

ARCHAEOLOGICAL
SERVICES
DURHAM UNIVERSITY

on behalf of
URS/Scott Wilson

Tunstall Farm
Valley Drive
Hartlepool

geophysical survey phase 2

report 2776
November 2011

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1. Summary

The project

- 1.1 This report presents the results of two programmes of geophysical survey conducted in advance of a proposed development at Tunstall Farm, Valley Drive, Hartlepool. The works comprised approximately 4ha of geomagnetic survey in three areas.
- 1.2 The works were commissioned by URS/Scott Wilson and conducted by Archaeological Services Durham University.

Results

- 1.3 Possible roundhouses have been identified. Similar features are known at the nearby Iron Age settlement site at Catcote.
- 1.4 Probable soil-filled ditch features, possibly associated with enclosure systems, have been detected.
- 1.5 A number of discrete features, possibly relating to soil-filled pit features, have been detected.
- 1.6 Former ridge and furrow cultivation has been detected in all of the survey areas.
- 1.7 Another former ploughing regime has been detected in Area 2.
- 1.8 Possible deposits of organic material or drift geology have been detected in Area 3.

2. Project background

Location (Figure 1)

- 2.1 The survey area was located on land at Tunstall Farm, Valley Drive, Hartlepool (NGR centre: NZ 4854 3185). Three surveys totalling approximately 4ha were conducted in three land parcels. To the north and west was housing along Valley Drive and Hylton Road; to the east and south was open farmland.

Development proposal

- 2.2 Taylor Wimpey Ltd proposes to submit a detailed planning application for development of the site.

Objective

- 2.3 The objectives of the survey were: to establish if the occupation remains investigated to the south of the site extend into the assessment area; to establish the presence or absence of any archaeological anomalies within the area of proposed development; to define the extent of any such anomalies; to characterise, if possible, any features or anomalies recorded; and to inform the requirement for further archaeological works (if required).

Methods statement

- 2.4 The surveys have been undertaken in accordance with a specification provided by the URS/Scott Wilson and approved by Peter Rowe, the Sites and Monuments Record Officer at Tees Archaeology (Appendix).

Dates

- 2.5 Fieldwork was undertaken in two phases: 18th August and 19th October 2011. This report was prepared for November 2011.

Personnel

- 2.6 Fieldwork was conducted by Duncan Hale, Natalie Swann, Lorne Elliott and Andy Platell. The geophysical data were processed by Duncan Hale. This report was prepared by Lorne Elliott, with illustrations by David Graham, and edited by Duncan Hale, the Project Manager.

Archive/OASIS

- 2.7 The site code is **HTF11**, for **Hartlepool Tunstall Farm 2011**. The survey archive will be supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **Online Access** to the **Index of archaeological investigationS** project (**OASIS**). The OASIS ID number for this project is **archaeol3-113142**.

3. Historical and archaeological background

- 3.1 A Cultural Heritage Assessment is being prepared by URS/Scott Wilson which will include a detailed summary of the historical and archaeological background of the site and its surrounding area. The following is taken from the specification provided by the client (Appendix).

Prehistoric

- 3.2 Dominating the landscape within which the site sits is the historic town of Hartlepool. This is surrounded on three sides by the sea. The original part of the settlement sits on a limestone peninsula, which is referred to as the Heugh at Hartlepool. The bay to the south originally comprised forest interspersed with peat bog in c. 8000 BC and is thought to have been part of a tidal island. The area covered by this stretches for approximately 400m either side of Newburn Bridge, which lies to the east of the site. Parts of the ancient peat bogs are visible at low tide and documents dating to the 13th century infer that parts of the ancient woodland were still visible. During the 19th century a number of tree trunks were found during excavation of the area known as the Slake. This region was exploited in the prehistoric period evidenced by the recovery of a number of Mesolithic tools to the east of the site near to Bellmont Gardens. Erosion of the peat bogs in 1984 produced further evidence for the continued exploitation of the area. Recorded were two metres of wattle hurdling, which dated to 3600 BC. This was interpreted as part of a fish trap and similar remains were recovered during sea defensive works between 1995 and 2002. The area continued to be exploited in the Neolithic period in part evidenced by the discovery of a skeleton in 1971. The human remains dated to around 2700 BC and it was determined that it had been placed in a crouched position on the surface of the peat. It is likely that this area continued to be used throughout the Bronze Age, however, there is currently no evidence to support this.
- 3.3 A Bronze Age settlement was discovered immediately to the south of the site during the levelling of the playing fields at Catcote School in 1963. Extensive remains were discovered which prompted excavations in 1964, 1987 and from 1998 onwards. The Bronze Age settlement lay to the north of Summerhill Country Park's visitor centre and comprised a series of enclosures, within which were found the postholes for small buildings. Further evidence for the Bronze Age was found to the south of the aforementioned country park. The site consists of two Bronze Age round barrows, one of which included three cist burials. Further ritual evidence was discovered during metal detecting to the north of the site near to High Throston. Investigation of the area revealed a pit, which contained ash, various bronze artefacts and the remains of a vessel, which were found to date to the 8th or 9th century BC. Further Bronze Age ritual activity in the form of an urn was found to the northeast of the site near to Glendale Avenue and a stone cist recorded below Dalton Park Plantation may also relate to this period.
- 3.4 An Iron Age settlement was established in close proximity to the Bronze Age settlement referred to above. This consisted of a system of routeways and ditched enclosures containing roundhouses. Later development within the settlement includes rectangular stone buildings. The settlement continued in use until the end of the Iron Age and later. The quantity and high status of some of the finds recovered suggests that the settlement was of some importance. Burials were found within the locality, which included groups of two or three individuals. Some of these were placed in old boundary ditches or abandoned buildings. Due to the close proximity of the remains there is the potential for associated features including field systems to occur within the site. Analysis of aerial photographs indicates that there are linear features and possible enclosures within the site which may be associated with the activity to the south.

Roman

- 3.5 Excavation has determined that the Iron Age settlement situated to the south of the site continued in use into the Roman period and stone buildings including a possible grain store make an appearance. It has been suggested that at this time the settlement served as a local centre for trading with coastal shipping. Aerial photographs indicate the existence of features within the site which may be associated with the Roman remains immediately to the south. Further evidence for Roman activity has been found at Newton Bewley to the south of the site near to Billingham.

