



Archaeological Services
University of Durham

Miners Welfare Ground, Burradon, North Tyneside

geophysical survey and archaeological evaluation

on behalf of

Building Design Agency

ASUD Report 1196

January 2005

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NE12 6WQ*

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1. Summary

The project

- 1.1 This report presents the results of a scheme of works conducted in advance of a proposed development at the Miners Welfare Ground, Burradon, North Tyneside. The evaluation comprised a geophysical survey and the excavation of five trenches across the site.
- 1.2 The works were commissioned by Building Design Agency, and conducted by Archaeological Services University of Durham in accordance with a Project Design approved by the County Archaeologist for Tyne and Wear.

Results

- 1.3 Two parallel ditches of a possible medieval date were recorded in trench 1.
- 1.4 No deposits of archaeological significance were recorded in trenches 2-5.

Recommendations

- 1.5 It is likely that the planning authority will require further investigation of the features recorded in trench 1. This may comprise mechanical stripping of the new-build area around trench 1, followed by the identification, excavation and recording of archaeological features.

2. Project background

Location (Figure 1)

- 2.1 The site is located at The Miners Welfare Ground, Burradon, North Tyneside (NGR: NZ 2715 7260). The site covers an area of approximately 3.5 hectares, and is bounded by houses to the north, Burradon Road to the west, Kirkwood to the south and open fields to the east.

Development proposal

- 2.2 The proposal is to construct a new primary school with access roads, playing pitches, floodlit games area and skatepark.

Objective

- 2.3 The objective of the scheme of works was to assess the nature, extent and potential significance of any surviving archaeological features within the proposed development area, so that an informed decision may be made regarding the nature, and scope of, any further scheme of archaeological works that may be required in advance of development.

Methods statement

- 2.4 The works have been undertaken in accordance with a Project Design provided by Archaeological Services (PC04.209). Additional works, in the form of four further evaluation trenches, were also conducted.

Dates

- 2.5 Fieldwork was undertaken between 12th and 16th December 2004. This report was prepared between 17th December 2004 and 12th January 2005.

Personnel

- 2.6 The geophysical survey was conducted by Matt Claydon and supervised by Martin Railton. The evaluation trenches were conducted by Graeme Attwood, Al Rae, Mark Randerson and Andy Willis, and supervised by Matt Claydon. This report was prepared by Matt Claydon and Martin Railton, with illustrations by Martin Railton. Specialist analysis was conducted by Dr Charlotte O'Brien (plant macrofossil analysis). The Project Manager was Peter Carne.

Archive

- 2.7 The site code is **BNT04**, for **Burradon, North Tyneside 2004**. The site archive will be deposited with the county HER upon completion. Archaeological Services University of Durham is registered with the **Online AccesS** to the **Index of archaeological investigationS** project (OASIS). The OASIS ID number for this project is **archaeol3-5642**.



