:	northpen3-102619
PRINT DATE:	23/06/2011
GRID REFERENCE:	SP 5847 7276

Quality Assurance

This report covers works as outlined in the brief for the above-named project as issued by the relevant authority, and as outlined in the agreed programme of works. Any deviation to the programme of works has been agreed by all parties. The works have been carried out according to the guidelines set out in the Institute for Archaeologists (IfA) Standards, Policy Statements and Codes of Conduct. The report has been prepared in keeping with the guidance set out by North Pennines Survey CIC on the preparation of reports.

Revision Schedule			
	01	02	03
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The objective of the geophysical surveys was to determine the presence/absence, nature and extent of potential archaeological features within the study area, and the presence/absence of any known modern features within the survey area, which may affect the results. The results of the project were to be used to inform the need for further archaeological work, or mitigation measures, should potential significant archaeological remains be identified during the project.

Geomagnetic surveys covering 6.7ha of land have been conducted within four fields on the northwest sode of the town. Large parts of the geophysical study area were dominated by the magnetic fields generated by modern features, including an electricity pylon, telegraph posts, services and metal fences. A former access road to the Midland Meat Packers Factory was also detected crossing the study area, which dominated the results of the geophysical survey in the immediate vicinity.

The most notable feature detected by the geophysical survey was a square feature, measuring *c*.60m across, interpreted as a possible ditched enclosure. This may have one or more entrances on the southwest side, and contained possible ring ditches, perhaps representing one or more round houses. Similar circular and curvilinear features were detected to the southwest of this feature. Given the archaeological background of the surrounding area it is possible that these features are associated with an Iron Age or Romano-British farmstead.

The remains of ridge and furrow cultivation of medieval or later date were also detected by the geophysical survey to the south and west of this possible enclosure, along with a possible field boundary ditch. However, the presence or absence of this across the interior of the enclosure was uncertain.

It is recommended that the results of the geophysical surveys are tested through the excavation of a series of trial trenches across the site, targeting both the geophysical anomalies, and also testing areas apparently devoid of archaeological features. Further information regarding nature and extent of the identified features could also be provided by further detailed geophysical survey. North Pennines Survey CIC would like to thank Charlotte Dawson of Wardell Armstrong LLP, for commissioning the geophysical survey, and for all assistance throughout the project.

The geophysical surveys were undertaken by Angus Clark and Don O'Meara. The report was written by and illustrated by Martin Railton, BA (Hons) MA MIfA, Project Manager, who also managed the project. Matthew Town, Project Manager for NPA Ltd, edited the report.

1.1 CIRCUMSTANCES OF THE PROJECT (FIGURE 1)

- 1.1.1 In June 2011, North Pennines Survey CIC, undertook geophysical surveys of land to the northwest of Crick, Northamptonshire at the request of Wardell Armstrong LLP, on behalf of their clients Gallagher Estates Ltd. This followed a request for an archaeological evaluation by the Northamptonshire County Council (NCC) as part of an Archaeology and Cultural Heritage chapter within an Environmental Statement for the site. The work was undertaken in accordance with a Written Scheme of Investigation (WSI) produced by Wardell Armstrong LLP (Dawson 2011), and a North Pennines Archaeology Ltd Project Design (Railton 2011), which was submitted to, and approved by NCC. This was in line with government advice as set out in the DoE Planning Policy Guidance on Archaeology and Planning (PPG 16), and its successor Planning Policy Statement 5 (Planning for the Historic Environment).
- 1.1.2 The study area comprises four fields of pasture land on the northwest side of Crick, measuring 6.7ha in total (Figure 1). It is bounded by Main Road to the west and the A428 to the north, with modern developments, including an industrial estate and sewage works to the west of the site. A factory and abattoir lie to the north. To the south and east are the houses and gardens of Crick, with a sports field immediately to the south of the study area. The site is centred on Ordnance Survey grid reference SP 5847 7276.
- 1.1.3 It is believed that archaeological remains could survive at the site, including the remains of ridge and furrow cultivation (HER references 8074/0/22 and 8074/0/36) and possible activity relating to quarrying, which has previously been recorded to the immediate north of the site, and dated tentatively to the Roman period (HER reference 433/0/1).
- 1.1.4 The objective of the geophysical surveys was to determine the presence/absence, nature and extent of potential archaeological features within the survey area, and the presence/absence of any known modern features within the survey area, which may affect the results. The results of the project are to be used to inform the need for further archaeological work, or mitigation measures, should potential significant archaeological remains be identified during the project.
- 1.1.5 This report outlines the results of the geophysical surveys undertaken, and includes an interpretation of the geophysical survey results, in light of the archaeological and historical background of the site, with recommendations for further work where necessary.