Medieval

- 3.6 Historical documents infer that Hartlepool was established as a Saxon settlement with the land surrounding it including the site given over to agriculture. The name Hartlepool is probably derived from the Saxon words Heorot eg pol. Heorot is Saxon for hart. The word eg refers to island or peninsula and pol meant pool or bay. In AD 640 St Aidan established a monastery near to the site of St Hilda's Church. The first abbess was an Irish Princess named Hieu who was succeeded by St Hilda until AD 657 when she left and founded Whitby Monastery. During the 8th century the monastery declined and by the 9th century it was in a state of ruin. Some accounts suggest that it was destroyed by the raiding Danes in this period but excavation of a number of Northumbrian monasteries suggests they were abandoned following the political troubles of the late 8th century. In the early 19th century the cemetery associated with the monastery was discovered. Further burial activity was found to the south of the site during the excavations of the Romano-British settlement. These comprised cist burials which is a burial practice dating to 5th/ 6th century. This suggests that the Romano-British settlement continued into the early medieval period. Further cist burials were found to the south of Summerhill Country Park in 1949 during extraction. These were deemed to be of Anglo-Saxon date based on their typology.
- 3.7 Analysis of the 1857 1st edition Ordnance Survey map shows that the site and immediate area comprised a series of open fields. Those to the east consist of slightly curved field boundaries which replicate the line of the medieval furrows or headlands suggesting that the site and surrounding area was farmed in the medieval period. Further evidence occurs to the southwest near to Field House Farm and apparent on aerial photographs to the north of Abbey Hill Farm adjacent to the medieval village of Elwick, are the remains of medieval fishponds, two enclosures and a section of open field system. The area covered by these features is designated as a Scheduled Ancient Monument. It is thought that these features are associated with the former medieval Elwick Hall. Medieval remains also exist 1.44km to the north of the site near to Hart Lane. This comprises the Deserted Medieval Settlement of Low Throston, which is designated as a Scheduled Monument.
- 3.8 Hartlepool, to the west of the site, continued to grow in the 11th century and documents suggest that at this time Robert de Brus was given lands in the area and became Lord of Hartness and Lord of the Manor of Hartlepool. There are various references to the town in the 12th century, with one document referring to it as Hertepol. The settlement continued to grow throughout the medieval period and became a well established port, which was borne out by the booming fishing industry. The harbour was an important part to the settlement and was originally founded by the de Brus family. Throughout the centuries the port was continually

developed by the family to take full advantage of coastal trade. The port soon monopolised the shipping of the Durham Bishopric and was one of the busiest places on the eastern coast. It is purported that in the early 13th century the town had a population of several hundred and consisted of a few main streets including Southgate Street, St Marys Street and St Helens Street which still form part of the old town. In 1201 King John granted Hartlepool its first charter and the merchants of Hartlepool were given the same status as those in Newcastle. At this time the coastal port and town became a fortified peninsula at the heart of which was St Hilda's Church, which dates from the 13th century. This was originally built as a burial place for Norman de Brus.

- 3.9 Throughout its medieval history the town has been the focus of a number of attacks due to its strategic position and important port. The first attack came in 1068 when settlements between York and the River Tees were subject to varying degrees of destruction. Accounts dating to 1153 refer to another attack on the port from Norwegian pirates under King Eystein in 1153. The port was also the landing platform for 40 knights and 500 infantry in 1174. They were brought in to help the Scottish campaigns but shortly after their landing the Scots were defeated and subsequently they returned to Belgium. The port became a regular target for marauding Scots and sea borne attacks, which lead to the fortification of the peninsula with defensive walls by Robert de Brus. Accounts dating to 1315 suggest that funds were made available for this from King Edward II and the Archbishop of Durham. In the same year King Robert de Brus attacked the town a year after he defeated King Edward I at Bannockburn. It has been suggested that the reason for the attack was due to fact that King Edward sort refuge there after his defeat at Bannockburn.
- 3.10 In 1569 the Spanish Ambassador had instructed northern rebels to capture the town to facilitate the landing of troops from the Netherlands and to aid his military campaigns. To prevent this, the Earl of Sussex ordered that the town be garrisoned but this order was not acted upon, subsequently northern rebels led by Lord Neville seized Hartlepool. In December of the same year a Royal ship engaged the rebels who were eventually dispelled.

Post-medieval - Early Modern

- 3.11 Analysis of the historic Ordnance Survey map series demonstrates that the site was divided into various parcels of land through 18th-century Parliamentary enclosure. These have largely remained unaltered apart from the disappearance of an enclosure immediately to the south of Tunstall Farm. Hartlepool to the west saw significant development in the post-medieval period with its relentless expansion into the once agricultural landscape. Such development began to occur in the 16th/17th centuries in part due to its strategic coastal position, which was the cause for a number of conflicts. During the English Civil War (1642-9) the town was occupied by the Scots troops in 1644, evidence for which was visible in the early 19th century to the northeast of the site near to Hylton Road. This comprised Civil War entrenchments belonging to the Scots army. It is possible that associated earthworks may occur within the northeastern extent of the site.
- 3.12 By the 18th century the town's importance began to waiver, in part due to the decline of the port, which gradually fell into disrepair. This was aggravated by the partial destruction of the old pier during a storm and the introduction of a toll on

ships using the port. By the 19th century the port was more or less redundant and became known merely as a health resort rather than a strategic port. Further demise was seen due to the enclosure of the harbour for agricultural purposes in the early 19th century; however, a petition forced the reverse of the enclosure in 1813. To improve the economic situation of the town a new docks was built in 1835 and a railway was laid in 1839, which connected Hartlepool to other towns. This infrastructure made it possible to export coal from the Durham coalfield through Hartlepool. As a result Hartlepool boomed and by 1841 it had a population of 5,236 and by 1851 it had reached 9,227.

- 3.13 During the mid-19th century a new town known as West Hartlepool developed. It began when the owners of the railway and the proprietor of the docks fell out, subsequently the railway owners decided to build their own docks to the southwest of the town. These were completed in 1847. By the 1880s West Hartlepool had overtaken the size of the old town and by 1881 it had a population of 28,000, which almost trebled by the turn of the century with it recorded at 63,000. For many years the two towns were separate but merged as one in 1966 under the Hartlepool Order. During this period of expansion the town encroached into the area which sits above the site. No development occurred within the site boundary.
- 3.14 Located to the north of the site immediately to the north of Egerton Road is Ward Jackson Park, which is designated as a Registered Historic Park and Garden. The park opened in 1883 and was designed by Matthew Scott, son of the Town Surveyor. It became the focus of a number of roads including Elwick Road and Park Avenue which were flanked by fashionable late 19th-century villas. Residing on the edge of the park is a World War II box. A further one is recorded to the west of the site near to Abbey Mill Farm.

4. Landuse, topography and geology

- 4.1 At the time of survey the proposed development area comprised one field of pasture and two fields cut for hay or silage. A number of geotechnical test pits had been excavated in the areas.
- 4.2 The topography was gently undulating with a mean elevation of approximately 30m OD. Area 1 occupied slightly higher ground than Areas 2 and 3 to the east. Area 3 slopes down towards a drain at the eastern end of the survey area.
- 4.3 The underlying solid geology of the area comprises Permian strata of the Zechstein Group: Dolomitic Limestone and Argillaceous rocks, which are overlain by Devensian Till.