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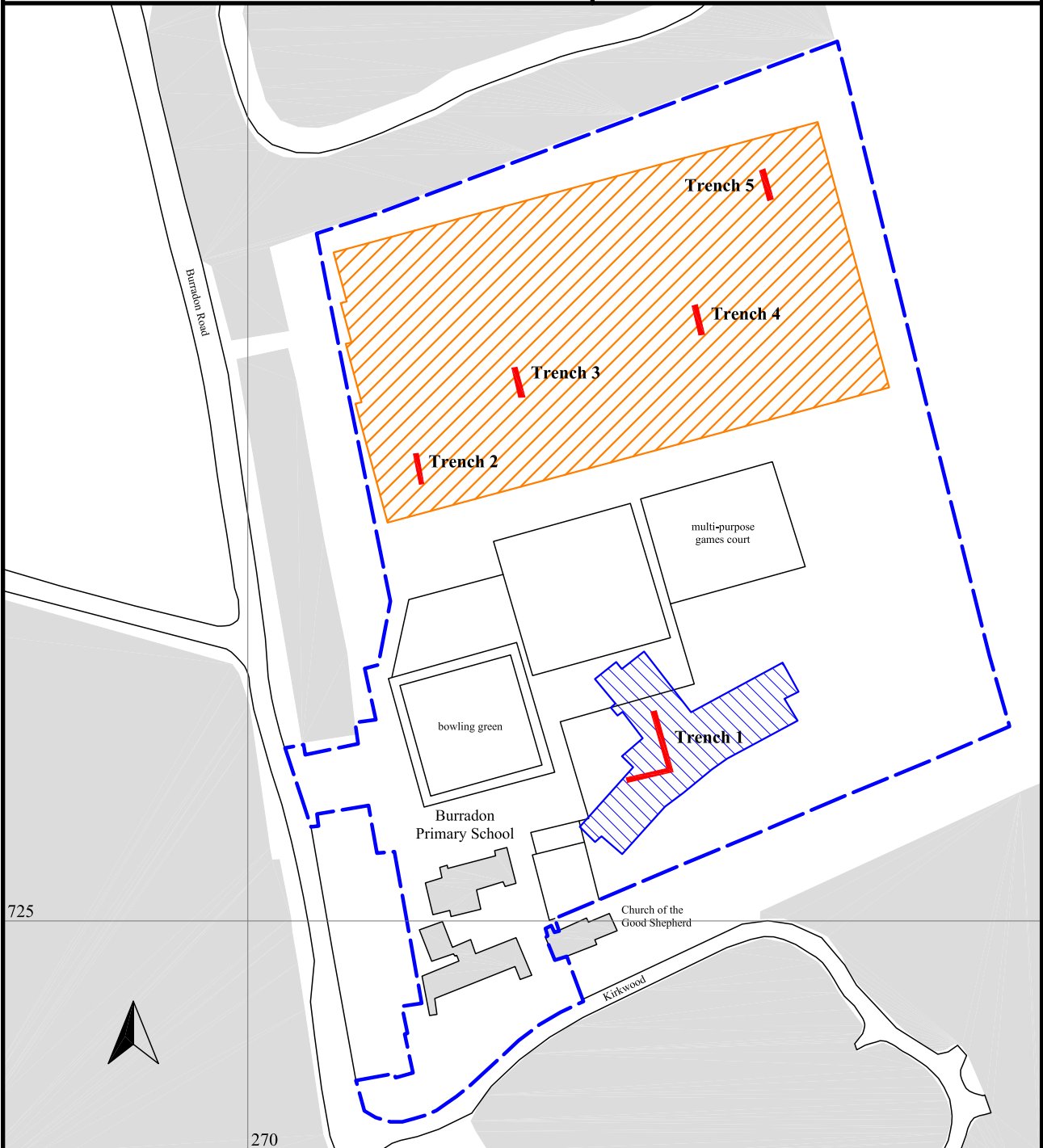
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Figure 1 *Locations of the geophysical survey
and evaluation trenches*

on behalf of
Building Design Agency



scale 1:2000 - for A4 plot



outline of proposed
development area



area of proposed
new school



survey area



evaluation trench

3. Landuse, topography and geology

Landuse and topography

- 3.1 The site is located on recreational land to the east of Burradon Road, Burradon, North Tyneside. The proposed development includes the site of Burradon Primary School and Community Hall and has a mean elevation of c.68m OD.

Geology

- 3.2 The underlying solid geology of the area includes mudstones, shales and limestone with coal seams. The overlying drift deposits are made up of boulder clays. Boreholes taken in the vicinity of the proposed school indicate sandy, gravely clays to a depth of c.5m, sandstone to a depth of c.14m with mudstone with seams of coal below (Robinson Environmental 2003).

