RPS Planning, Transport and Environment

| INDEX DATA | RPS INFORMATION |
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| Scheme Title<br>Skipton Bypass II | Details<br>Geophysical Survey |
| Road Number A 629 | Date 1993 |
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| County YORKSHIRE | |
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Geophysical Surveys of Bradford

REPORT ON GEOPHYSICAL SURVEY

# A629
# SKIPTON-KILDWICK

Report number 93/102

Work commissioned by :

RPS CLOUSTON
THE ENVIRONMENTAL CONSULTANCY

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## SITE SUMMARY SHEET

## 93/102 A629 Skipton-Kildwick

**NGR:** SD 998 470 - SE 004 462 approximately

**Location, topography and geology**

The site lies some 4km south of Skipton adjacent to the A629 and Cononley roads to the east and north respectively. The application area covers three relatively flat fields which were under rough pasture at the time of survey. The underlying geology consists of glacial sands and gravels.

**Archaeology**

The area under investigation contains no known cropmarks, but the site lies within a general area of archaeological potential. A Roman road passes approximately 900m to the south and a number of nearby sites are noted in the Sites and Monuments Record for the region.

**Aim of Survey**

The geophysical work forms part of a wider evaluation carried out by **RPS Clouston** in advance of the proposed A629 Skipton to Kildwick road improvement scheme. A 50% sample was surveyed using gradiometry with the aim of locating any anomalies of archaeological interest within the application area.


**Summary of Results***

The survey has identified a few isolated anomalies, both ditch and pit-like, which may be archaeologically significant, though this interpretation is tentative. The majority of the responses noted in the data are attributed to agricultural activity.


*** It is essential that this summary is read in conjunction with the detailed results of the survey.**

# SURVEY RESULTS

## 93/102 A629 Skipton-Kildwick

## 1. Survey Area (Figure 1)

1.1 Seven areas (A-G) totalling 2.5ha were surveyed by gradiometry. The locations of the survey areas are given in Figure 1 at a scale of 1:2500.

1.2 The survey grids were laid out by **Geophysical Surveys of Bradford (GSB)** to the specifications of **RPS Clouston**. Minor changes in the layout of some of the grids were necessitated by the presence of field boundaries. The grid baselines were tied in by **GSB** staff and this information has been lodged with the client.

## 2. Display

2.1 The results are displayed in two formats :- dot density plot and X-Y trace. These display formats are discussed in the *Technical Information* section, at the end of the text.

2.2 A summary interpretation diagram (Figure 2) is produced at a scale of 1:2500. Data plots and interpretations for each area (Figures A1-G2) are produced at 1:500.

## 3. General Considerations - Complicating factors

3.1 The conditions for survey were good, the ground being generally flat and free from obstruction. A pipe in Area G has created a band of magnetic disturbance approximately 20m wide, which will have obscured any archaeological responses, if present.

3.2 Areas A to C lie in a field in which clear evidence of past ploughing, possibly ridge and furrow, is visible on the ground. This appears in the data as marked linear trends. Although archaeological anomalies have been noted that are stronger than these responses, it is possible that more ephemeral anomalies and particularly those aligned with the trends have not been identified in the data.

## 4. Results

***Field 1: Areas A-C (Figures A1-C2)***

4.1 The data sets for Areas A-C are dominated by parallel linear anomalies running SWW-NNE, which are attributed to ploughing (see Section 3.2 above).

4.2 A few anomalies of possible archaeological significance are noted. The most obvious of these are two segmented ditch-type responses in Areas B and C. It is thought that these anomalies represent former field boundaries and that the fragmentation probably reflects plough damage. The remaining anomalies, consisting of possible pits and short lengths of ditch, are more ephemeral and could equally have a geological/pedological origin.

 

4.3 A few 'iron spikes', produced by presumed modern ferrous debris in the topsoil, are visible in the data and marked on the interpretation.

*Field 2: Areas D-F (Figures D1-F1)*

4.4 Hints of a linear trend can be seen in these areas. Although the alignment is slightly different to that in Field 1 (Section 4.1 above) these responses are thought to be the product of agricultural activity.

4.5 A few archaeological-type anomalies have been tentatively identified in Areas D and E; but in the absence of any wider archaeological context, an agricultural or natural origin cannot be ruled out.

4.6 The thin band of increased magnetic noise along the eastern edge of Area D is caused by the proximity of a wire and stone field boundary. Elsewhere, stray ferrous peaks are noted.

*Field 3: Area G (Figures G1&2)*

4.7 One distinct ditch-type anomaly has been noted, in the southern half of Area G. Several possible pit-type responses are also highlighted on the interpretation, though these are weak and poorly defined.

4.8 The disturbance caused by a ferrous pipe (see Section 3.1 above) is clearly visible in the data and isolated ferrous peaks are also noted.