2.1 PROJECT DESIGN

2.1.1 A project design was submitted by North Pennines Archaeology Ltd in response to a request by Wardell Armstrong LLP, for a geophysical survey of the study area. Following acceptance of the project design by Northamptonshire County Council Development Control Archaeologist, North Pennines Survey CIC was commissioned by the client to undertake the work. The project design was adhered to in full, and the work was conducted in accordance with English Heritage guidelines (English Heritage 2008), and in accordance with the draft standard and guidance of the Institute for Archaeologists (IfA 2010).

2.2 GEOPHYSICAL SURVEYS

- Technique Selection: geomagnetic survey was selected as the most 2.2.1appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. In addition, the potential of the clays in North West Northamptonshire has been demonstrated by the discovery through geophysical prospection and survey of extensive Iron Age and Roman settlements at the Daventry International Rail Freight Terminal, near Crick (Chapman 1994, and Birmingham University Field Archaeology Unit 1998), and the now almost standard use of geophysical survey on sites of archaeological potential has been the most useful new tool for the location of sites on clays and pasture land (Chapman 2006). This technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of subsurface archaeological features. Data were recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.
- 2.2.2 *Field Methods:* the geophysical study area measured *c*.6.7ha divided into 2 large fields (Areas 1-2), which were further subdivided by hedgerows making four separate survey areas necessary (Areas 1a and 1b and Areas 2a and 2b). A 30m grid was established in each area, and tied-in to known Ordnance Survey points using a Trimble 3605DR Geodimeter total station with datalogger.
- 2.2.3 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m would be detected using this arrangement. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 30m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 3600

sample measurements per grid unit. The data were downloaded on site into a laptop computer for processing and storage.

- 2.2.4 *Data Processing:* geophysical survey data were processed using ArchaeoSurveyor II software, which was used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies are displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar shows the relationship between the grey shades and geomagnetic values in nT.
- 2.2.5 Raw data were processed in order to further define and highlight the archaeological features detected. The following basic data processing functions were used:

Despike: to locate and suppress random iron spikes in the gradiometer data.

Clip: to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data.

Destagger: to reduce the effect of staggered gradiometer data, sometimes caused by difficult working conditions, topography, or operator error.

Interpolate: to match the traverse and sample intervals in the gradiometer data.

2.2.6 *Interpretation:* four types of geophysical anomaly were detected in the gradiometer data:

positive magnetic: regions of anomalously high or positive magnetic data, which may be associated with the presence of high magnetic susceptibility soil-filled features, such as pits or ditches.

negative magnetic: regions of anomalously low or negative magnetic data, which may be associated with features of low magnetic susceptibility, such as stone-built features, geological features, land-drains or sub-surface voids.

dipolar magnetic: regions of paired positive and negative magnetic anomalies, which typically reflect ferrous or fired materials, including fired/ferrous debris in the topsoil, modern services, metallic structures, or fired structures, such as kilns or hearths.

- 2.2.7 *Presentation:* the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey plans. Colour-coded geophysical interpretation diagrams are provided, showing the locations and extent of positive, negative, dipolar, geomagnetic anomalies.
- 2.2.8 Archaeological interpretation diagrams are provided, which are based on the interpretation of the geophysical survey results, in light of the archaeological and historical background of the site.
- 2.2.9 Trace plots of the unprocessed geophysical are available if required.

