

Coatham Enclosure, Redcar

geophysical survey

for

Tyne & Wear Museums, Archaeology Department

Report 1450

April 2006

Archaeological Services

Durham University

South Road

Durham DH1 3LE

Tel: 0191 334 1121

Fax: 0191 334 1126

archaeological.services@durham.ac.uk

www.durham.ac.uk/archaeologicalservices

Coatham Enclosure, Redcar

geophysical survey

Report 1450

April 2006

Archaeological Services Durham University

for

Tyne & Wear Museums, Archaeology Department

*East Lodge, Jesmond Old Cemetery Gates, Jesmond Road,
Newcastle upon Tyne NE2 1NL*

Contents

1. Summary	1
2. Project background	2
3. Archaeological and historical background.	2
4. Landuse, topography and geology	3
5. Geophysical survey	3
6. Conclusions	6
7. Sources	6
Appendix I: Trace plots of geophysical data	7
Appendix II: Project specification	9

1. Summary

The project

- 1.1 This report presents the results of a geophysical survey conducted in advance of a proposed development on a former golf links to the south of Majuba Road, Redcar.
- 1.2 The works were commissioned by Tyne & Wear Museums Archaeology Department and conducted by Archaeological Services in accordance with a brief supplied by Tees Archaeology and a written scheme of investigation designed by Archaeological Services.

Results

- 1.3 No features of archaeological significance have been identified in the survey area.
- 1.4 Large areas of disturbance have been identified, especially in the northern part of the area.
- 1.5 There is high level of ferrous contamination throughout the topsoil, which has made it impossible to distinguish any possible mines not removed after the war.

2. Project background

Location (Figure 1)

- 2.1 The proposed development area is located on land adjacent to Majuba Road, Redcar (centred on NGR: NZ 59 25), and incorporates the former Cleveland Golf Links.

Development proposal

- 2.2 The proposal is for redevelopment of the area known as Coatham Enclosure, with the aim of providing a leisure-based mixed development.

Objective

- 2.3 The principal aim of the surveys was to determine the nature and extent of any sub-surface features of potential archaeological significance 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 surveys have been undertaken adhering to a brief provided by Tees Archaeology (Appendix II) and in accordance with a written scheme of investigation designed by Archaeological Services.

Dates

- 2.5 Fieldwork was undertaken between 10th and 12th April 2006. This report was prepared between the 25th and 28th April 2006.

Personnel

- 2.6 Fieldwork was conducted by Bryan Atkinson and Natalie Swann. This report was prepared by Sam Roberts with illustrations by Martin Railton. The Project Manager was Duncan Hale.

Archive/OASIS

- 2.7 The site code is **CER06**, for **Coatham Enclosure, Redcar 2006**. The survey archive will be transferred to Tees Archaeology 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 **archaeol3-14732**.

3. Archaeological and historical background

- 3.1 This coastal area would have been attractive to the earliest settlers of Teesside from the prehistoric periods onwards. Prehistoric coastal sites are known from elsewhere in the area, principally at Boulby, Saltburn, and Hartlepool. Flint tools have been found at the Redcar Submerged Forest indicating early activity in the general area.

- 3.2 Coatham is first mentioned by name in the medieval period. The golf links are in the vicinity of 'East Coatham' - a medieval settlement first recorded in 1123. The original extent and exact location of this settlement is not properly understood.
- 3.3 The extraction of salt from seawater was a major industry in the medieval period. Numerous salt mounds survive at Coatham Marsh, a short distance from the golf links. It is possible that this complex of saltmounds originally extended further to the east and that remains may survive beneath the current ground surface.
- 3.4 The area was heavily mined in World War II with anti-tank mines. It is not known how extensive the minefield was or how intensive its subsequent clearance was.

4. Landuse, topography and geology

- 4.1 At the time of survey the proposed development area comprised a parcel of land measuring approximately 6.5ha, formerly in use as a golf links.
- 4.2 The terrain was undulating, forming a rough u-shaped channel aligned east-west, with the sides steepening to the western end of the survey area. The land was composed mainly of grassed over sand dunes, with several bunkers scattered around the area cut into the slopes. A number of footpaths crossed the area with signposts, manhole covers and telegraph poles also in evidence.
- 4.3 The underlying solid geology of the area comprises Jurassic Lower Lias deposits. Drift geology is composed of marine deposits overlain by blown sands.

