



**STRATASCAN**

# Geophysical Survey Report

## Staverton Marina, Wiltshire

for

Cotswold Archaeology

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## 1 SUMMARY OF RESULTS

A detailed magnetometry survey was carried out on land lying between New Terrace and Marina Drive at Staverton near Trowbridge, Wiltshire. The main concentration of geophysical anomalies has been identified in the north of the survey within an area of flat topography. Two possible enclosures have been identified, a rectilinear enclosure to the northwest of possible Romano-British date, and possibly the south western edge of a larger enclosure running along the north to northwest edge of the survey area. A number of faint linear anomalies can be identified within and around the rectilinear enclosure and appear to be 'cut' by it, possibly indicating multiphase activity. Ridge and furrow has been identified across the central and southern parts of the survey area.

## 2 INTRODUCTION

### 2.1 Background synopsis

Stratascan were commissioned by Cotswold Archaeology to undertake a geophysical survey of an area outlined for development for the New Terrace link road at Staverton. This survey forms part of an archaeological investigation prior to any ground works.

### 2.2 Site location

The site is located between New Terrace and Marine Drive, Staverton, near Trowbridge, Wiltshire at OS ref. ST 858 603.

### 2.3 Description of site

The survey area is approximately 3.8 hectares of agricultural land which gently slopes down to the southeast. The underlying geology is Oxford Clays and Kellaways Beds (British Geological Survey South Sheet, Third Edition Solid, 1979). The overlying soils are known as Wickham 3 soils, which are drift over Mesozoic clay. These consist of seasonally waterlogged fine and coarse loamy over clayey soils (Soil Survey of England and Wales, Sheet 5 South West England).



*Photo 1:* Taken from the northern edge of the survey area, looking south

## 2.4 Site history and archaeological potential

The Field name 'Blacklands' has been suggested as a possible indication of Roman or Medieval activity. An evaluation carried out by Cotswold Archaeology (2002) revealed features dating to the later Neolithic/early Bronze Age, Iron Age, Romano-British and post-medieval periods. The majority of prehistoric and Romano-British features were located on the higher ground towards the northwest end of the site.

## 2.5 Survey objectives

The objective of the survey was to locate any features of possible archaeological significance in order that they may be assessed prior to development.

## 2.6 Survey methods

Detailed magnetometry was used as an efficient and effective method of locating archaeological anomalies. More information regarding this technique is included in the Methodology section below.

# 3 **METHODOLOGY**

## 3.1 Date of fieldwork

The fieldwork was carried out over 2 days from 9/8/04-10/8/04. Weather conditions during the survey were wet and changeable.

## 3.2 Grid locations

The location of the survey grids has been plotted in Figure 2 together with the referencing information.

## 3.3 Description of techniques and equipment configurations

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTesla (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The mapping of the anomaly in a systematic manner will allow an estimate of the type of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects or by kilns or hearths (thermoremanent features). More subtle

anomalies such as pits and ditches can be seen if they contain more humic material which is normally rich in magnetic iron oxides when compared with the subsoil.

To illustrate this point, the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material being accumulated in the trench compared to the undisturbed subsoil. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each sensor has a 1m separation between the sensing elements giving a strong response to deep anomalies.

### 3.4 Sampling interval, depth of scan, resolution and data capture

#### 3.4.1 Sampling interval

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

#### 3.4.2 Depth of scan and resolution

The Grad601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution.

#### 3.4.3 Data capture

The readings are logged consecutively into the data logger which in turn is daily downloaded into a portable computer whilst on site. At the end of each job, data is transferred to the office for processing and presentation.

### 3.5 Processing, presentation of results and interpretation

#### 3.5.1 Processing

Processing is performed using specialist software known as *Geoplot 3*. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. 'Despiking' is also performed to remove the anomalies resulting from small iron objects often found

on agricultural land. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all processed gradiometer data used in this report:

1. *Despike* (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)

*Geoplot parameters:*

X radius = 1, y radius = 1, threshold = 3 std. dev.

Spike replacement = mean

2. *Zero mean grid* (sets the background mean of each grid to zero and is useful for removing grid edge discontinuities)

*Geoplot parameters:*

Threshold = 0.25 std. dev.

3. *Zero mean traverse* (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)

*Geoplot parameters:*

Least mean square fit = off

### 3.5.2 Presentation of results and interpretation

The presentation of the data for each site involves a print-out of the raw data both as greyscale (Figure 3) and trace plots (Figure 4 and 5), together with a greyscale plot of the processed data (Figure 6). Magnetic anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site (Figure 7).



## 4 RESULTS

The detailed magnetometry survey located a concentration of anomalies towards the northern end of the site with some suggestion of multiphase activity. These are classified into the following; positive and negative linear anomalies associated with ridge and furrow, positive linear anomalies indicating cut features of possible archaeological origin, negative linear anomalies indicating possible earthwork/embankment remains, areas of magnetic disturbance in association with a service and strong discrete positive anomalies with negative returns relating to ferrous objects within the topsoil (see Figures 3-7).

The north of the site has revealed a series of complex linear anomalies positioned mainly on a flat plateau above a gentle slope to the south.

A possible rectilinear enclosure (A) has been identified through a series of positive linear anomalies (Figures 6 and 7). This is approximately 40m wide and the interior is divided into at least four rectilinear areas. An evaluation excavation carried out by Cotswold Archaeology (2002: 02005) located Romano-British features and finds nearby suggesting the enclosure is of possible Romano-British date (See Figure 8).

A number of faint linear anomalies (C and E) can be identified within and around the rectilinear structure and appear to be 'cut' by it suggesting these anomalies predate the enclosure (Figures 6 and 7).

To the southeast of the enclosure a set of parallel positive linear responses (B), possibly indicate the southern extent of a separate enclosure that appears to continue outside the survey area. This enclosure also appears to be subdivided into at least four areas by three positive linear anomalies running in a northeast to southwest direction. Clear identification of further anomalies within this feature has proved difficult due to the magnetic disturbance caused by a service and metal fencing (Figures 3, 6 and 7).

A positive linear anomaly (F) has been identified running in a northeast to southwest direction for approximately 70m and is of possible archaeological origin (Figures 3, 6 and 7).

Evidence of ridge and furrow can be identified in a series of positive and negative linear anomalies running across the centre and south of the site in a southeast to northwest alignment. Furrows are likely to relate to positive linear responses and there is some enhancement at the northwestern end due to the inclusion of enhanced soils from the adjacent enclosure site. Earthworks associated with the ridge and furrow were known to have existed across the site and later machine flattened during the mid 20<sup>th</sup> century with excess earth pushed to the southern end of the field (Figures 3, 6 and 7).

A spread of strong discrete positive anomalies with negative returns has been identified across the site and is likely to represent ferrous objects within the topsoil (Figures 6 and 7).

A service has been identified running around the perimeter of the survey area, associated with this further magnetic disturbance has been caused by metal fencing (Figures 3, 6 and 7).

## 5 CONCLUSION

A rectilinear enclosure of possible Romano-British date has been identified towards the northwest of the survey area. Several smaller linear features have been identified in and around the enclosure and could possibly predate it. Another possible enclosure to the northeast has been identified; although only the southwestern edge has been established. Any clear identification within this enclosure has been made difficult due to the magnetic disturbance caused by a service and nearby metal fences.

The majority of anomalies appear to be located towards the northern end of the site on slightly higher and flatter ground. Anomalies relating to ridge and furrow are visible more extensively across the site, particularly within the central and southern areas. It is possible that ridge and furrow has disturbed or destroyed archaeological features outside of the northern area.