5. Geophysical survey Standards

- 5.1 The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) *Draft Standard and Guidance for archaeological geophysical survey* (2010); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden

2002); and the Archaeology Data Service *Guide to Good Practice: Geophysical Data in Archaeology* (draft 2nd edition, Schmidt & Ernenwein 2011).

Technique selection

- 5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.
- 5.3 In this instance, based on previous work in the vicinity, it was considered likely that cut features such as ditches and pits might be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) might also be present.
- 5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

Field methods

- 5.5 A 30m grid was established across each survey area and tied-in to known, mapped Ordnance Survey points using a Leica GS15 global navigation satellite system (GNSS) with real time kinematic (RTK) corrections.
- 5.6 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval was 0.25m and the traverse interval was 1m, thus providing 3,600 sample measurements per 30m grid unit.
- 5.7 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

- 5.8 Geoplot v.3 software was used to process the geophysical data and to produce both continuous tone greyscale images and trace plots of the raw (minimally processed) data. The greyscale images and interpretations are presented in Figures 2-4; the trace plots are provided in Figure 5. In the greyscale images, 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.
- 5.9 The following basic processing functions have been applied to each dataset:

<i>clip</i>	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
<i>zero mean traverse</i>	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
<i>destagger</i>	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
<i>interpolate</i>	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

Interpretation: anomaly types

- 5.10 A colour-coded geophysical interpretation plan is provided. Three types of geomagnetic anomaly have been distinguished in the data:

<i>positive magnetic</i>	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
<i>negative magnetic</i>	regions of anomalously low or negative magnetic field gradient, which may correspond to features of low magnetic susceptibility such as wall footings and other concentrations of sedimentary rock or voids
<i>dipolar magnetic</i>	paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths

Interpretation: features

General comments

- 5.11 Colour-coded archaeological interpretation plans are provided.
- 5.12 Except where stated otherwise in the text below, positive magnetic anomalies are taken to reflect relatively high magnetic susceptibility materials, typically sediments in cut archaeological features (such as ditches or pits) whose magnetic susceptibility has been enhanced by decomposed organic matter or by burning.
- 5.13 Series of parallel, weak, positive and negative magnetic anomalies, which almost certainly reflect former ridge and furrow cultivation, have been detected aligned broadly east/west across Areas 1 and 2, and approximately north-west / south-east in Area 3.
- 5.14 Small, discrete dipolar magnetic anomalies have been detected in all of the survey areas. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments, and in most cases have little or no archaeological significance. A sample of these is shown on the geophysical interpretation plan, however, they have been omitted from the archaeological interpretation plan and the following discussion.

Area 1

- 5.15 Two parallel, strong positive magnetic anomalies have been detected aligned north/south in the east of this area. These almost certainly reflect soil-filled features; the results of the archaeological evaluation indicate that these are modern field drains. A series of perpendicular positive magnetic anomalies appear to connect these two features; the results of the archaeological evaluation indicate that these are furrows.
- 5.16 A number of discrete positive magnetic anomalies have been detected in this area. These may reflect soil-filled pit features, such as midden dumps or clay extraction pits.
- 5.17 A number of linear positive magnetic anomalies have been detected in the south of the survey area which could be interpreted as soil-filled ditches; the results of the archaeological evaluation indicate that these are a furrow and a field drain.
- 5.18 A large and diffuse, roughly semi-circular, positive magnetic anomaly has been detected in the north of the survey area. This could reflect a soil-filled feature.
- 5.19 A weak positive magnetic anomaly has been detected in the south-east corner of the survey area. This could reflect a soil-filled ring-ditch, such as might be associated with a roundhouse.
- 5.20 A weak positive magnetic anomaly, which may reflect the remains of a soil-filled ditch or elongated pit, has been detected in the north-east of the survey area.
- 5.21 The concentration of dipolar magnetic anomalies detected on the west edge of the area corresponds to an area of disturbance noted on the ground.
- 5.22 A chain of dipolar magnetic anomalies detected along the eastern edge survey area almost certainly reflects a modern service. This may account for a drop in the land surface of up to 1 metre, between Areas 1 and 2.

Area 2

- 5.23 A number of linear positive magnetic anomalies, which may reflect soil-filled ditch features, have been detected in this area. There is a concentration of these features in the south-west of the area, which may reflect the remains of an enclosure system. Two of these anomalies in the western half of the survey aligned broadly north/south and east/west, may reflect a double-ditched enclosure or droveway.
- 5.24 A few sub-circular, weak positive magnetic anomalies have been detected in this area. These measure approximately 10m in diameter and may reflect ring-ditches associated with Iron Age roundhouses, such as those investigated to the south of the area.
- 5.25 A number of discrete positive magnetic anomalies, which could reflect soil-filled pits, have been detected in this area.

- 5.26 Parallel lines of closely spaced, weak, positive and negative magnetic anomalies have been detected aligned broadly north-east/south-west. This 'texture' may reflect a former ploughing regime.
- 5.27 The concentrations of dipolar magnetic anomalies detected in the south-west of the area are likely to be associated with the construction and use of a farmer's track which was noted on the ground.
- 5.28 A small, strong dipolar magnetic anomaly detected on the east of the south edge of the area corresponds to the location of a water cover.

Area 3

- 5.29 Two large diffuse, curvilinear positive magnetic anomalies have been detected in the south-east corner of the survey. These anomalies correspond with a slope in the topography down towards a small channel/drain, and possibly reflect deposits of organic material or drift geology rather than archaeological features.

6. Conclusions

- 6.1 Approximately 4ha of geomagnetic survey were undertaken at Tunstall Farm, Valley Drive, Hartlepool, prior to a housing development.
- 6.2 Possible roundhouses have been identified. Similar features are known at the nearby Iron Age settlement site at Catcote.
- 6.3 Probable soil-filled ditch features, possibly associated with enclosure systems, have been detected.
- 6.4 A number of discrete features, possibly relating to soil-filled pit features, have been detected.
- 6.5 Former ridge and furrow cultivation has been detected in all of the survey areas.
- 6.6 Another former ploughing regime has been detected in Area 2.
- 6.7 Possible deposits of organic material or drift geology have been detected in Area 3.