4. Historical and archaeological background

The prehistoric period (up to AD 70)

- 4.1 There is evidence for the settlement of this area during the Iron Age. The study area lies within a landscape that appears to have been occupied throughout the Iron Age and into the 3rd century AD. An Early Iron Age enclosure, known as Burradon 1 (HER 305), has been excavated 200m north-west of the development site. A possible Iron Age or Romano-British rectilinear enclosure, known as Burradon 2 (HER 308), has been recorded from cropmarks shown on aerial photographs less than 100m south-west of the site. A third enclosure, Burradon 3 (HER 309), lay less than 100m south of the first, and now lies under a modern housing development. Three further enclosures (HER 177, 758 and 799) lie within 1km of the site, none of which has been accurately dated, but they are believed to belong to the Iron Age or Romano-British period.

The Roman-British period (70 AD to 5th century AD)

- 4.2 Superimposed over the Early Iron Age enclosure settlement of Burradon 1 (HER 305), was a smaller enclosure (HER 306). This square (52m by 48m) enclosure had curved corners and contained a large, round, timber built structure described as a homestead. Roman pottery from the site has been dated to the 2nd century AD.

The medieval period (5th century AD to 1540 AD)

- 4.3 The site may lie within the medieval township of Burradon.

Previous archaeological works

- 4.4 No archaeological investigation has been undertaken on the site of the proposed development. An archaeological assessment (Speak 2003) was commissioned prior to a development at the junction of Burradon Road and Front Street, 150m south of the proposed development area. The results of the assessment suggested that the site lay on the line of a ditch of prehistoric enclosure Burradon 3 (HER 309). A subsequent evaluation trench excavated in 2004 was unable to locate the ditch. The excavation of Burradon 1 (HER 305),

located 200m north-west of the study area, revealed a settlement of Early Iron Age date, overlain by a later Romano-British settlement (Jobey 1970).

5. The geophysical survey

Standards

- 5.1 The survey and reporting were conducted in accordance with English Heritage (1995) Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation*; the Institute of Field Archaeologists (2002) Paper No.6, *The use of geophysical techniques in archaeological evaluations*; and the Archaeology Data Service (2001) *Geophysical Data in Archaeology: A Guide to Good Practice*.

Technique selection

- 5.2 Given the anticipated shallowness of targets (<1.5m in depth) and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting any cut, built and fired archaeological features that might be present. This technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field; such anomalies often reflect archaeological features.

Field methods

- 5.3 A 30m grid was established across the survey area and tied-in to known, mapped Ordnance Survey points.
- 5.4 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601 fluxgate gradiometers with automatic datalogging facilities. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was set to 0.1nT, the sample interval to 0.5m and the traverse interval to 1.0m, thus providing 1800 sample measurements per 30m grid unit.
- 5.5 Data were downloaded on-site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

- 5.6 Geoplot v.3(K) software was used to process the geophysical data and to produce both a continuous tone greyscale image and a trace plot of the raw data. The greyscale image and interpretations are presented at 1:1000 in Figures 2-4; the trace plot is provided in Appendix I. In the greyscale image (Figure 2), positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. A palette bar relates the greyscale intensities to anomaly values in nanoTesla.

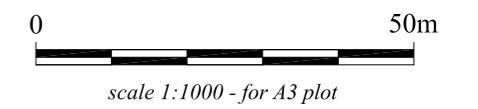
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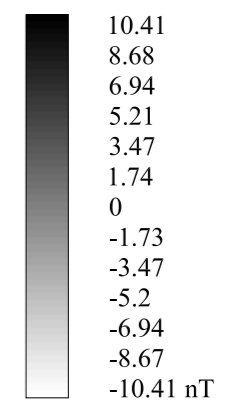
Figure 2

Geophysical survey

on behalf of
Building Design Agency



 outline of proposed
development area



- 5.7 The following basic processing functions have been applied to the data:
- Zero mean traverse* – sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities.
- Despike* – locates and suppresses random iron spikes in gradiometer data.
- Interpolate* – increases the number of data points in a survey; to match sample and traverse intervals and so create a smoother appearance to the data. In this instance the gradiometer data have been interpolated from 1.0 x 0.5m intervals to 0.5 x 0.5m intervals.