2.3 ARCHIVE

- 2.3.1 The data archive for the geophysical survey has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2001). This archive is currently held at the company offices at Nenthead, Cumbria.
- 2.3.2 One copy of the final report will be deposited with the Northamptonshire Historic Environment Record, where viewing will be available on request. The project is also registered with the Online AccesS to the Index of archaeological investigationS (OASIS), where a digital copy of the report will be made available.
- 2.3.3 The OASIS reference for this project is **northpen3-102619**.

3.1 LOCATION AND GEOLOGICAL CONTEXT

- 3.1.1 Crick lies within the rolling countryside of Northamptonshire in the district of Daventry, situated between the Grand Union Canal and the M1 Motorway. The study area lies on the northwest side of Crick, approximately 500m from the centre of the village, and 1km to the east of Junction 18 of the M1. The Northamptonshire Uplands lie to the west, and the Yardley-Whittlewood Ridge lies to the south, with Rockingham Forest region to the east (Countryside Commission 1999). The topography of the study area rises from a low point of 114m AOD in the southwest of the site to 128m AOD in the northeast of the site. The land to the west and north of the study area has previously been developed as an industrial estate, sewage works and factories. The proposed development area forms a block of land between the Crick Main Road and the A428 with the suburbs of Crick to the south. The construction of the Crick bypass may have caused some disturbance to the northern fringes of the site.
- 3.1.2 The solid geology comprises Middle Lias deposits of silt and clay (silts, mudstones and thin silty limestones) in the eastern two thirds of the site and Lower Lias deposits (mainly mudstone with a few very thin limestones) in the western third of the site. Drift geology comprising boulder clay overlies the eastern third of the site. A soil survey carried out by Wardell Armstrong LLP as part of the Environmental Statement states that topsoil over the site comprises 25 to 35cm light brown to orange brown sandy clay loam demonstrating a sub angular blocky to granular structure. The depth of subsoil varies between no subsoil/shallow soils (<50cm) in the east of the site to some deep profiles in the west of the site (up to 110cm). Deeper soils were generally mottled orange/grey sandy clay loams over heavily mottled grey sandy clays/clays. The findings of the site survey are comparable to the literature based assessment, in that the soil profiles described generally match the description given of the typical component of the '712b Denchworth' soil association (Wardell Armstrong 2011).

3.2 HISTORICAL CONTEXT

- 3.2.1 *Introduction:* the historical background of the study area has been assessed by Wardell Armstrong LLP as part of an Archaeology and Cultural Heritage chapter within the Environmental Statement, a summary of which is presented here. This background is compiled mostly from secondary sources, and is intended only as a brief summary of historical developments specific to the study area. References to the Northamptonshire Historic Environment Record (HER) are included where known.
- 3.2.2 *Prehistoric:* the Historic Environment Record was consulted for activity within 1km of the site which is dominated, in part, by activity relating to the

Iron Age period. Whilst this includes occupation sites 800m north and 800m west of the site boundary (HER references 7305 and 8237), the most intensively occupied area appears to have been located 1km to the west, where a 16ha occupation site comprising features and finds demonstrating intensive and continued occupation throughout the Iron Age has been recorded (HER reference 7030). This was recorded during fieldwork, including a detailed geophysical survey (HER reference ENN18398) undertaken prior to the construction of the Daventry International Rail Freight Terminal. The geophysical survey was successful in locating features, later confirmed by excavation. The geology of the settled area, located on a south-western facing slope at 107.24m OD to 103.79m AOD, comprised Lower Lias Clay overlain by alluvial deposits of sand, gravel and clay.