5. Geophysical survey

Standards

- 5.1 The surveys and reporting were conducted in accordance with English Heritage Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation* (David1995); the Institute of Field Archaeologists Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt 2001).

Technique selection

- 5.2 Geophysical surveying enables the relatively rapid and non-invasive identification of potential archaeological features within landscapes and can involve a variety of complementary techniques such as magnetometry, electrical resistivity, ground-penetrating radar and electromagnetic survey. Some techniques are more suitable than others in particular situations, depending on a variety of 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 desktop research, it was considered possible that cut features, such as ditches and pits, may 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, as well as remains of military coastal defences dating from World War II.
- 5.4 Given the anticipated shallowness of the targets and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting each of the types of feature mentioned above. This technique involves the use of hand-held magnetometers to detect and record minute 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 the survey area and tied-in to known, mapped Ordnance Survey points using a Leica GS50 Global Positioning System (GPS) unit.
- 5.6 Measurements of vertical geomagnetic field gradient were determined using a Bartington Grad 601-2 fluxgate gradiometer 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 0.25m and the traverse interval to 1.0m, thus providing 3600 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 data. The greyscale images and interpretations are presented in Figures 2-4; the trace plots are provided in Appendix I. 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:

Clip – clips, or limits data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic.

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.

Destagger – corrects for displacement of anomalies caused by alternate zig-zag traverses.

Despike – locates and suppresses random iron spikes in gradiometer data.

Interpolate – increases the number of data points in a survey in order to match sample and traverse intervals. In this instance the gradiometer data have been interpolated to 0.25m intervals.

Interpretation: anomaly types

- 5.10 A colour-coded geophysical interpretation plan is provided in Figure 3. Three 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.

negative magnetic 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.

dipolar magnetic 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 (Figures 2-4)

- 5.11 A colour-coded archaeological interpretation plan is provided in Figure 4.
- 5.12 Dipolar magnetic anomalies are present across the whole of site, particularly concentrated along the northern and southern boundaries and in the northeastern corner. The northeastern corner was formerly occupied by golf course buildings including the clubhouse. The anomalies in this region may reflect building rubble and ground disturbance associated with the construction or demolition of these structures.
- 5.13 The dipolar magnetic anomalies along the southern boundary reflect metal fencing and buildings.
- 5.14 Large, sinuous dipolar magnetic anomalies observed along the northern boundary of the survey area within the general spread of dipolar magnetic responses may be traces of landscaping and ground works associated either

with the construction of the golf course or with the military defences and exploitation of this area during World War II including post-war mine clearance.

- 5.15 Many of the smaller discrete dipolar magnetic anomalies detected almost certainly reflect small items of near-surface ferrous and/or fired debris. Other dipolar magnetic anomalies reflect man-hole covers and signposts.
- 5.13 A linear dipolar magnetic anomaly in the southwestern corner of the survey area almost certainly reflects a service pipe.
- 5.14 Linear positive, negative and dipolar magnetic anomalies have been detected traversing the survey area. These correspond to footpaths recorded during survey, including an asphalt path leading from an entrance to the west.
- 5.15 Bunkers recorded during survey have been detected as well-defined dipolar magnetic and positive magnetic features. Litter was noted to have accumulated in some of the bunkers, accounting for the dipolar magnetic responses observed.

6. Conclusions

- 6.1 No features of archaeological significance have been identified in the survey area.
- 6.2 Large areas of disturbance have been identified, especially in the northern part of the area.
- 6.3 There is high level of ferrous contamination throughout the topsoil, which has made it impossible to distinguish any targets likely to represent mines remaining from the war.