Interpretation: anomaly types

- 5.8 A colour-coded geophysical interpretation plan is provided in Figure 3. Two types of geomagnetic anomaly have been distinguished in the data:

- positive magnetic* regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches.
- dipolar magnetic* paired positive-negative magnetic anomalies, which typically reflect ferrous or fired debris and/or fired structures such as kilns or hearths.

Interpretation: features

- 5.9 A colour-coded archaeological interpretation plan is provided in Figure 4.
- 5.10 A concentration of small dipolar magnetic anomalies was detected throughout the survey area. These almost certainly reflect items of near-surface ferrous and fired litter and are not referred to again in the following interpretations.
- 5.11 A number of intense dipolar magnetic anomalies were detected around the periphery of the survey area and running across this area in a north-west to south-east direction. These were due to the presence of metal fences which subdivided the field.
- 5.12 An intense dipolar magnetic anomaly with a square outline on the south side was detected in the western half of the survey area. This measured c.26m by c.22m and was interpreted as an area of disturbed ground containing stone/brick rubble and/or ferrous debris.
- 5.13 Two linear positive magnetic anomalies were detected in the western half of the survey area running north-west to south-east. A pattern of regularly spaced, linear weak positive magnetic anomalies were also detected running roughly east to west. These were interpreted as probable land drains.

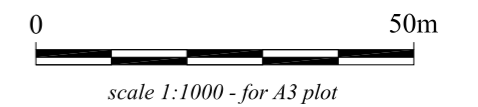
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


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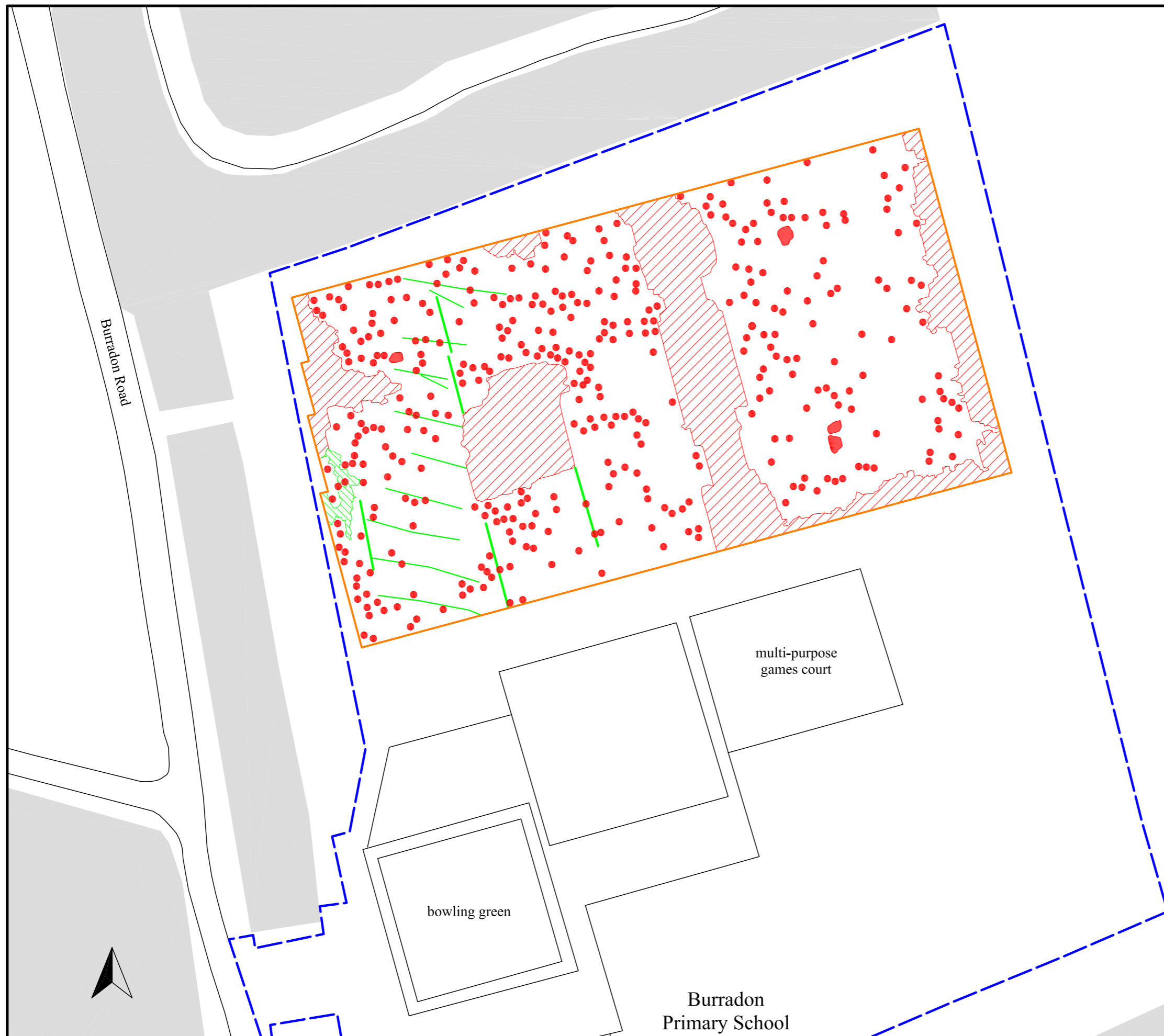
Figure 3