## 5. Conclusions

5.1 The gradiometer survey has revealed few anomalies of archaeological potential. Three clearly defined ditch-type anomalies are noted, in Areas B, C and G (see Sections 4.2 and 4.7) and are presumed to reflect former field systems. The remainder of the archaeological anomalies are weak and poorly defined and, given the lack of a wider archaeological context, a natural/pedological origin for some of these responses cannot be ruled out.

**Project Co-ordinator** C Stephens
**Project Assistants:** Dr C Gaffney, S Lancaster, N Nemeck & A Shields.

**Geophysical Surveys of Bradford**
7th September 1993

 

# TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GEOPHYSICAL SURVEYS OF BRADFORD** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GEOPHYSICAL SURVEYS OF BRADFORD**.

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

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Magnetic readings are logged at 0.5m intervals along one axis in 1m traverses giving 800 readings per 20m x 20m grid, unless otherwise stated. Resistance readings are logged at 1m intervals giving 400 readings per 20m x 20m grid. The data are then transferred to portable computers and stored on 3.5" floppy discs. Field plots are produced on a portable Hewlett Packard Thinkjet. Further processing is carried out back at base on computers linked to appropriate printers and plotters.

### Instrumentation

#### (a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT) or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method.

#### (b) Resistance Meter - Geoscan RM4 or RM15

This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections".

#### (c) Magnetic Susceptibility

Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. For the latter 50g soil samples are collected in the field.

## Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.

### (a) X-Y Plot

This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. Advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the indiviual anomalies. Results are produced on a flatbed plotter.

### (b) Dot-Density

In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum cut-off value will appear white, whilst any value above the maximum cut-off value will appear black. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). Usually the C.F. = 1, producing a linear scale between the cut-off levels. Assessing a lower than normal reading involves the use of an inverse plot, This plot simply reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. This display is much favoured for producing plans of sites, where positioning of the anomalies and features is important.

### (c) Contour

This display joins data points of an equal value by a contour line. Displays are generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer.

### (d) 3-D Mesh

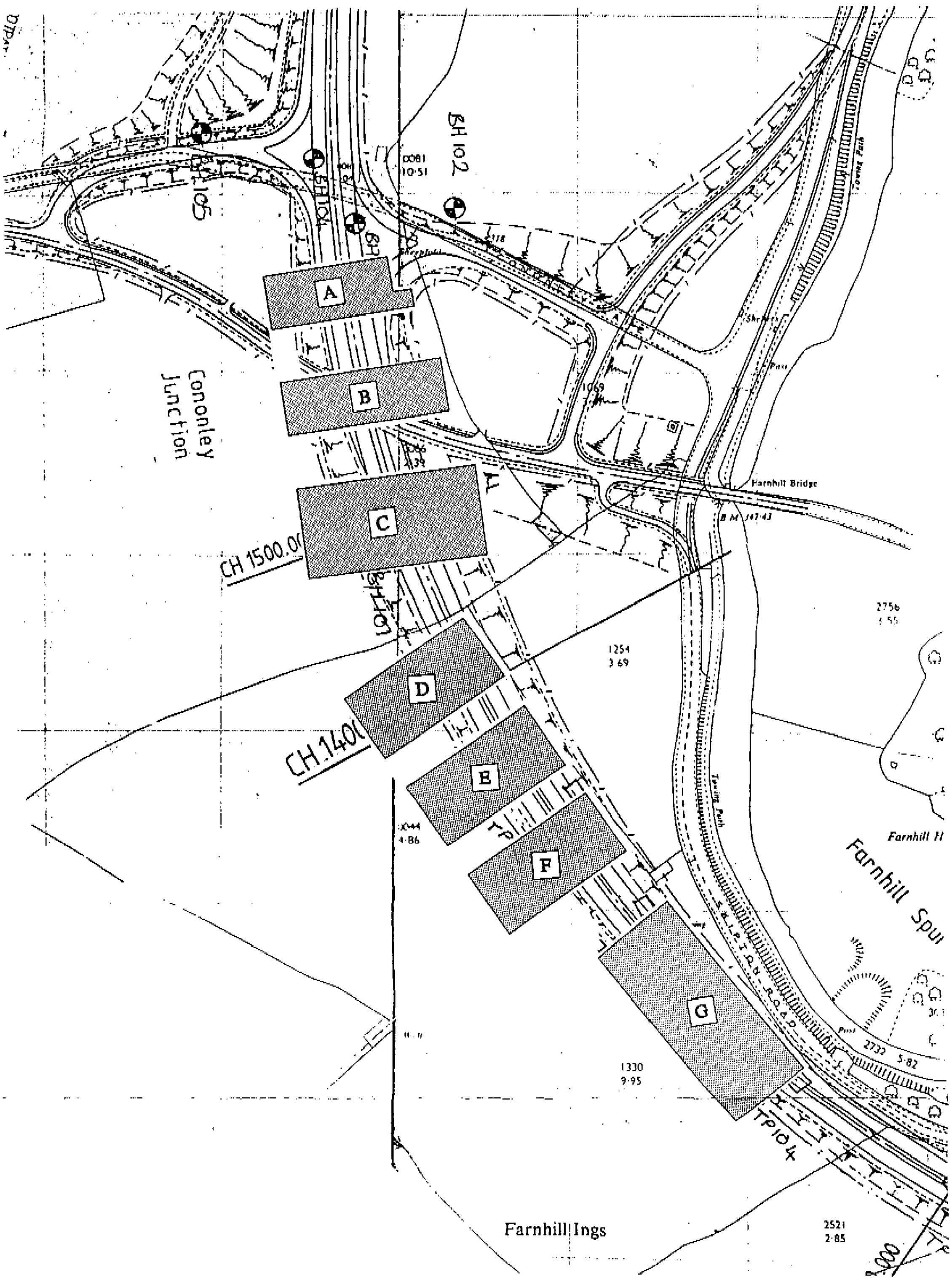
This display joins the data values in both the X and Y axis. The display may be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white. A hidden line option is occasionally used (see (a) above).