7. Sources

- David, A, Linford, N, & Linford, P, 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage
- Gaffney, C, Gater, J, & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*. Technical Paper 6, Institute of Field Archaeologists
- IfA 2010 *Draft Standard and Guidance for archaeological geophysical survey*. Institute for Archaeologists
- Schmidt, A, & Ernenwein, E, 2011 (draft) *Guide to Good Practice: Geophysical Data in Archaeology*. Archaeology Data Service

Appendix: Project specification



Tunstall Farm, Valley Drive - Hartlepool

Geophysical Survey Specification

July 2011

Prepared for
Taylor Wimpey Ltd

Taylor Wimpey Ltd
Tunstall Farm, Valley Drive

Revision Schedule

Geophysical Survey Specification July 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	July 2011	Draft	Jim MacQueen Principal Consultant - Heritage	Neil MacNab Principal Archaeologist	Annette Roe Technical Director
02	July 2011	Draft 2	Jim MacQueen Principal Consultant - Heritage	Neil MacNab Principal Archaeologist	Annette Roe Technical Director

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Taylor Wimpey Ltd
Tunstall Farm, Valley Drive

1 Introduction

Project background

- 1.1 This specification has been prepared by URS Scott Wilson Ltd in consultation with Peter Rowe (Sites and Monuments Record Officer, Tees Archaeology) and it describes the requirements for a geophysical survey. The survey will form part of the Cultural Heritage Assessment which is being prepared for Taylor Wimpey Ltd as part of a detailed planning application.
- 1.2 The specification and accompanying drawings (refer to Appendix 1) detail the requirements for geophysical survey to inform the requirement for further work, if necessary.
- 1.3 The proposed works include 3.42ha of detailed magnetometry which is to be carried out at locations shown on the Figure 2 (see Appendix 1).
- 1.4 The archaeological fieldwork, post-survey assessment, archiving, analysis and preparation of the fieldwork report text will be undertaken by the 'Contractor', unless specified otherwise in this specification.

Site location and Geology

- 1.5 The site is located on the south western fringes of Hartlepool, immediately to the south of Valley Drive. Immediately to the north of the site is terraced housing and to the south is agricultural land. Just below the southern boundary are a number of buildings which pertain to Tunstall Farm.
- 1.6 The drift geology of the area comprises glacial till which overlies Dolomitised Limestone and Dolomite.

2 Archaeological/ Historical Background

Prehistoric

- 2.1 Dominating the landscape within which the site sits is the historic town of Hartlepool. This is surrounded on three sides by the sea. The original part of the settlement sits on a limestone peninsula, which is referred to as the Heugh at Hartlepool. The bay to the south originally comprised forest interspersed with peat bog in c. 8000 BC and is thought to have been part of a tidal island. The area covered by this stretches for approximately 400m either side of Newburn Bridge, which lies to the east of the site. Parts of the ancient peat bogs are visible at low tide and documents dating to the 13th century infer that parts of the ancient woodland were still visible. During the 19th century a number of tree trunks were found during excavation of the area known as the Slake. This region was exploited in the prehistoric period evidenced by the recovery of a number of Mesolithic tools to the east of the site near to Belmont Gardens. Erosion of the peat bogs in 1984 produced further evidence for the continued exploitation of the area. Recorded were two metres of wattle hurdling, which dated to 3600 BC. This was interpreted as part of a fish trap and similar remains were recovered during sea defensive works between 1995 and 2002. The area continued to be exploited in the Neolithic period in part evidenced by the discovery of a skeleton in 1971. The human remains dated to around 2700 BC and it was determined that it had been placed in a crouched position on the surface of

Taylor Wimpey Ltd
Tunstall Farm, Valley Drive

the peat. It is likely that this area continued to be used throughout the Bronze Age, however, there is currently no evidence to suggest this.

2.2 A Bronze Age settlement was discovered immediately to the south of the site during the levelling of the playing fields at Carcote School in 1963. Extensive remains were discovered which prompted excavations in 1964, 1987 and from 1998 onwards. The Bronze Age settlement lay to the north of Summerhill Country Park's visitor centre and comprised a series of enclosures, within which were found the post holes for small buildings. Further evidence for the Bronze Age was found to the south of the aforementioned country park. The site consists of two Bronze Age round barrows, one of which included three cist burials. Further ritual evidence was discovered during metal detecting to the north of the site near to High Throston. Investigation of the area revealed a pit, which contained ash, various bronze artefacts and the remains of a vessel, which were found to date to the 8th or 9th century BC. Further Bronze Age ritual activity in the form of an urn was found to the northeast of the site near to Glendale Avenue and a stone cist recorded below Dalton Park Plantation may also relate to this period.

2.3 An Iron Age settlement was established in close proximity to the Bronze Age settlement referred to above. This consisted of a system of routeways and ditched enclosures containing roundhouses. Later development within the settlement includes rectangular stone buildings. The settlement continued in use until the end of the Iron Age and later. The quantity and high status of some of the finds recovered suggests that the settlement was of some importance. Burials were found within the locality, which included groups of two or three individuals. Some of these were placed in old boundary ditches or abandoned buildings. Due to the close proximity of the remains there is the potential for associated features including field systems to occur within the site. Analysis of aerial photographs indicates that there are linear features and possible enclosures within the site which may be associated with the activity to the south.

Roman

2.4 Excavation has determined that the Iron Age settlement situated to the south of the site continued in use into the Roman period and stone buildings including a possible grain store make an appearance. It has been suggested that at this time the settlement served as a local centre for trading with coastal shipping. Aerial photographs indicate to the existence of features within the site which may be associated with the Roman remains immediately to the south. Further evidence for Roman activity has been found at Newton Bewley to the south of the site near to Billingham.

Medieval

2.5 Historical documents infer that Hartlepool was established as a Saxon settlement with the land surrounding it including the site given over to agriculture. The name Hartlepool is probably derived from the Saxon words *Heorot eg pol*. Heorot is Saxon for hart. The word *eg* refers to island or peninsula and *pol* meant pool or bay. In AD 640 St Aidan established a monastery near to the site of St Hilda's Church. The first abbess was an Irish Princess named Hieu who was succeeded by St Hilda until AD 657 when she left and founded Whitby Monastery. During the 8th century the monastery declined and by the 9th century it was in a state of ruin. Some accounts suggest that it was destroyed by the raiding Danes in this period but excavation of a number of the Northumbrian Monasteries suggests they were abandoned following the political troubles of the late 8th century. In the early 19th century the cemetery associated with the monastery was discovered. Further burial activity was found to the south of the site during the excavations of the Romano-British settlement. These comprised cist burials which is a burial practice dating to 5th/ 6th century. This suggests that the Romano-British settlement continued into the early medieval period. Further cist burials were found to the south of Summerhill

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Country Park in 1949 during extraction. These were deemed to be of Anglo-Saxon date based on their typology.