Geophysical interpretation

on behalf of
Building Design Agency



-  outline of proposed development area
-  outline of survey area
-  positive magnetic anomalies
-  dipolar magnetic anomalies



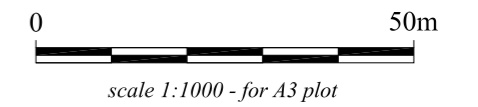
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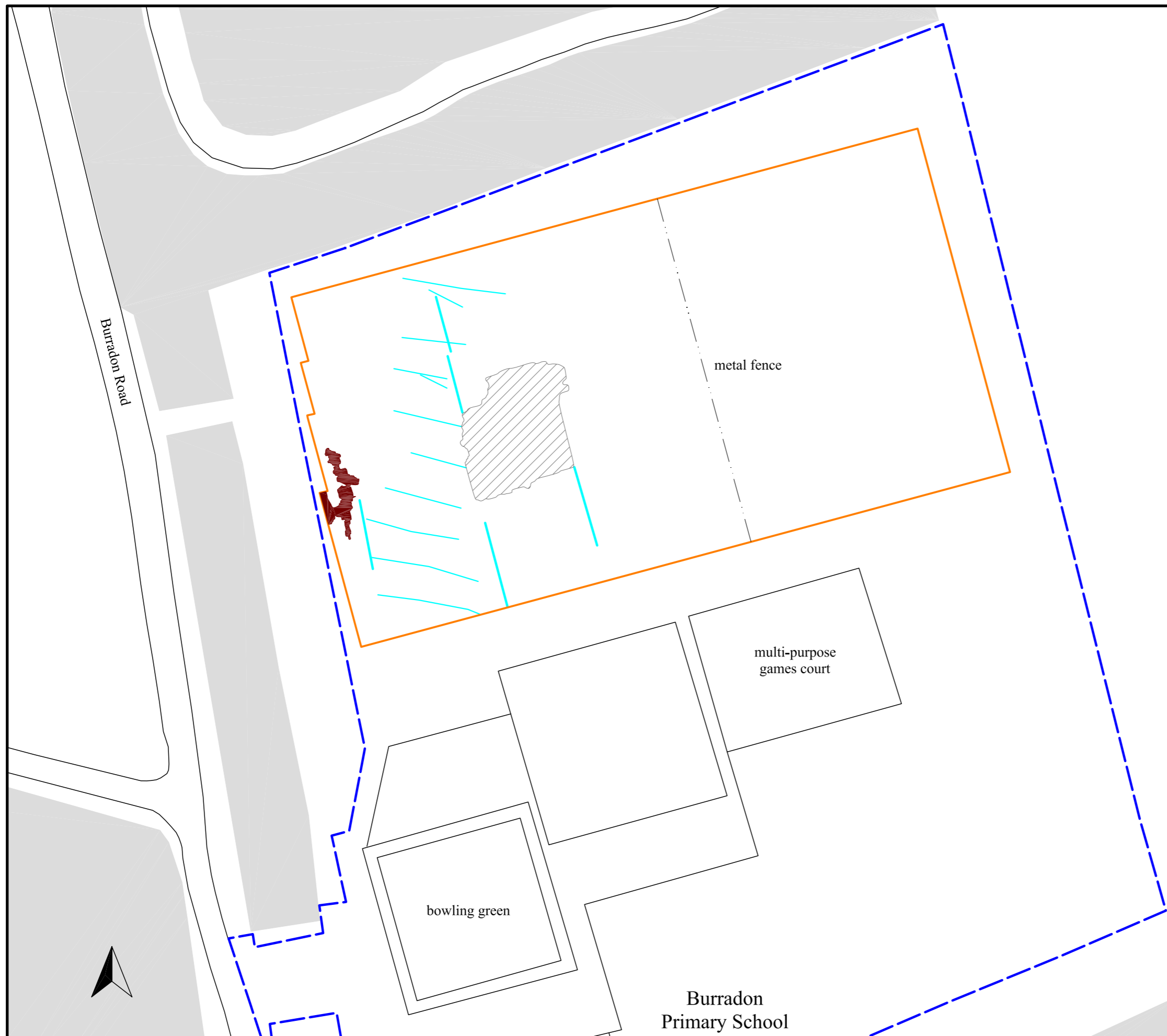
Figure 4