- 3.2.3 *Roman:* the potential for buried remains dated to the Roman period cannot be discounted since a watching brief undertaken during the construction of the Crick Bypass (A428) recorded a possible extraction site tentatively dated to the Roman period to the immediate north of the site boundary (HER reference 433/0/1). This comprised six adjoining irregular shaped pits measuring 2m in diameter, although it should be noted that the feature may have been reworked during later periods i.e. medieval to post medieval periods.
- 3.2.4 *Medieval:* the remainder of the HER sites are dominated by the medieval period due to the presence of the medieval settlement of Crick recorded by the HER extending to the south-eastern boundary of the site (HER reference 455). It is possible that a medieval road was once present adjacent to and parallel with the eastern boundary of the site (Royal Commission on Historic Monuments 1981). However, with regards to medieval remains the extent of ridge and furrow and the location of the 'town' fields recorded during a survey by Hall and Harding in 1977 (see front cover) indicates that the site was located within areas under an agricultural regime during the medieval period (Northamptonshire Archaeology 2001). Indeed two areas of non-designated ridge and furrow extend to within the site boundary (HER references 8024/22 and 8024/36).
- 3.2.5 *Post-medieval and Modern:* an access road to the Midland Meat Packers Factory was once aligned through the site. Whilst a section of the road remains along the southern boundary of the site the part of the road crossing the site has been ploughed up.

3.3 PREVIOUS ARCHAEOLOGICAL WORK

3.3.1 No known previous archaeological work has taken place within the boundaries of the study area.

4.1 INTRODUCTION (FIGURE 2)

- 4.1.1 The geophysical surveys were undertaken between 13th and 15th June 2011. Geomagnetic survey was undertaken over four separate areas (Areas 1a & 1b and Areas 2a & 2b) within the study area (Figure 2). Each area was subdivided by field boundaries consisting of hedges and fences, some of which incorporated post and wire fences. These fences produced strong dipolar magnetic anomalies around the periphery of the survey areas.
- 4.1.2 Small discrete dipolar magnetic anomalies were detected across the whole of the study area. These are almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.

4.2 AREA 1A (FIGURES 3-5)

- 4.2.1 Area 1a measured *c*.0.8ha and was situated on the northwest side of the study area, bounded by Main Road to the west and the A428 to the north. A fence on the north side of the survey area produced strong dipolar magnetic anomalies along the northern edge of Area 1a.
- 4.2.2 A very strong discrete dipolar magnetic anomaly was detected on the north side of Area 1, which dominated the results of the geophysical survey in this area. This was due to the presence of an electricity pylon which produced an extensive magnetic field.
- 4.2.2 A number of weak positive linear magnetic anomalies were detected at the southeast corner of Area 1a, aligned northwest to southeast, which are interpreted as possible soil-filled features, although the nature of these is uncertain.

4.3 AREA 1B (FIGURES 3-5)

- 4.3.1 Area 1b measured *c*.0.4ha and was situated to the northeast of Area 1a, subdivided by a hedge row and fence. Fences on the north and east sides of Area 2b also produced strong dipolar magnetic anomalies along the edges of this area.
- 4.3.2 A very strong discrete dipolar magnetic anomaly was detected on the north side of Area 1, which dominated the results of the geophysical survey in this area. This was due to the presence of an electricity pylon which produced an extensive magnetic field.
- 4.3.2 A number of weak positive linear and curvilinear magnetic anomalies were detected on the east and west sides of Area 1b, which are interpreted as

possible soil-filled features, although as with Area 1a the nature of these is uncertain.

4.4 **AREA 2A (FIGURES 3-5)**

- 4.4.1 Area 2a measured *c*.1.6ha and was situated on the southwest side of the study area, bounded by Main Road to the west and the remains of a redundant access road to the Midland Meat Packers Factory to the south. A hedgerow separated the survey area from Area 1a & 1b to the north. A fence on the south side of the survey area produced strong dipolar magnetic anomalies along the southern edge of Area 2a.
- 4.4.2 A concentration of dipolar magnetic anomalies was detected on the southwest side of Area 2a, close to the entrance into the field from Main Road. These are likely to represent modern fired/ferrous material used to consolidate the ground in this area.
- 4.4.3 A strong dipolar linear magnetic anomaly was detected crossing the east end of Area 2a, aligned north northwest to south southeast. This is almost certainly a modern feature, probably a service pipe.
- 4.4.4 Further weak positive linear and curvilinear magnetic anomalies were detected in Area 2a, similar to those in Area 1a & 1b, which are interpreted as possible soil-filled features.