7. Sources

David, A 1995 *Geophysical survey in archaeological field evaluation*, Research and Professional Services Guideline 1, English Heritage

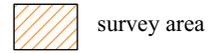
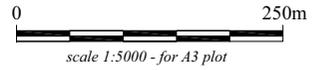
Gaffney, C, Gater, J & Ovenden, S 2002 *The use of geophysical techniques in archaeological evaluations*, Technical Paper 6, Institute of Field Archaeologists

Schmidt, A 2001 *Geophysical Data in Archaeology: A Guide to Good Practice*, Archaeology Data Service



Archaeological Services
University of Durham

on behalf of
**Tyne and Wear Museums,
Archaeology Department**



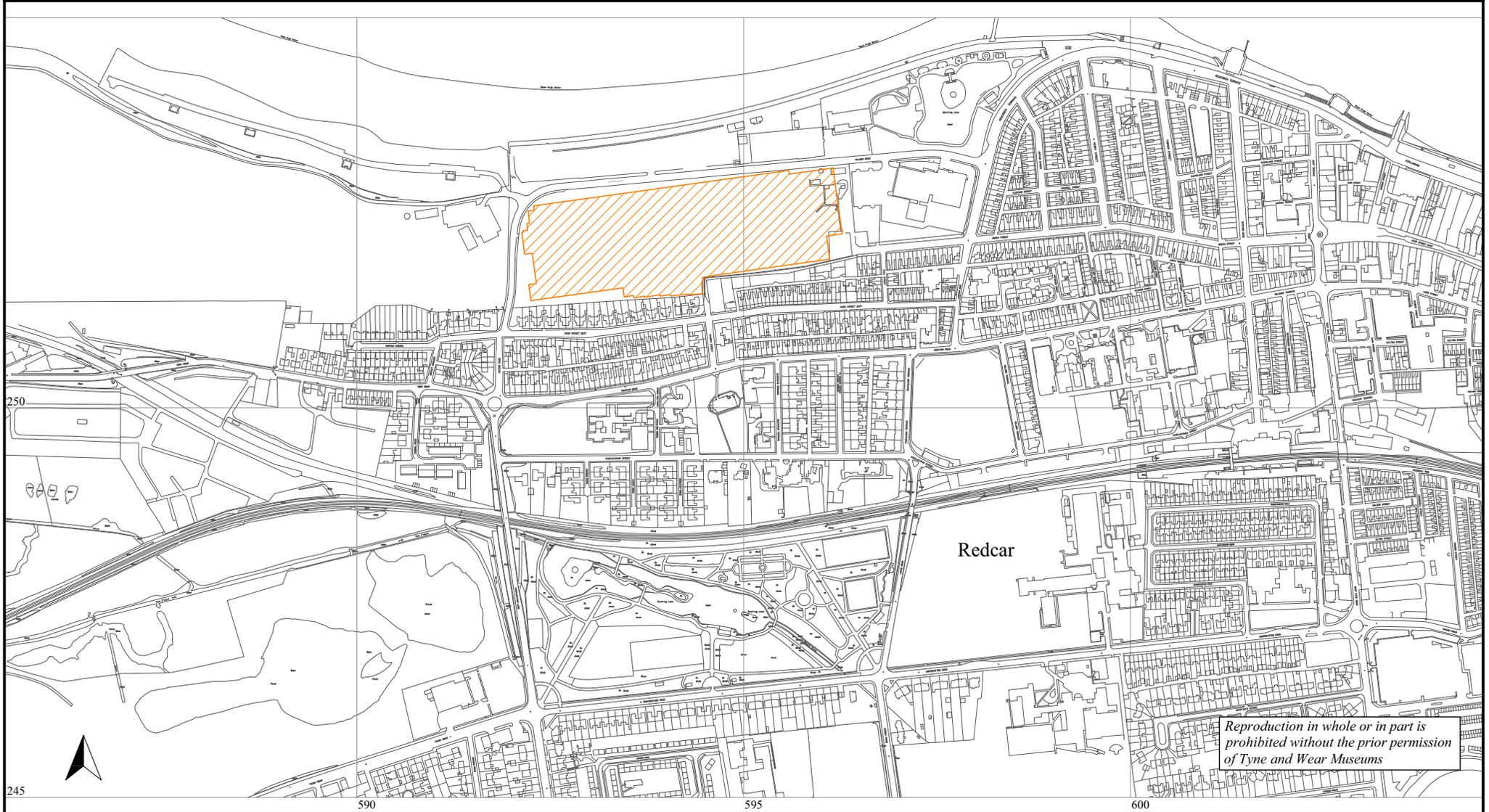
Coatham Enclosure, Redcar

geophysical survey

Report 1450

Figure 1

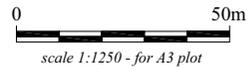
Location plan



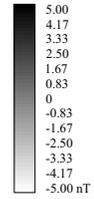


Archaeological Services
University of Durham

on behalf of
**Tyne and Wear Museums,
Archaeology Department**



outline of survey area



Coatham Enclosure, Redcar

geophysical survey

Report 1450

Figure 2

geophysical survey

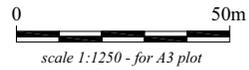


*Reproduction in whole or in part is
prohibited without the prior permission
of Tyne and Wear Museums*



Archaeological Services
University of Durham

on behalf of
**Tyne and Wear Museums,
Archaeology Department**



-  outline of survey area
-  positive magnetic anomalies
-  negative magnetic anomalies
-  dipolar magnetic anomalies

Coatham Enclosure, Redcar

geophysical survey

Report 1450

Figure 3

geophysical interpretation





Archaeological Services
University of Durham

on behalf of
**Tyne and Wear Museums,
Archaeology Department**

0 50m
scale 1:1250 - for A3 plot

-  outline of survey area
-  bunker
-  service pipe
-  manhole covers
-  paths
-  modern disturbance (ferrous/fired materials)

