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Engineering Archaeological Services Ltd

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*Dunholme
Geophysical Survey*

August 1999

Event L12463

Source L17083

S3148 Roman

S4604 L182120 Essex

S3156 Med

S4606 L182122 Med

S3158 Med/med

S4607 Undated L182120

*Survey Commissioned
by
Archaeological Project Services*

*Surveyed
by
I.P. Brooks
Engineering Archaeological Services Ltd.*

Registered In England

Nº 2869678

99/7

*Dunholme
Geophysical Survey*

August 1999

Received 5 November 1999

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Dunholme Geophysical Survey - Introduction:

NGR

Centred On TF 026 793

Location And Topography

The area surveyed lies to the south east of Dunholme village lying between Scothern Lane and the A46. The area has been abandoned for a number of years and as a result ground conditions are poor with rubbish having been tipped in a number of areas as well as dense vegetation which needed mowing prior to survey. The southern end of the survey area was also marked by blocks of re-inforced concrete and sheets of corrugated iron within the topsoil.

Archaeological Background

The area lies close to the medieval centre of Dunholme, and the brief refers to a possible medieval building towards the north east of the site. An initial geophysical survey was carried out in May 1998 by Engineering Archaeological Services Ltd. (Price 1998) which indicated the presence of a possible enclosure in the northern part of the site.

Aims Of Survey

To extend the magnetometry survey carried out in 1998 to cover the majority of the proposed development area.

SUMMARY OF RESULTS

The southern end of the survey area was highly disturbed by modern features, however in the mid area of the survey a possible lane and associated boundaries were located.

Dunholme Geophysical Survey -Results:

Survey Results:

Area

An area of c.1.5 Ha. of detailed magnetometry was carried out. This extended the area of 1 Ha in two blocks which was carried out in 1998. The area is shown as Area 3 in Figure 1.

Display

The results are displayed as Grey Scale Image and as X-Y Trace Plots. (Figures 2 and 3)

Results:

Complicating Factors

The whole area had been covered by dense vegetation prior to survey and this had been cut leaving a very variable surface with some areas of thick vegetation, dense swathes of grass on the ground and a rough surface beneath presumably from the areas last ploughing. Part of the area had previously had buildings and yard areas and was littered with construction debris.

Detailed survey:

The principle features detected were part of an enclosure, illustrated in red on the interpretation (Figure 5), together with a possible lane and associated field boundaries. There are a number of other features connected to the south western corner of this enclosure. There is a small, potentially archaeological feature in the north western corner of the area.

The eastern half of the area has a number of very faint features illustrated in green on the interpretation and most clearly seen when the data is processed using a low pass filter (Figure 3 centre). While these features are potentially archaeological the main axis is parallel or orthogonal to the lane to the north and it is likely that these represent relict ridge and furrow or drainage features.

Towards the eastern end of the area is a circular feature illustrated in magenta on the interpretation. This is almost certainly a well. It

still has a small bore iron pipe projecting from it though this is too small to be responsible for the feature detected. A similar feature was recorded at the southern end of Area 3. This was surrounded by re-inforced concrete blocks, but also had a vertical pipe projecting from the ground.

The remaining features, illustrated in blue on the interpretation, are all ferro magnetic and correspond to re-inforced concrete blocks, corrugated iron sheets, modern rubbish, disturbance and services. The eastern most of these features corresponds to a trial hole where medieval pottery was observed on the surface.

Magnetic Susceptibility

Soil samples were taken from random locations across the area in order to assess the magnetic susceptibility of the soils. No sub-soil samples were obtained for comparison.

Sample	Volume susceptibility χ_v	Mass susceptibility χ_m
Grid 1	53	45.3
Grid 4	11	10.2
Grid 7	11	8.7
Grid 8	47	37.3
Grid 11	28	23.3
Grid 12	7	7
Grid 14	17	15.5
Grid 16	30	27.3
Grid 18	20	16.8
Grid 21	8	7.9
Grid 23	31	29
Grid 25	14	12.6
Grid 27	34	31.2

The susceptibilities as measured show a significant variation. It may be significant that the

Dunholme Geophysical Survey -Results:

higher values come from the western end of the enclosure and that area immediately to its west.

Conclusions

It is a fundamental axiom of archaeological geophysics that the absence of features in the survey data does not mean that there is no archaeology present in the survey area only that the techniques used have not detected it.

Detailed magnetic survey detected archaeological features, both close to the northern boundary and in the mid section of the survey. Whilst the northern feature is roughly aligned with the Medieval street pattern of Dunholme the possible lane is at an oblique angle suggesting it may be earlier in date.

References

*Price, J. 1998 Dunholme Geophysical Survey.
Unpublished report.*

Dunholme Geophysical Survey -Technical Information:

Techniques Of Geophysical Survey:

Magnetometry:

This relies on variations in soil magnetic susceptibility and magnetic remanence which often result from past human activities. Using a Fluxgate Gradiometer these variations can be mapped, or a rapid evaluation of archaeological potential can be made by scanning.

Resistivity:

This relies on variations in the electrical conductivity of the soil and subsoil which in general is related to soil moisture levels. As such, results can be seasonally dependant. Slower than Magnetometry this technique is best suited to locating positive features such as buried walls that give rise to high resistance anomalies.

Resistance Tomography

Builds up a vertical profile or pseudosection through deposits by taking resistivity readings along a transect using a range of different probe spacings

Magnetic Susceptibility:

Variations in soil magnetic susceptibility occur naturally but can be greatly enhanced by human activity. Information on the enhancement of magnetic susceptibility can be used to ascertain the suitability of a site for magnetic survey and for targeting areas of potential archaeological activity when extensive sites need to be investigated. Very large areas can be rapidly evaluated and specific areas identified for detailed survey by gradiometer.

Instrumentation:

- 1. Fluxgate Gradiometer - Geoscan Fm36**
- 2. Resistance Meter - Geoscan Rm4/DI10**
- 3. Magnetic Susceptibility Meter - Bartington MS2**
- 4. Geopulse Imager 25 - Campus**

Methodology:

For Gradiometer and Resistivity Survey 20m x 20m or 30m x 30m grids are laid out over the survey area. Gradiometer readings are logged at either 0.5m or 1m intervals along traverses 1m apart. Resistance meter readings are logged at 1m intervals. Data is down-loaded to a laptop computer in the field for initial configuration and analysis. Final analysis is carried out back at base.

For scanning transects are laid out at 10m intervals. Any anomalies noticed are where possible traced and recorded on the location plan.

For Magnetic Susceptibility Survey a large grid is laid out and readings logged at 20m intervals along traverses 20m apart, data is again configured and analysed on a laptop computer.

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4.0
3.4
2.8
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nT

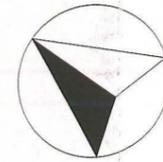
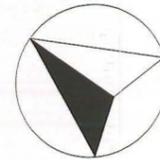


Figure 2: Dunholme Grey Scale Plot
Scale 1:1000



50nT

Figure 3: Dunholme X-Y Plot
Scale 1:1000