4.5 AREA 2B (FIGURES 6-8)

- 4.5.1 Area 2b measured *c*.2.4ha and was situated on the northeast side of the study area, bounded by the A428 to the north and the houses and factories if Crick to the east and south. Fences on the north, east and west sides of the survey area produced strong dipolar magnetic anomalies along the edges of Area 2b. Two small copses of trees were present on the west side of this survey area surrounded by post & wire fences, which could not be surveyed. These also produced strong dipolar magnetic anomalies.
- 4.5.2 A very strong discrete dipolar magnetic anomaly was detected on the east side of Area 2a, which is almost certainly due to the presence of a modern ferrous structure. Another strong discrete dipolar magnetic anomaly was detected on the north side of the survey area due to the presence of a telegraph pole.
- 4.5.3 A very strong dipolar linear magnetic anomaly was detected crossing the west side of Area 2b, aligned approximately north to south. This is believed to be due to the sub-surface remains of the former access road to the Midland Meat Packers Factory, which once crosses the site [1].
- 4.5.4 A parallel series of weak positive and negative linear magnetic anomalies were detected crossing the survey area, aligned northeast to southwest, which are interpreted as the remains of ridge and furrow cultivation [2]. A number of stronger positive linear magnetic anomalies, with the same

alignment were also detected, which are likely to be magnetically-enhanced soil-filled furrows. The furrows were spaced on average between *c*.8m and *c*.12m apart and are likely to be medieval or later in date. Another series of weak positive linear magnetic anomalies were detected on the south side of the survey area, aligned northwest to southeast, which may represent a separate phase of cultivation.

- 4.5.5 A similar parallel series of weak positive linear magnetic anomalies was detected at the northwest corner of Area 2b, aligned northeast to southwest, which are also interpreted as the remains of ridge and furrow cultivation [3]. A positive linear magnetic anomaly was detected immediately to the north of these, aligned northwest to southeast, which may be an associated soil-filled field boundary.
- 4.5.6 A series of positive and negative linear and magnetic anomalies were detected at the centre of Area 2b, forming a c.60m-square area [4]. These anomalies have the characteristics of soil-filled ditches, and appear to form a square enclosure with one or more possible entrances on the southwest side.
- 4.5.7 Two further parallel positive linear magnetic anomalies were detected on the southeast side of this square area, one immediately inside the enclosure, and one to the southeast, which may be associated [5]. However, it is also possible that these are unrelated features, such as magnetically-enhanced plough furrows.
- 4.5.8 Within the square area were three curvilinear magnetic anomalies, which are interested as soil-filled features [6]. Given the possible presence of an enclosure, it is conceivable that these represent the ring ditches of one or more round houses. A number of similar curvilinear magnetic anomalies were detected outside of the 'enclosure' to the southwest, which may also represent soil-filled ditches or gullies. Two discrete positive magnetic anomalies were detected nearby, which are interpreted as other possible soil-filled features, such as pits.
- 4.5.9 Further weak positive linear and curvilinear magnetic anomalies were detected in Area 2b, similar to those in Area 1a & 1b and Area 1a, which are interpreted as possible soil-filled features. However, the nature of these is uncertain.

5.1 CONCLUSIONS

- 5.1.1 Geomagnetic surveys covering 6.7ha of land have been conducted within four fields to the northwest of Crick, Northamptonshire, covering the location of proposed development.
- 5.1.2 Large parts of the geophysical study area were dominated by the magnetic fields generated by modern features, including an electricity pylon, telegraph posts, services and metal fences. A former access road to the Midland Meat Packers Factory was also detected crossing the site, which dominated the results of the geophysical survey in the immediate area.
- 5.1.3 The most notable feature detected by the geophysical survey was a square feature, measuring *c*.60m across, interpreted as a possible ditched enclosure. This may have one or more entrances on the southwest side, and contained possible ring ditches, perhaps representing one or more round houses. Similar circular and curvilinear features were detected to the southwest of this feature. Given the archaeological background of the surrounding area it is possible that these features are associated with an Iron Age or Romano-British farmstead.
- 5.1.4 The remains of ridge and furrow cultivation of medieval or later date were also detected by the geophysical survey to the south and west of this possible enclosure, along with a possible field boundary ditch. However, the presence or absence of this across the interior of the enclosure was uncertain.