Archaeological interpretation

on behalf of
Building Design Agency



-  outline of proposed development area
-  outline of survey area
-  probable land drains
-  area of disturbed ground
-  possible soil-filled feature



- 5.14 A 3m wide irregular positive magnetic anomaly was detected close to the western edge of the survey area and was interpreted as a possible soil-filled feature.

6. The evaluation trenches

Introduction

- 6.1 Five trenches were opened over the site (Figure 1). A JCB fitted with a toothless ditching bucket was used to remove the topsoil and modern overburden. All features were excavated by hand and written, drawn and photographic records were made.

Trench 1 (Figure 5)

- 6.2 This trench was 'L' shaped in plan and was located within the area of the proposed new school. One axis of the trench ran from east to west, at the eastern end the trench turned 90 degrees to the north. Each axis of the trench measured c.20m by 1.5m. Natural subsoil, an orange-brown boulder clay [3] was reached at a depth of 0.6m at the south end of the trench, sloping to 0.96m at the northern end of the north-south axis; the depth remained a constant 0.6m on the east-west axis. The subsoil was cut by two linear, or possibly curvilinear ditches lying on a roughly north-east/south-west alignment. Both features measured 1.8m in width and 0.2m in depth, and were located 4m apart in the east-west axis of the trench. Feature [F8] was located to the west and was filled with a friable mid yellow-brown sandy clay silt [7]. Ditch [F10] was located to the east and was filled with a similar material [9]. A linear ditch was also recorded in the north-south axis of the trench. The feature [F12] measured approximately 1.4m in width and 0.4m in depth and lay on a roughly north-east/south-west alignment. It was filled with a friable mid yellow-brown sandy silty clay [11]. It was presumed that the feature was a continuation of one of the ditches in the east-west axis of the trench. The features were overlain by a 0.2m thick layer of brown silty clay [4]. This deposit was overlain by a thick deposit of clinker and ash [5], which measured 0.06m in depth at the south end of the trench, increasing to 0.54m thickness in the north. This material appears to have been used to terrace the ground into two levels over what was originally a gradual slope. The clinker layer was overlain by a 0.22m thick layer of topsoil and turf [1].