- 2.6 Analysis of the 1857 1st edition Ordnance Survey map shows that the site and immediate area comprised a series of open fields. Those to the east consist of slightly curved field boundaries which replicate the line of the medieval furrows or headlands suggesting that the site and surrounding area was farmed in the medieval period. Further evidence occurs to the southwest near to Field House Farm and apparent on aerial photographs to the north of Abbey Hill Farm adjacent to the medieval village of Elwick, are the remains of medieval fishponds, two enclosures and a section of open field system. The area covered by these features is designated as a Scheduled Ancient Monument. It is thought that these features are associated with the former medieval Elwick Hall. Medieval remains also exist 1.44km to the north of the site near to Hart Lane. This comprises the Deserted Medieval Settlement of Low Throston, which is designated as a Scheduled Monument.
- 2.7 Hartlepool, to the west of the site, continued to grow in the 11th century and documents suggest that at this time Robert de Brus was given lands in the area and became Lord of Hartness and Lord of the Manor of Hartlepool. There are various references to the town in the 12th century, with one document referring to it as *Hertepol*. The settlement continued to grow throughout the medieval period and became a well established port, which was borne out by the booming fishing industry. The harbour was an important part to the settlement and was originally founded by the de Brus family. Throughout the centuries the port was continually developed by the family to take full advantage of coastal trade. The port soon monopolised the shipping of the Durham Bishopric and was one of the busiest places on the eastern coast. It is purported that in the early 13th century the town had a population of several hundred and consisted of a few main streets including Southgate Street, St Marys Street and St Helens Street which still form part of the old town. In 1201 King John granted Hartlepool its first charter and the merchants of Hartlepool were given the same status as those in Newcastle. At this time the coastal port and town became a fortified peninsula at the heart of which was St Hilda's Church, which dates from the 13th century. This was originally built as a burial place for Norman de Brus.
- 2.8 Throughout its medieval history the town has been the focus of a number of attacks due to its strategic position and important port. The first attack came in 1068 when settlements between York and the River Tees were subject to varying degrees of destruction. Accounts dating to 1153 refer to another attack on the port from Norwegian pirates under King Eystein in 1153. The port was also the landing platform for 40 knights and 500 infantry in 1174. They were brought in to help the Scottish campaigns but shortly after their landing the Scots were defeated and subsequently they returned to Belgium. The port became a regular target for marauding Scots and sea borne attacks, which lead to the fortification of the peninsula with defensive walls by Robert de Brus. Accounts dating to 1315 suggest that funds were made available for this from King Edward II and the Archbishop of Durham. In the same year King Robert de Brus attacked the town a year after he defeated King Edward I at Bannockburn. It has been suggested that the reason for the attack was due to fact that King Edward sort refuge there after his defeat at Bannockburn.
- 2.9 In 1569 the Spanish Ambassador had instructed northern rebels to capture the town to facilitate the landing of troops from the Netherlands and to aid his military campaigns. To prevent this, the Earl of Sussex ordered that the town be garrisoned but this order was not acted upon, subsequently northern rebels led by Lord Neville seized Hartlepool. In December of the same year a Royal ship engaged the rebels who were eventually dispelled.

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- 2.10 Located 1.44km to the north of the site within the part of Hartlepool that grew up in the 20th century is the Deserted Medieval Settlement of Low Throston which is designated as a Scheduled Monument.

Post-medieval - Early Modern

- 2.11 Analysis of the historic Ordnance Survey map series demonstrates that the site was divided into various parcels of land through 18th century Parliamentary enclosure. These have largely remained unaltered apart from the disappearance of an enclosure immediately to the south of Tunstall Farm. Hartlepool to the west saw significant development in the post-medieval period with its relentless expansion into the once agricultural landscape. Such development began to occur in the 16th/ 17th centuries in part due to its strategic coastal position, which was the cause for a number of conflicts. During the English Civil War (1642-9) the town was occupied by the Scots troops in 1644, evidence for which was visible in the early 19th century to the northeast of the site near to Hylton Road. This comprised Civil War entrenchments belonging to the Scots army. It is possible that associated earthworks may occur within the northeastern extent of the site.
- 2.12 By the 18th century the town's importance began to waiver, in part due to the decline of the port, which gradually fell into disrepair. This was aggravated by the partial destruction of the old pier during a storm and the introduction of a toll on ships using the port. By the 19th century the port was more or less redundant and became known merely as a health resort rather than a strategic port. Further demise was seen due to the enclosure of the harbour for agricultural purposes in the early 19th century; however, a petition forced the reverse of the enclosure in 1813. To improve the economic situation of the town a new docks was built in 1835 and a railway was laid in 1839, which connected Hartlepool to other towns. This infrastructure made it possible to export coal from the Durham coalfield through Hartlepool. As a result Hartlepool boomed and by 1841 it had a population of 5,236 and by 1851 it had reached 9,227.
- 2.13 During the mid-19th century a new town known as West Hartlepool developed. It began when the owners of the railway and the proprietor of the docks fell out, subsequently the railway owners decided to build their own docks to the southwest of the town. These were completed in 1847. By the 1880s West Hartlepool had overtaken the size of the old town and by 1881 it had a population of 28,000, which almost trebled by the turn of the century with it recorded at 63,000. For many years the two towns were separate but merged as one in 1966 under the Hartlepool Order. During this period of expansion the town encroached into the area which sits above the site. No development occurred within the site boundary.
- 2.14 Located to the north of the site immediately to the north of Egerton Road is Ward Jackson Park, which is designated as a Registered Historic Park and Garden. The park opened in 1883 and was designed by Matthew Scott, son of the Town Surveyor. It became the focus of a number of roads including Elwick Road and Park Avenue which were flanked by fashionable late 19th century villas. Residing on the edge of the park is a World War II box. A further one is recorded to the west of the site near to Abbey Mill Farm.

3 Project Objectives

- 3.1 The specific objectives of the detailed magnetometer survey are:
- to establish if the occupation/ settlement remains investigated to the south of the site extend into the assessment area.

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3.2 The general objectives of the survey are:

- to establish the presence or absence of any archaeological anomalies within the area of proposed development;
- to define the extent of any such anomalies;
- to characterise, if possible, any features or anomalies recorded; and
- to inform the requirement for further archaeological works (if required).

4 Scope of Works

4.1 The detailed magnetometer survey will cover the areas defined in Figure 2. The total area to be surveyed measures 3.42ha and has been divided into three areas as detailed in Table 1. Each area is composed of a number of 30m x 30m grid squares.

Table 1 Geophysical Survey Areas

Item	Survey Area	Area (HA)
1	Area 1	0.90
2	Area 2	1.53
3	Area 3	0.99
Total Area		3.42ha

4.2 If there are any areas that cannot be surveyed, the Contractor will inform URS Scott Wilson immediately and details of these will be provided in the interim report.

5 Works Specification

General Works

- 5.1 All archaeological works will be carried out in accordance with this Specification (and any further instructions from the Consultant). This design takes account of assessment guidance in Standard and Guidance for archaeological field evaluation prepared by the Institute for Archaeologists (IfA, 2008), the IfA Code of Conduct (IfA, 2010), English Heritage guidelines (English Heritage, 2008) and other current and relevant best practice and standards and guidance (refer to Appendix 2).
- 5.2 The survey will be undertaken by an experienced operator to provide consistent results with regard to pattern recognition and to provide initial screening of noise resulting from recent ferrous disturbance and local magnetic pollution.
- 5.3 During the survey a record should be made of surface conditions and sources of modern geophysical interference that might have a bearing on subsequent interpretation of field data.
- 5.4 The survey grid/ transects must be established by electronic means (using a survey-grade GPS (English Heritage 2003) or equivalent metric survey device) and accurately tied to the Ordnance Survey National Grid. This should be internally accurate to 100 mm, and the grid locatable on the Ordnance Survey 1:2500 map.