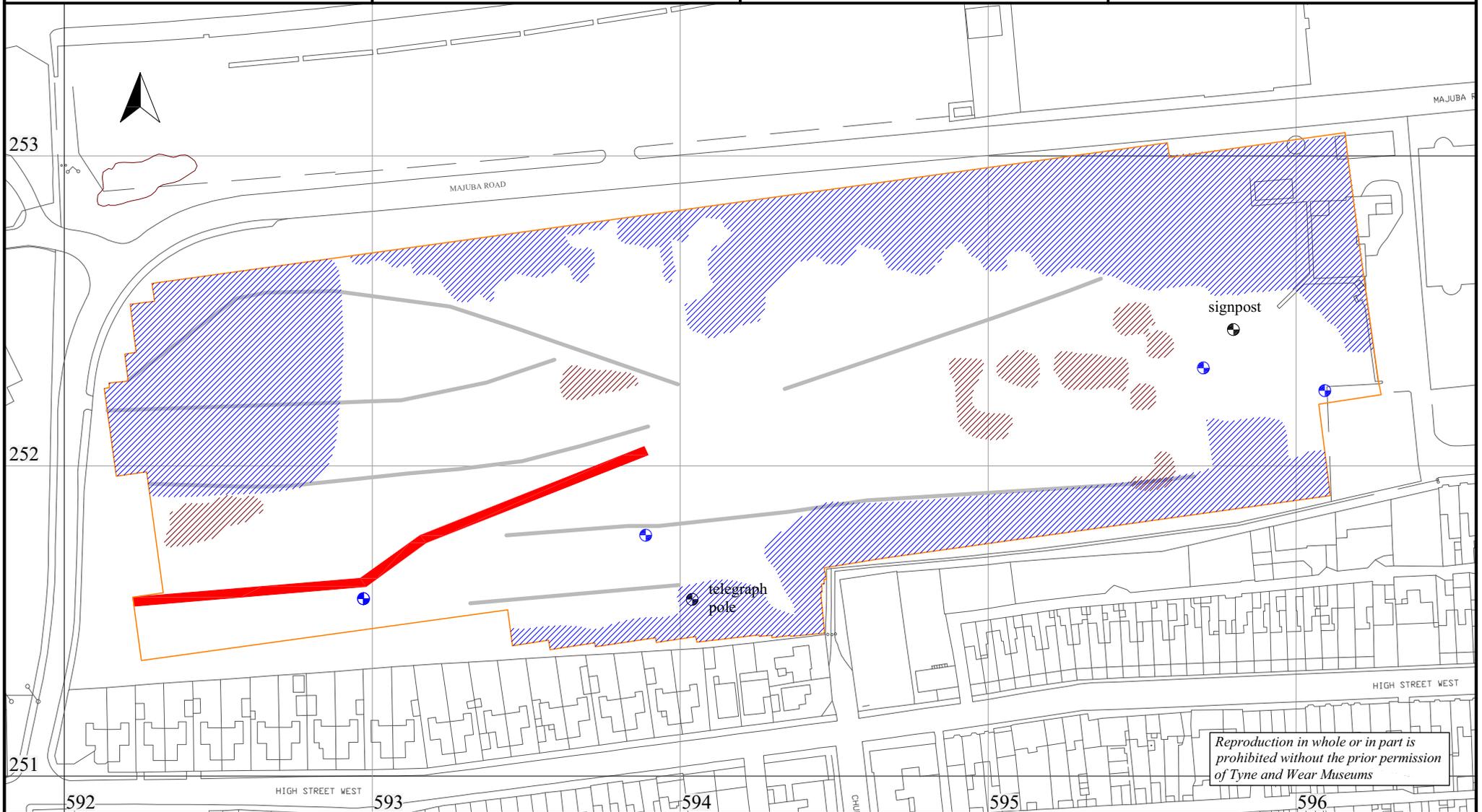
Coatham Enclosure, Redcar

geophysical survey

Report 1450

Figure 4

archaeological interpretation



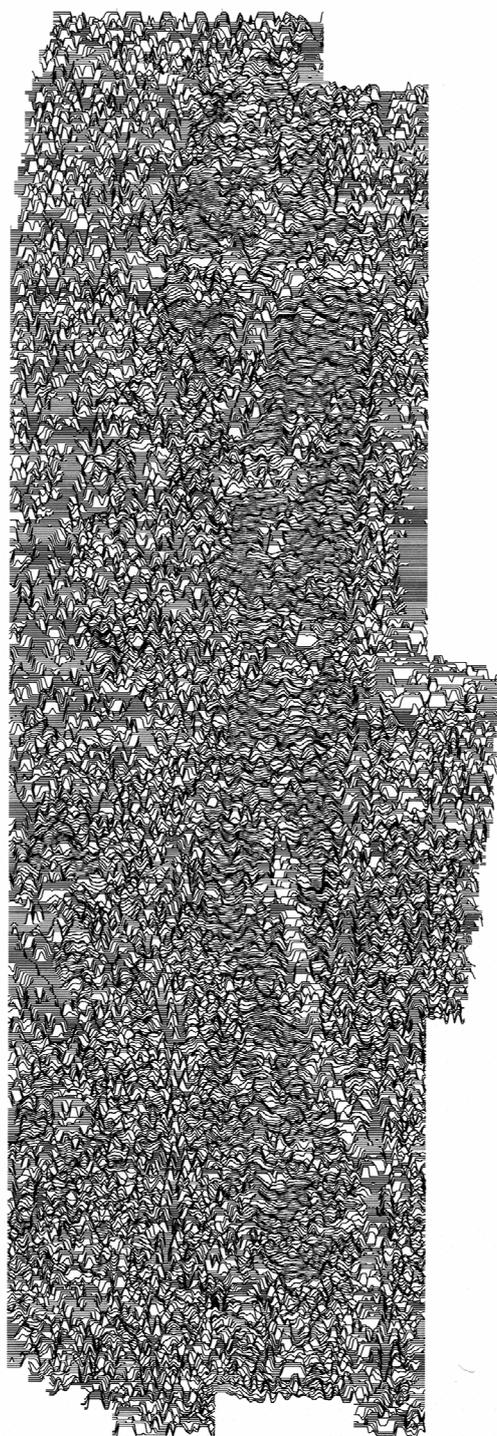
Reproduction in whole or in part is prohibited without the prior permission of Tyne and Wear Museums

Appendix I: Trace plot of geophysical data

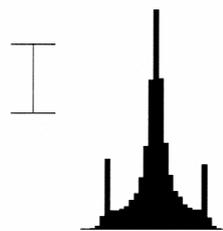
Coatham Enclosure, Redcar

Geomagnetic data

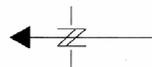
1:2000 @ A4



40.00nT/cm



80m



Appendix II: Project specification

Tees Archaeology

Brief for archaeological evaluation:

Coatham Enclosure, Redcar.