Trenches 2, 4 and 5

- 6.3 Trenches 2, 4 and 5 were located over the sports pitches in the north of the site. Each trench measured 10m by 1.5m and lay on a north-south alignment. Natural clay subsoil [3] was reached at a depth of 0.35m. This was overlain by a 0.15m thick layer of brown silty clay [4] which was overlain by 0.2m of topsoil and turf [1]. No features or artefacts were identified.

Trench 3

- 6.4 Trench 3 was located over a square anomaly recorded on the geophysical survey. The trench measured 10m by 1.5m and lay on a roughly north-south alignment. Natural clay subsoil [3] was reached at a depth of 0.35m. This was

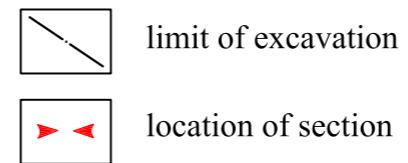
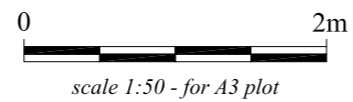
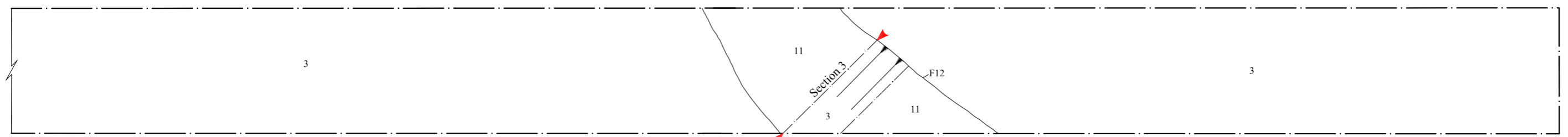
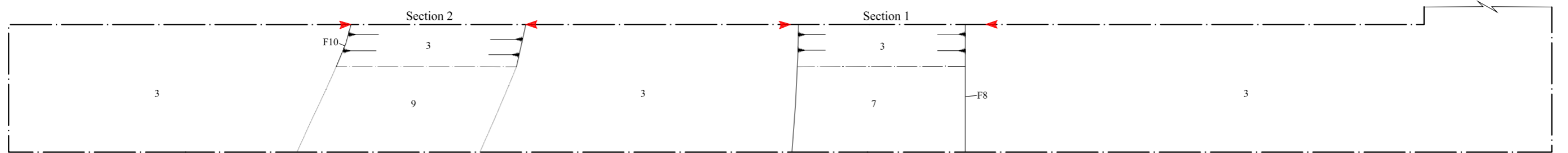
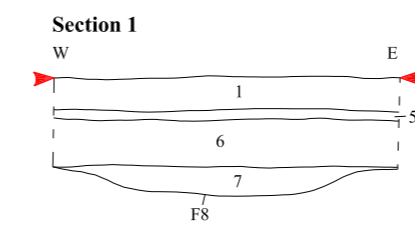
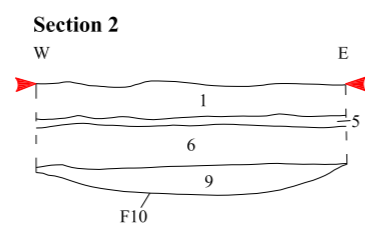
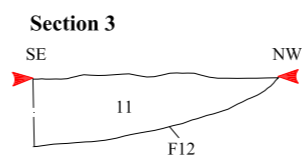


Figure 5
Plan and sections of Trench 1



continued below



continued above



overlain by a 0.15m thick layer of brown silty clay [4] which was overlain by 0.1m thick lens of clinker [2] extending 3.2m from the northern end of the trench. A 0.2m thick layer of topsoil and turf [1] overlay the trench. No features or artefacts were identified.

7. The finds

Pottery

- 7.1 Two small sherds of light tan coloured, unglazed buff-ware with frequent small quartz inclusions were recovered from the environmental sample of context [9]. This may date ditch [F10] to the medieval period.