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Specific Works

Detailed Magnetometer Survey

- 5.5 A detailed magnetometer survey will be carried out over the designated survey area using either a Geoscan FM 36 Fluxgate Gradiometer or a Bartington GRAD 601 Fluxgate Gradiometer (or similar electronic instrument). Readings should be taken at 4 readings per metre at 1m traverses within a 1m grid system.
- 5.6 The data should be downloaded at regular intervals on-site into a laptop computer for initial processing and storage. This will ultimately be transferred to a desktop computer for further processing, interpretation and archiving. Geoplot v.3 software (or comparable) will be used to interpolate the data to form an array of regularly spaced values at 0.25m x 0.25m intervals. Continuous tone greyscale images of raw data and an x/y trace plot will also be produced. Palette bars relating the greyscale intensities to anomaly values in ohms will be included with the images.
- 5.7 The raw and processed data should be presented in the report. The processed drawings should be accurately located and presented in relation to the Ordnance Survey base plan for the route and the survey markers should be accurately plotted to aid in the laying out of subsequent evaluation or excavation areas. Interpretation plots shall be included in the report.

6 Reporting

- 6.1 An Interim Statement of the results of the fieldwork will be prepared and submitted within 1 week of the completion of the works.
- 6.2 A fieldwork report will be submitted in draft within 2 weeks of the completion of fieldwork. The preparation of the survey archive and fieldwork report will be undertaken in accordance with this Archaeological Design and relevant archaeological standards and national guidelines (refer to Appendix 2). The report will include the following
- a non technical summary;
 - site location;
 - archaeological and historical background;
 - full detailed methodology;
 - aims and objectives;
 - results (to include full description, assessment of condition, quality and significance of the results);
 - general and detailed plans showing the location of the results accurately positioned on an Ordnance Survey base map (to a known scale commensurate with the objectives of the survey);
 - colour/grey scale plots to aid interpretation. The plots will be contoured (if appropriate) to allow trends to be shown superimposed over data without obscuring it;
 - an interpretative plot(s);

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- an assessment of potential with recommendations for further survey;
 - publication proposals if warranted; and
 - a cross-referenced index of the project archive.
- 6.3 An electronic pdf copy (complete with illustrations) of the completed report will be submitted to URS Scott Wilson as a draft for comment.
- 6.4 Three bound copies, one unbound master-copy and a digital version of the final report will be submitted within one week of the receipt of comments on the draft report.
- 6.5 A project CD shall be submitted containing image files in JPEG or TIFF format, digital text files shall be submitted in MS Word format, illustrations in AutoCAD format or ArcView shapefile format. A fully collated version of the report shall be included in PDF format.
- 6.6 A copy of the survey database with national grid co-ordinates shall be provided in Excel, MS Access or in ArcView shapefile format.

7 Archive Preparation and Deposition

- 7.1 The archive of records generated during the fieldwork will be kept secure at all stages of the project. All records will be quantified, ordered, indexed and will be internally consistent. The digital archive will be produced to the national standards (ADS, Geophysical Data in Archaeology: A Guide to Good Practice, 2002 and IfA, Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation, 2007).
- 7.2 If appropriate the 'Contractor' will, prior to the start of fieldwork, liaise with an appropriate recipient museum to obtain agreement in principle to accept the documentary, digital and photographic archive for long-term storage. The 'Contractor' will be responsible for identifying any specific requirements or policies of the museum in respect of the archive, and for adhering to those requirements.
- 7.3 The 'Contractor' will store the archive in a suitable secure location until it is deposited in the agreed museum.
- 7.4 The deposition of the archive forms the final stage of this project. The 'Contractor' shall provide URS Scott Wilson with copies of communication with the recipient museum and written confirmation of the deposition of the archive. URS Scott Wilson will deal with the transfer of ownership and copyright issues.
- 7.5 Within 3 months of the completion of the report the 'Contractor' will also prepare and submit the online OASIS form (<http://ads.ahds.ac.uk/project/oasis>). When completing the form the 'Contractor' must make reference to the Regional Research Framework.

8 Publication

- 8.1 If significant results are obtained and it is likely that further stages of archaeological work will be required, publication shall be deferred until such time as the project works are substantially complete.

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- 8.2 The format of any publication shall be commensurate with the importance of the results and be agreed in advance with URS Scott Wilson.

9 Confidentiality and Publicity

- 9.1 Detailed information regarding the proposed development is not yet in the public domain and the archaeological works may attract interest.
- 9.2 All communication regarding this project is to be directed through URS Scott Wilson. The 'Contractor' will refer all inquiries to URS Scott Wilson without making any unauthorised statements or comments.
- 9.3 The 'Contractor' will not disseminate information or images associated with the project for publicity or information purposes without the prior written consent of URS Scott Wilson.

10 Copyright

- 10.1 The 'Contractor' shall assign copyright in all reports and documentation/ images produced as part of this project to URS Scott Wilson. The 'Contractor' shall retain the right to be identified as the author/ originator of the material. This applies to all aspects of the project. It is the responsibility of the 'Contractor' to obtain such rights from sub-contracted specialists.
- 10.2 The 'Contractor' may apply in writing to use/disseminate any of the project archive or documentation (including images). Such permission will not be unreasonably withheld.
- 10.3 The results of the archaeological works shall be submitted to the client, the Local Authority Archaeologist (or their equivalent) and if appropriate to English Heritage by URS Scott Wilson and will ultimately be made available for public access.

11 Resources and Timetable

- 11.1 All archaeological personnel involved in the project should be suitably qualified and experienced professionals. The 'Contractor' shall provide URS Scott Wilson with staff CVs of the Project Manager, Site Supervisor and any proposed specialists. Site assistants' CVs will not be required, but all site assistants should have an appropriate understanding of geophysical survey procedures.
- 11.2 All staff will be fully briefed and aware of the work required under this specification and will understand the objectives of the investigation and methodologies to be employed.
- 11.3 The fieldwork is programmed to be implemented at the earliest available opportunity (subject to land access agreements). The survey will be completed within one week.
- 11.4 The timetable for completion of the reporting is 2 weeks after completion of fieldwork. The Interim plot of the results of the fieldwork will be provided within 48 hours of the completion of the work.
- 11.5 The 'Contractor' shall give immediate warning to URS Scott Wilson should any agreed programme date not be achievable.

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12 Access Arrangements and Site Information

- 12.1 Access to the land for fieldwork will be arranged /organised by URS Scott Wilson.
- 12.2 The survey schedule will be agreed in advance. There will be no separate negotiation concerning the availability of land for survey with landowners, their agents or representatives without the prior agreement of URS Scott Wilson.
- 12.3 Should the 'Contractor' require an adjustment to the location of the survey areas due to unforeseen local conditions, these shall be agreed with URS Scott Wilson prior to implementation.
- 12.4 The 'Contractor' will notify URS Scott Wilson immediately of any areas that cannot be surveyed and will provide a clear explanation for the situation.