1 Background

1.1 Redcar and Cleveland Borough Council are preparing a detailed development brief for the area known as Coatham Enclosure. The purpose of the development brief is to achieve a quality leisure based mixed development.

1.2 The site centred on NZ 59 25 is currently a mixture of car parking, leisure buildings and an open space known as Cleveland Golf Links. It is the golf links to which the current archaeological evaluation applies.

1.3 This coastal area would have been attractive to the earliest settlers of Teesside from the prehistoric periods onwards. Prehistoric coastal sites are known from elsewhere in the area, principally at Boulby, Saltburn, and Hartlepool. Flint tools have been found at the Redcar Submerged Forest indicating early activity in the general area.

1.4 Coatham is first mentioned by name in the medieval period. The golf links are in the vicinity of 'East Coatham' a medieval settlement first recorded in 1123. The original extent and exact location of this settlement is not properly understood.

1.5 The extraction of salt from seawater was a major industry in the medieval period. Numerous salt mounds survive at Coatham Marsh, a short distance from the golf links. It is possible that this complex of saltmounds originally extended further to the east and that remains may survive beneath the current ground surface.

1.6 The area was heavily mined in World War II with anti-tank mines. It is not known how extensive the minefield was or how intensive its subsequent clearance was.

2 Aims

2.1 The archaeological work should take the form of geophysical survey and trial trenching of the development area. Evidence should be particularly sought for the following: -

- the extent and survival of Prehistoric remains including pits, ditches, gullies, burials and any other associated deposits or environmental information.
- the extent and survival of medieval remains including pits, ditches, gullies, buildings, burials and any other associated deposits or environmental information.
- the survival of potential mines from World War II.

Tees Archaeology

2.2 The purpose of the work is to advise on the impact of redevelopment of the site on archaeological remains. This will allow for flexibility in design to allow preservation of important deposits *in situ*. Where preservation *in situ* is not compatible with development then planning consent may not be appropriate. Archaeological mitigation such as full excavation may be appropriate for less sensitive areas of the site. This is in accordance with the advice given in P.P.G. 16 and the Redcar and Cleveland Local Plan.

3 Methodology

Geophysical survey

3.1.1 The golf links should be subject to geophysical survey (see enclose plan). The most likely remains to be encountered are cut and built features such as ditches, pits, walls, cobbled surfaces, graves and fired features such as hearths or kilns. Geomagnetic survey should be implemented to locate cut and built features which will produce a contrasting level of magnetic susceptibility to the undisturbed sub-soil as well as clearly indicating fired features again with a high susceptibility.

3.1.2 A strategy for the Geophysical Survey should be provided and agreed with the Tees Archaeology Officer or his representative. All suitable areas of the development site should be subject to the survey as shown on the attached plan.

3.1.3. The geophysical survey should be conducted according to the standards set out in 'English Heritage, 1995. *Geophysical survey in Archaeological Field Evaluation*. Research and Professional Services Guideline No. 1. English Heritage'.

3.1.4 The results of the geophysical survey should inform of the location of major archaeological features and provide an indicative plan of the site to inform the subsequent excavation sampling strategy. It may also indicate features that may not otherwise be obvious under traditional excavation such as cut features with indistinct fills.

3.1.5 Geomagnetic survey may also indicate possible mines from World War II. Particular attention should be drawn to any anomaly that may represent military material.

Trial Trenching

3.2.1 Following the geophysical survey a strategy should be devised for sampling the site with trial trenches. A maximum of 15 trenches measuring 5 metres by 5 metres or equivalent combined area should be excavated. It is not envisioned that trial trenches will target feature that may be military in origin.

3.2.2 The project should include the following: -

- i) Archaeological supervision of machine stripping;

Tees Archaeology

ii) Inspection and cleaning of the subsoil to properly expose archaeological features;

iii) The formulation and implementation of a sampling strategy for the investigation and recording of archaeological features/deposits;

iv) Retrieval, processing, conservation and specialist examination of artifactual and environmental information including human remains.