8. The environmental evidence

Plant microfossils

Methods statement

- 8.1 Sediment from three contexts was assessed. Five litres of each sample were manually floated and sieved through a 500 μ mesh. The residues were retained, described and scanned using a magnet for ferrous fragments. The flots were dried slowly and scanned at x 40 magnification for waterlogged and charred botanical remains. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services, University of Durham. Total numbers of remains per species were logged and the results were interpreted in their archaeological and palaeoecological contexts. Plant taxonomic nomenclature follows Stace (1997).

Results

- 8.2 The contexts produced low volumes of flot. The only plant macrofossil was an uncharred orache seed in context [11]. Small amounts of coal and modern roots were present in all of the contexts, and two small pieces of pot occurred in context [9]. The contents of the residues and flots are listed in Appendix 2, Table 1.

Discussion

- 8.3 The aerobic, well-drained nature of the sediment has resulted in poor preservation of plant remains. It has also allowed the penetration of modern roots which were present in small quantities in all of the flots. An uncharred seed of orache occurred in context [11]. Oraches grow in open, disturbed areas and on cultivated ground.
- 8.4 The flots also contained small amounts of coal which may represent fuel waste or may be a later contaminant.

Recommendations

- 8.5 No further work is recommended for the contexts.

9. Conclusions and recommendations

- 9.1 No features of archaeological significance were recorded in trenches 2-5, located over the sports pitches in the north of the site.
- 9.2 Three linear ditch features were recorded in trench 1. Two small sherds of possible medieval pottery were recovered from one of the features.
- 9.3 It is likely that the planning authority will require further investigation of the features recorded in trench 1. This may comprise mechanical stripping of the new-build area around trench 1, followed by the identification, excavation and recording of archaeological features (Figure 1). A costed project design for this work can be provided as necessary. As it is not practical or cost-effective to excavate 100% of each archaeological feature, a strategy of sample excavation is likely to be agreed and used on site as follows: 50% of discrete features such as pits and post-holes; 10% of linear features such as ditches; other features excavated with discretion, in terms of potential added value.

10. References

- Archaeology Data Service 2001 *Geophysical Data in Archaeology: A Guide to Good Practice*.
- Archaeological Services University of Durham 2004 *Burradon, North Tyneside; archaeological desk-top assessment*, ASUD Report 1152
- English Heritage 1995 Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation*.
- Institute of Field Archaeologists 2002 Paper No.6, *The use of geophysical techniques in archaeological evaluations*.
- Robinson Environmental, 2003 *Phase 1: Desk top study report*
- Robinson Environmental, 2003 *Phase 2: Ground investigation report*
- Stace, C. (1997) *New Flora of the British Isles*. 2nd Edition. Cambridge University Press.

Appendix 1: Context data

Context no	Description
[1]	Topsoil, all trenches
[2]	Clinker layer, trench 3
[3]	Natural clay, all trenches
[4]	Loam subsoil, trenches 2-5
[5]	Clinker layer, trench 1
[6]	Loam subsoil, trench 1
[7]	Fill of ditch [F8], trench 1
[F8]	Cut for ditch, trench 1
[9]	Fill of ditch [F10], trench 1
[F10]	Cut for ditch, trench 1
[11]	Fill of ditch [F11], trench 1
[F12]	Cut for ditch, trench 1

Appendix 2: Environmental data table

Table 1: Contents of the residues and flots from BNT04.

Sample	1	2	3
Context	7	9	11
<i>Volume processed (ml)</i>	5000	5000	5000
<i>Volume of flot (ml)</i>	25	5	10
<i>Volume of flot assessed (ml)</i>	25	5	10
<i>Residue contents</i>			
Pot	-	2 small pieces	-
<i>Flot matrix (relative abundance)</i>			
Coal	1	1	1
Modern roots	1	1	1
<i>Waterlogged remains (total counts)</i>			
(r) <i>Atriplex</i> sp (Orache)	-	-	1

(r: ruderal)

Relative abundance is based on a scale from 1 (lowest) to 5 (highest).

Appendix 3: Stratigraphic matrices