13 Insurances and Health and Safety

- 13.1 The 'Contractor' will provide URS Scott Wilson with details of their public and professional indemnity insurance cover.
- 13.2 The 'Contractor' will have their own Health and Safety policies compiled using national guidelines, which conform to all relevant Health and Safety legislation. A copy of the 'Contractors' Health and Safety policy will be submitted to URS Scott Wilson with their proposal.
- 13.3 The 'Contractor' shall prepare a Risk Assessments and submit these to URS Scott Wilson for approval prior to the commencement of the survey. If amendments are required to the Risk Assessment during the works URS Scott Wilson and any other interested party must be provided with the revised document at the earliest opportunity.
- 13.4 All site personnel will familiarise themselves with the following:
- site emergency and evacuation procedures;
 - the first aider; and
 - the location of the nearest hospital and doctors surgery.

14 General Provisions

- 14.1 The 'Contractor' will undertake the works according to this specification and any subsequent written variations. No variation from or changes to the specification will occur except by prior agreement with URS Scott Wilson.
- 14.2 All communications on archaeological matters will be directed through URS Scott Wilson.
- 14.3 The archive of data and records generated during the fieldwork will be kept secure in appropriate conditions using suitable materials at all stages of the project. The archive will be removed from site each evening and will be kept in secure premises by the 'Contractor'.

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- 14.4 Processing of datasets will be concurrent with the fieldwork and immediately after completion of fieldwork the processing of the remaining data will be completed.
- 14.5 The 'Contractor' shall leave the survey area(s) in a tidy and workmanlike condition and remove all materials used during the fieldwork.
- 14.6 The 'Contractor' shall make the minimum of disturbance during the survey and will avoid any unnecessary damage.
- 14.7 The 'Contractor' will immediately notify URS Scott Wilson of any evidence of or damage to the integrity of the survey caused by any third party including the activities of unauthorised metal-detectorists.

15 References

English Heritage, 2003, Where on Earth Are We? The Global Positioning System (GPS) in archaeological field survey. English Heritage (London)

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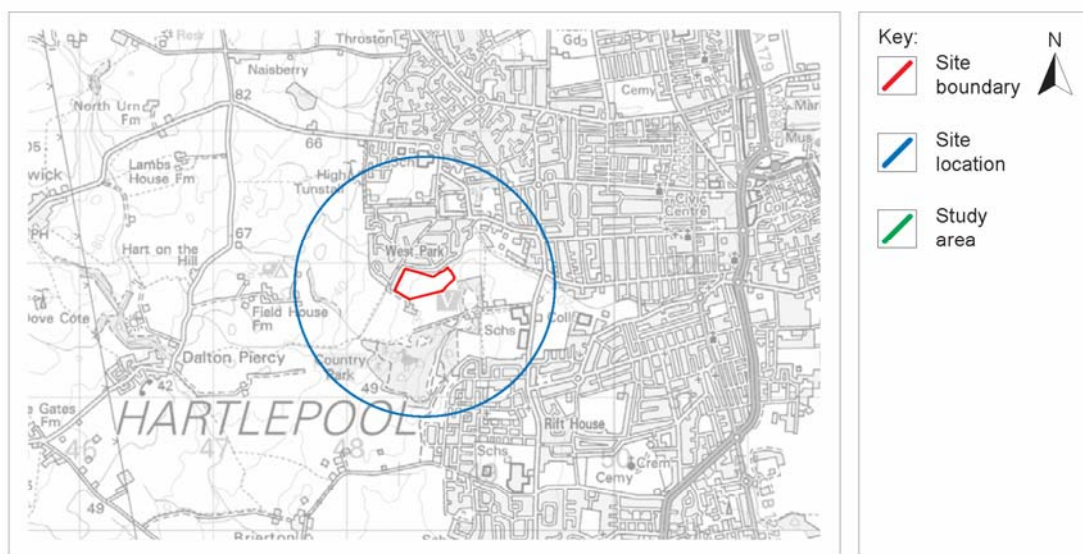
IfA, 2008, Standard and Guidance for Archaeological Field Evaluation. Institute for Archaeologists (Reading)

IfA, 2010, Code of Conduct. Institute for Archaeologists (Reading)

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Appendix 1

Figures



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Drawing Title	Scale(s) @ A4	Figure Number
SITE LOCATION PLAN	NOT TO SCALE	FIGURE 1
Drn	Chk	Date
A. Csaba	LR	22/07/11
	AR	App

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Appendix 2

Relevant Archaeological Standards & Guidelines

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Relevant Archaeological Standards and Guidelines

AAF, 2007, Archaeological Archives. A guide to best practice in creation, compilation, transfer and curation. Archaeological Archives Forum

Bewely, R., Donoghue, D., Gaffney, V., Van Leusen, M., Wise, M., 1998, Archiving Aerial Photography and Remote Sensing Data: A guide to good practice. Archaeology Data Service

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IfA, 2008, Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology. Institute for Archaeologists (Reading)