3.2.3 All features will be recorded in plan. Linear features such as ditches or trackways should be sampled in sections totalling at least 20% of their length. Discrete or waterlogged features such as floor surfaces, graves, pits and structures may require 100% excavation. Features with a high potential for the recovery of environmental or other organic material should be particularly targeted.

3.2.4 Environmental sampling and processing should be carried out on all deposits found, in order to assess the environmental potential of the site and should be carried out in consultation with a qualified environmental specialist. The sampling strategy should particularly target negative features such as gullies, pits and ditches. Bulk samples of 30-60 litres, wherever possible, should be taken for flotation and subsequent recovery of charred plant remains and associated small bones or industrial debris. Both flots and residues must be retained upon 500µm mesh and the fine residue checked for material – the nature of the soils in this area often leads to partial mineralisation and much charred material can fail to float. 10 litre sub samples from waterlogged deposits should be wet sieved and examined for biological remains in particular. Five litre sub-samples may be processed from dry deposits to assess the potential of each sample. Samples worthy of further work must be fully processed.

3.2.5 All fieldwork should be carried out in such a way that the records obtained may be easily integrated with any future investigation. This will involve the accurate location and levelling of trenches and geophysical survey areas and the recording of features and contexts at the appropriate scale.

3.2.6 Specialist reports should be produced for all excavated material, principally, flint, pottery, slag environmental and faunal remains.

3.2.7 Material should be selected for scientific dating techniques such as radio-carbon and thermoluminescence and samples processed accordingly.

4 Method Statement

4.1 The current brief should not be considered sufficient to enable the execution of the project. A method statement will be required to provide the basis for a measurable standard for monitoring. The method statement should be prepared in response to this brief in the format set out in Appendix 2 of English Heritage, 1991. *Management of Archaeological Projects*.

4.2 The method statement should particularly:-

Tees Archaeology

- demonstrate the techniques, materials and recording systems to be employed
- provide a provisional programme for undertaking the fieldwork, processing of the data, report preparation and the deposition of the project archive
- identify the staff involved, their qualifications, and those who will be carrying out specialist assessments
- demonstrate that the work will be undertaken in accordance with all relevant health and safety legislation.
- include a strategy for the recovery and analysis of environmental samples.
- define a programme of post-excavation work, including scientific dating, to allow the delivery of a publication ready academic report.

5 *Monitoring*

5.1 The proposal for the work should identify the staff involved and those who will be carrying out specialist assessments. The Tees Archaeology Officer or his representative should be notified in writing at least two weeks in advance of the work taking place and should be allowed on site to inspect and monitor the work at any reasonable time.

5.2 The monitoring will be in the form of a series of visits by a member of Tees Archaeology and the completion of monitoring forms on site (Appendix 1). The archaeological contractor will be notified if standards contained in the brief and method statement are not being met. The report for the work and deposition of archive will be monitored and standards enforced where required.

6 *Report and Recommendations*

6.1 The information from the fieldwork should be brought together in a report. The report should present the information together with local, regional and national parallels. Reference and comparisons should be made to previous archaeological excavations in Norton and contemporary sites.

6.2 The report should include: -

- i) supporting text and illustrations providing historical background, an interpretation of the development of the site, and detailed interpretation of each phase of archaeological activity.
- ii) a statement on the archaeological potential of the site and a strategy for the preservation of important remains should be included. Where remains do not

Tees Archaeology

require physical preservation then a suitable mitigation strategy should be included for preservation by record.

6.3 The report should be written with the intention that it will be submitted to a regional or national journal for publication. Provision for a publication level report should be fully detailed in the method statement.

6.4 Three copies of the report should be forwarded to the Tees Archaeology Sites and Monuments Record.

7 *Archive*

7.1 An appendix (Appendix 2) is attached detailing the archival requirements. A copy of the documentary and photographic archive should be deposited with Tees Archaeology at Sir William Gray House, Clarence Road, Hartlepool, TS24 8BT. Unless overridden by National Law any artifacts recovered from the site belong to the landowner. The contracting archaeologist should arrange for the artifacts to be deposited with a suitable repository. In the first instance in the Boroughs of Hartlepool, Middlesborough, Stockton-on-Tees and Redcar & Cleveland this will be Tees Archaeology. A completed transfer of title deed (Appendix 3) should accompany any material deposited with Tees Archaeology. Tees Archaeology must have legal ownership of artefacts in order to justify expenditure on, documentation, packaging, storage and research that each item will require.