5.2 **Recommendations**

- 5.2.1 It is recommended that the results of the geophysical surveys are tested through the excavation of a series of trial trenches across the site, targeting both the geophysical anomalies, and also testing areas apparently devoid of archaeological features.
- 5.2.2 Detailed geophysical survey of the area of the enclosure, undertaken at a higher resolution than the present survey, could provide further information on potential archaeological features in this area. Given the level of magnetic noise at the site, caused largely by the presence of modern features, it is suggested that an earth resistance survey could be undertaken, which would negate these effects and provide a complimentary dataset.

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GEOPHYSICAL SURVEYS OF LAND TO THE NORTHWEST OF CRICK, NORTHAMPTONSHIRE



GEOPHYSICAL SURVEY PROJECT DESIGN CP. NO: 1495 23/06/2011



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NORTH PENNINES ARCHAEOLOGY LTD

DOCUMENT TITLE:	Land at to the Northwest of Crick, Northamptonshire
DOCUMENT TYPE:	Geophysical Survey Project Design
CLIENT:	Gallagher Estates Ltd
CP NUMBER:	1495/11
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Revision Schedule			
	01	02	03
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ILLUSTRATIONS

FIGURES (APPENDIX 1)

FIGURE 1: SITE LOCATION

FIGURE 2: LOCATION OF THE PROPOSED DEVELOPMENT AREA

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 North Pennines Archaeology Ltd, have been commissioned by Wardell Armstrong LLP, on behalf of their clients Gallagher Estates Ltd, to undertake geophysical surveys of land to the northwest of Crick, Northamptonshire (Figure 1). An archaeological evaluation has been requested by the Northamptonshire County Council Development Control Archaeologist as part of an Archaeology and Cultural Heritage chapter within an Environmental Statement for the site. This is in line with government advice as set out in the DoE Planning Policy Guidance on Archaeology and Planning (PPG 16), and its successor Planning Policy Statement 5 (Planning for the Historic Environment).
- 1.1.2 The study area comprises four fields of pasture land on the northwest side of Crick, measuring 6.7ha in total (Figure 2). It is bounded by Main Road to the west and the A428 to the north, with modern developments, including an industrial estate and sewage works to the west of the site. A factory and abattoir lie to the north. To the south and east are the houses and gardens of Crick, with a sports field immediately to the south of the study area. The site is centred on Ordnance Survey grid reference SP 5847 7276. The topography of the study area rises from a low point of 114m AOD in the southwest of the site to 128m AOD in the northeast of the site.
- The solid geology comprises Middle Lias deposits of silt and clay (silts, 1.1.3 mudstones and thin silty limestones) in the eastern two thirds of the site and Lower Lias deposits (mainly mudstone with a few very thin limestones) in the western third of the site. Drift geology comprising boulder clay overlies the eastern third of the site. A soil survey carried out by Wardell Armstrong LLP as part of the Environmental Statement states that topsoil over the site comprises 25 to 35cm light brown to orange brown sandy clay loam demonstrating a sub angular blocky to granular structure. The depth of subsoil varies between no subsoil/shallow soils (<50cm) in the east of the site to some deep profiles in the west of the site (up to 110cm). Deeper soils were generally mottled orange/grey sandy clay loams over heavily mottled grey sandy clays/clays. The findings of the site survey are comparable to the literature based assessment, in that the soil profiles described generally match the description given of the typical component of the '712b Denchworth' soil association (Wardell Armstrong 2011).
- 1.1.4 It is believed that archaeological remains could survive at the site, including the remains of ridge and furrow cultivation (HER references 8074/0/22 and 8074/0/36) and possible activity relating to quarrying previously recorded to

the immediate north of the site, dated tentatively to the Roman period (HER reference 433/0/1). The objective of the geophysical surveys is to determine the presence/absence, nature and extent of potential archaeological features within the survey area, and the presence/absence of any known modern features within the survey area, which may affect the results. The results of the project are to be used to inform the need for further archaeological work, or mitigation measures, should potential significant archaeological remains be identified during the project.