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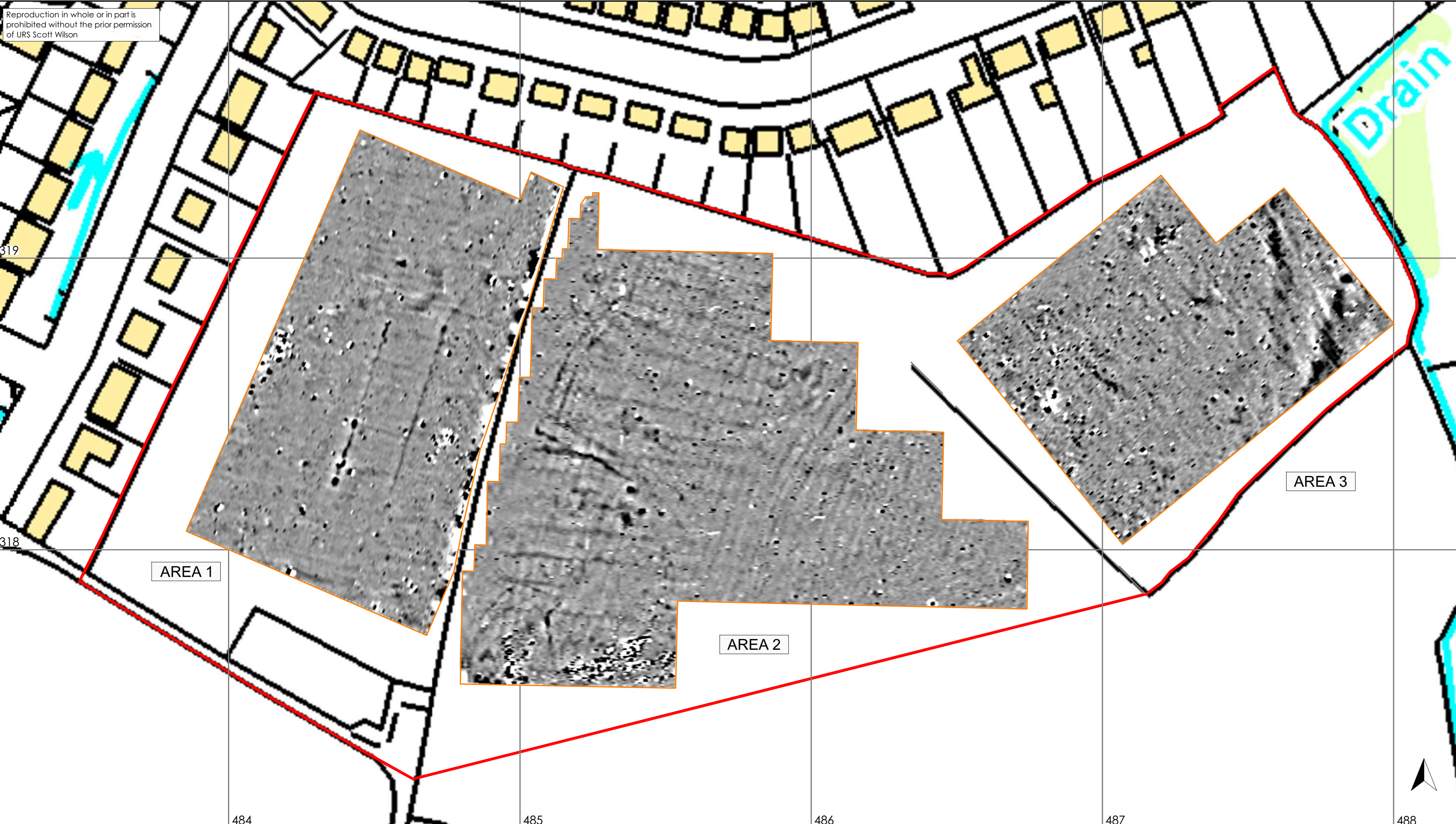
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
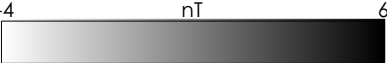



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Schmidt, A., 2001, Geophysical Data in Archaeology: A guide to good practice. Archaeology Data Service



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<p> magnetic survey</p> <p></p>	<p> scale 1:1000 for A2 plot</p>	<p>on behalf of</p> <p> </p>	<p>ARCHAEOLOGICAL SERVICES DURHAM UNIVERSITY</p>	<p>Tunstall Farm Valley Drive Hartlepool</p> <p>geophysical survey phase 2 report 2776</p> <p>Figure 2: Geophysical survey</p>
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magnetic survey



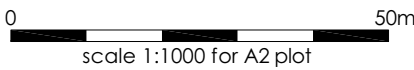
dipolar magnetic anomaly



positive magnetic anomaly



negative magnetic anomaly



on behalf of

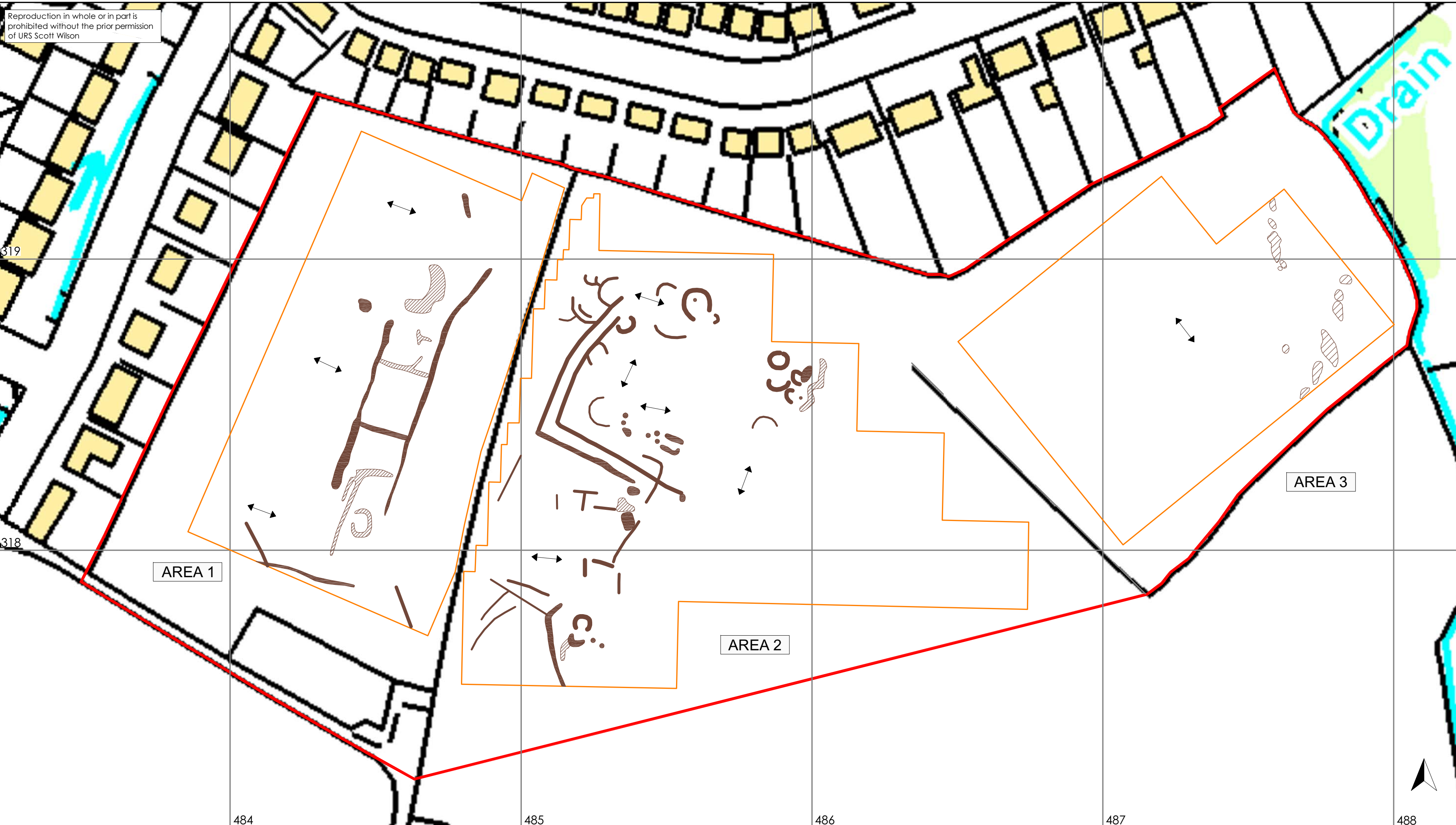


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Figure 3: Geophysical interpretation



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Figure 5:
Trace plots of geomagnetic data