7.2 The contractor should inform of the results of the work by forwarding three copies of the report to the SMR and one copy to the NMR and completing a model Archaeological Fieldwork Record Form (Appendix 4). This form is taken from SCAUM, 1997. *Recording Information about Archaeological Fieldwork*.

8 *Health and Safety*

8.1 Contractors are expected to abide by the 1974 Health and Safety Act and its subsequent amendments. Safe working practice should be adopted as described in the Standing Conference of Archaeological Unit Managers manual on archaeological health and safety. It is recommended that a risk assessment for the site is completed prior to the start of works. Problems with working on a school site should be particularly considered.

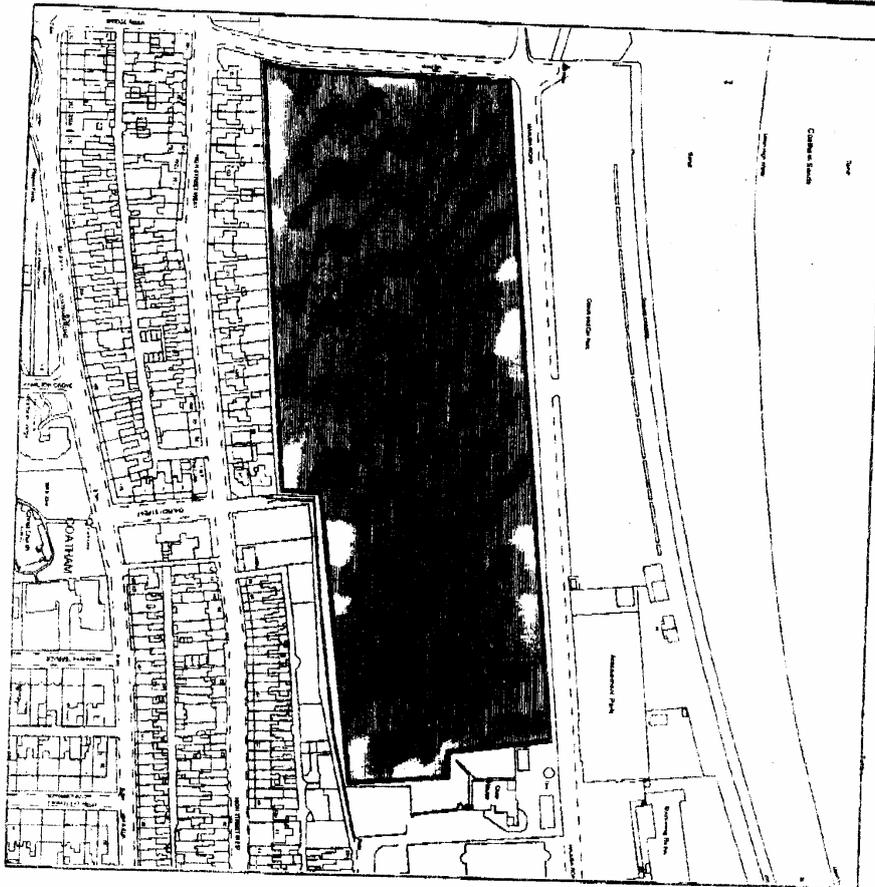
*Brief prepared by Peter Rowe, Sites and Monuments Officer.
28th March 2003.*

31-JAN-06 15:56

TYNE AND WEAR MUSEUMS ARCHAEOLOGY DEPT.

TEL: 0191-2816345

F: 07



Coatham Enclosure,
Redcar and Cleveland

Shaded area = proposed
geophysical survey



SCALE
1:2500

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction without the permission of Ordnance Survey is prohibited. Ordnance Survey, 100 Brook Hill Drive, Exton, Leicestershire LE19 7RU. Ordnance Survey, 149/151, 1999.