1.1.6 This project design is for the geophysical surveys of the study area only, and is to be submitted to the Northamptonshire County Council Development Control Archaeologist for approval, prior to fieldwork commencing.

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2 METHODOLOGY

2.1 STANDARDS

2.1.1 The geophysical survey and reporting will be conducted in accordance with English Heritage guidelines (English Heritage 2008), and in accordance with the draft standard and guidance of the Institute for Archaeologists (IfA 2010).

2.2 ARCHAEOLOGICAL BACKGROUND

- 2.2.1 The archaeological background of the study area has been assessed by Wardell Armstrong LLP as part of an Archaeology and Cultural Heritage chapter within the Environmental Statement, a summary of which is presented here.
- 2.2.2 The Historic Environment Record was consulted for activity within 1km of the site which is dominated, in part, by activity relating to the Iron Age period. Whilst this includes occupation sites 800m north and 800m west of the site boundary (HER references 7305 and 8237), the most intensively occupied area appears to have been located 1km to the west, where a 16ha occupation site comprising features and finds demonstrating intensive and continued occupation throughout the Iron Age has been recorded (HER reference 7030). This was recorded during fieldwork, including a detailed geophysical survey (HER reference ENN18398) undertaken prior to the construction of the Daventry International Rail Freight Terminal. The geophysical survey was successful in locating features, later confirmed by excavation. The geology of the settled area, located on a south-western facing slope at 107.24m OD to 103.79m AOD, comprised Lower Lias Clay overlain by alluvial deposits of sand, gravel and clay.
- 2.2.3 The remainder of the HER sites are dominated by the medieval period due to the presence of the medieval settlement of Crick recorded by the HER extending to the south-eastern boundary of the site (HER reference 455). It is possible that a medieval road was once present adjacent to and parallel with the eastern boundary of the site (Royal Commission on Historic Monuments 1981). However, with regards to medieval remains the extent of ridge and furrow and the location of the 'town' fields recorded during a survey by Hall and Harding in 1977 (see front cover) indicates that the site was located within areas under an agricultural regime during the medieval period (Northamptonshire Archaeology 2001). Indeed two areas of non-designated ridge and furrow extend to within the site boundary (HER references 8024/22 and 8024/36).

- 2.2.4 In addition to remains dating to the Iron Age and medieval periods, the potential for buried remains dated to other periods, in particular the Roman period, cannot be discounted. For example, a watching brief undertaken during the construction of the Crick Bypass (A428) recorded a possible extraction site tentatively dated to the Roman period to the immediate north of the site boundary (HER reference 433/0/1). This comprised six adjoining irregular shaped pits measuring 2m in diameter, although it should be noted that the feature may have been reworked during later periods i.e. medieval to post medieval periods.
- 2.2.5 The construction of the Crick bypass may have caused some disturbance to the northern fringes of the site. In addition, an access road to the Midland Meat Packers Factory was once aligned through the site. Whilst a section of the road remains along the southern boundary of the site the part of the road crossing the site has been ploughed up.

2.3 TECHNIQUE SELECTION

2.3.1 Geomagnetic survey has been selected as the most appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. This technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of sub-surface archaeological features. Data are recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.

2.4 GEOMAGNETIC SURVEY

- 2.4.1 The geophysical study area measures *c*.6.7ha divided into 4 separate fields. A 30m grid will be established in each area, and tied-in to known Ordnance Survey points using a Trimble 3605DR Geodimeter total station with datalogger.
- 2.4.2 Geomagnetic measurements will be determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m will be detected using this arrangement. The survey will be undertaken using a zigzag traverse scheme, with data being logged in 30m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 3600 sample measurements per grid unit.

2.5 DATA PROCESSING

- 2.4.1 Geophysical survey data will be processed using ArchaeoSurveyor II software, which is used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies will be displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar will show the relationship between the grey shades and geomagnetic values in nT.
- 2.4.2 Raw data will be processed in order to further define and highlight the archaeological features detected and the resulting greyscale images included in the report.

2.6 **Presentation**

- 2.4.1 The grey-scale images will be combined with site survey data and Ordnance Survey data to produce the geophysical survey plans at a scale of 1:1000 or larger. Colour-coded geophysical interpretation diagrams will be provided, showing the locations and extent of positive, negative, dipolar, geomagnetic anomalies.
- 2.4.2 Archaeological interpretation diagrams will be provided, based on the interpretation of the geophysical survey results, in light of the archaeological and historical background of the site.

3 REPORTING AND ARCHIVE

3.1 Report

3.2.1 A detailed report will be provided, and will include the following:

- A location plan showing the location of the study area, related to the national grid, and an eight figure Ordnance Survey grid reference
- The dates on which the project was undertaken
- A concise, non-technical summary of the results
- A summary of the historical and archaeological background of the site
- A description of the methodology employed, work undertaken and results obtained
- Digital photographs where appropriate
- A description of any geophysical anomalies detected within the study area
- Greyscale plans at an appropriate scale showing the location and extent of any geophysical anomalies
- Interpretation of the geophysical survey results in light of the archaeological and historical background of the site
- Geophysical and archaeological interpretation diagrams
- Trace plots of the unprocessed geophysical data as appropriate
- The associated OASIS reference

3.2 ARCHIVE

- 3.2.1 The data archive for the geophysical survey will be created in accordance with the recommendations of the Archaeology Data Service (ADS 2001).
- 3.2.2 One copy of the final report will be deposited with the County Historic Environment Record, where viewing will be available on request. The project is also registered with the Online AccesS to the Index of archaeological investigationS (OASIS), where a digital copy of the report will be made available in agreement with Wardell Armstrong LLP and the client.
- 3.2.3 The OASIS reference for this project is **northpen3-102619**.

4 HEALTH AND SAFETY

- 4.1 Full consideration will be given to health and safety issues during all fieldwork. North Pennines Archaeology Ltd. Health and Safety Statement conform to the provisions of the Standing Conference of Archaeological Unit Managers (SCAUM) Health and Safety Manual.
- 3.2 A full risk assessment will be undertaken to assess all real and potential hazards prior to the commencement of fieldwork. A valid first aid certificate will be held by at least one member of staff.

5 WORK PROGRAMME

- 5.1 North Pennines Archaeology Limited (NPA) is a wholly owned company of North Pennines Heritage Trust (Registered Charity No. 700701). The business is a not for private profit company and all surpluses are covenanted to charity. Geophysical surveys are conducted by the company's survey section: North Pennines Survey.
- 5.2 The work will be undertaken under the direction of Martin Railton BA (Hons) MA MIfA, NPA Project Manager. Martin Railton is a qualified archaeological surveyor with extensive experience of geophysical survey. He has completed numerous similar projects, both for North Pennines Archaeology Ltd., and his previous employer, Archaeological Services Durham University. He will be assisted by a small team of professional trained NPA staff to undertake the archaeological work. All staff are experienced archaeologists with significant previous experience of geophysical survey.
- 5.3 Following approved of this project design by the Northamptonshire County Council Development Control Archaeologist, North Pennines Archaeology Ltd. would be able to undertake the work.
- 5.4 It is expected that the fieldwork will take up to 1 week to complete. The work is programmed to begin on Monday 13th June 2011. A draft report at least will be available within one week following completion of the fieldwork

6 BIBLIOGRAPHY

6.1 SECONDARY SOURCES

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APPENDIX 2: FIGURES



Figure 1 : Location map



Figure 2 : Plan of the geophysical survey areas









Figure 6 : Geophysical survey of Area 2b