### (e) Grey-Scale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey scale.

Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, grey-scales tend to be more informative.

# A629 SKIPTON-KILDWICK
## Location of Survey Areas



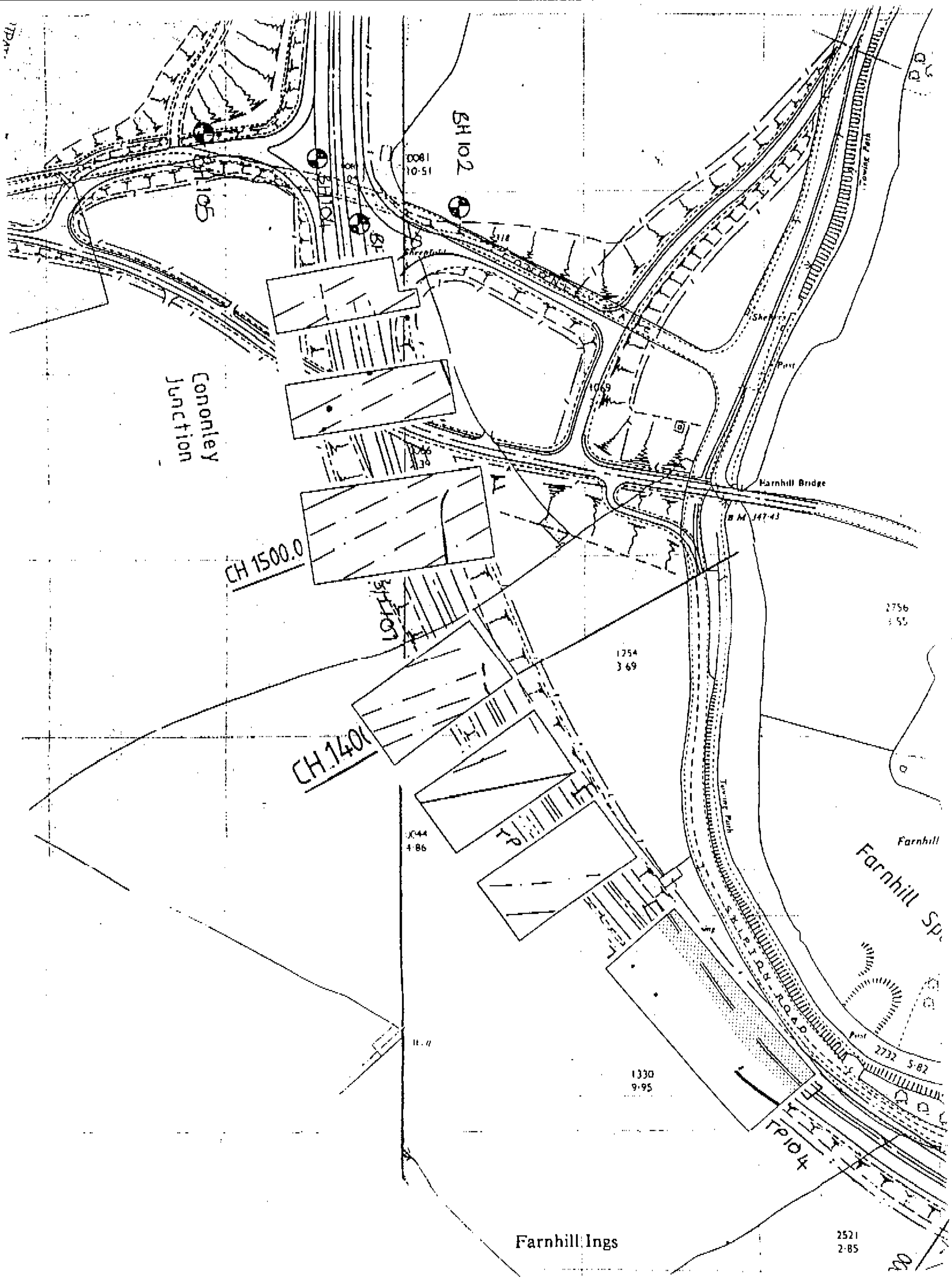



1:2500

Figure 1

ORIGINAL AT A3

# A629 SKIPTON-KILDWICK
## Summary Interpretation




?Archaeology | Agricultural | Pipe

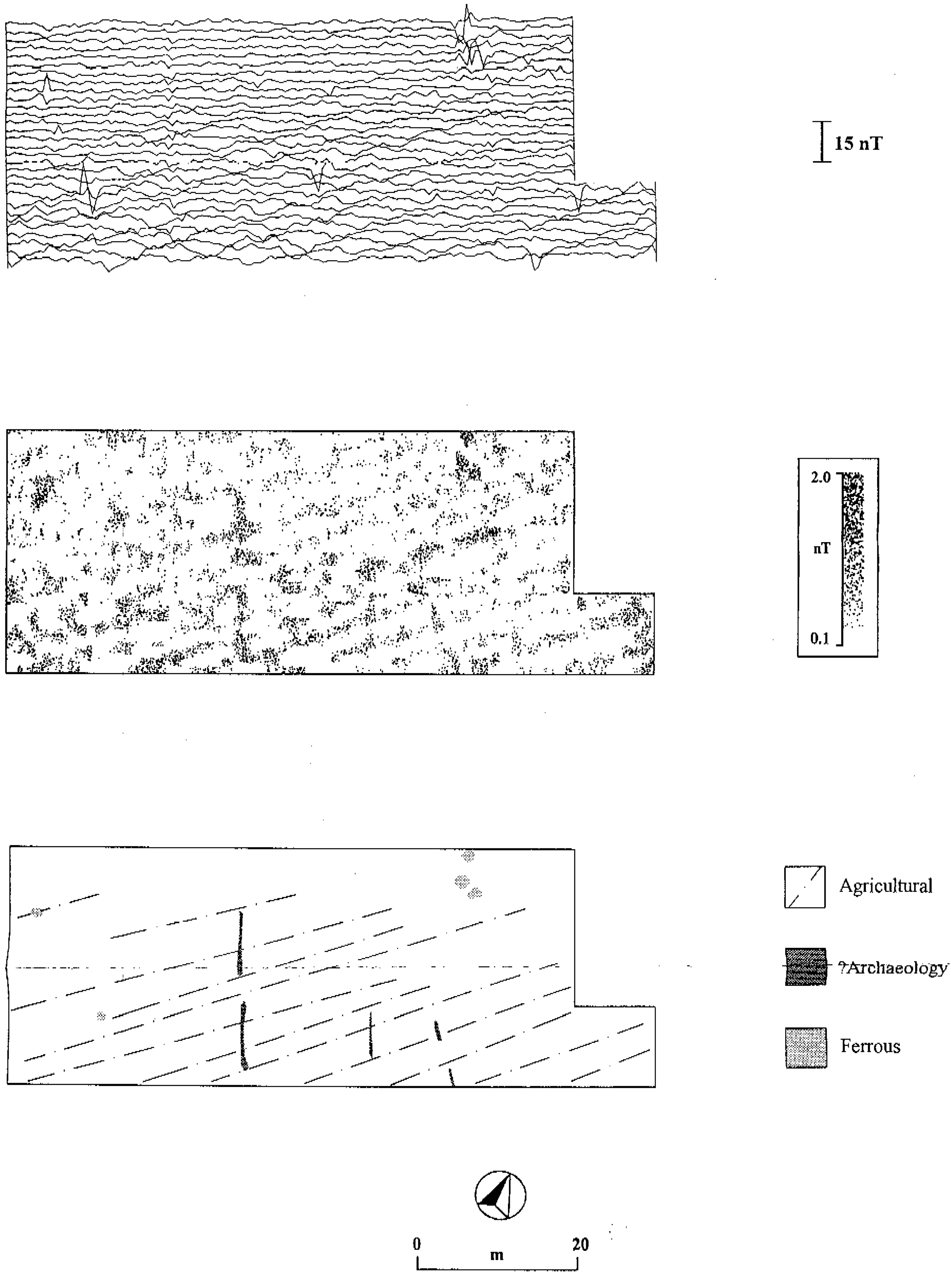


1:2500

Figure 2

ORIGINAL AT A3

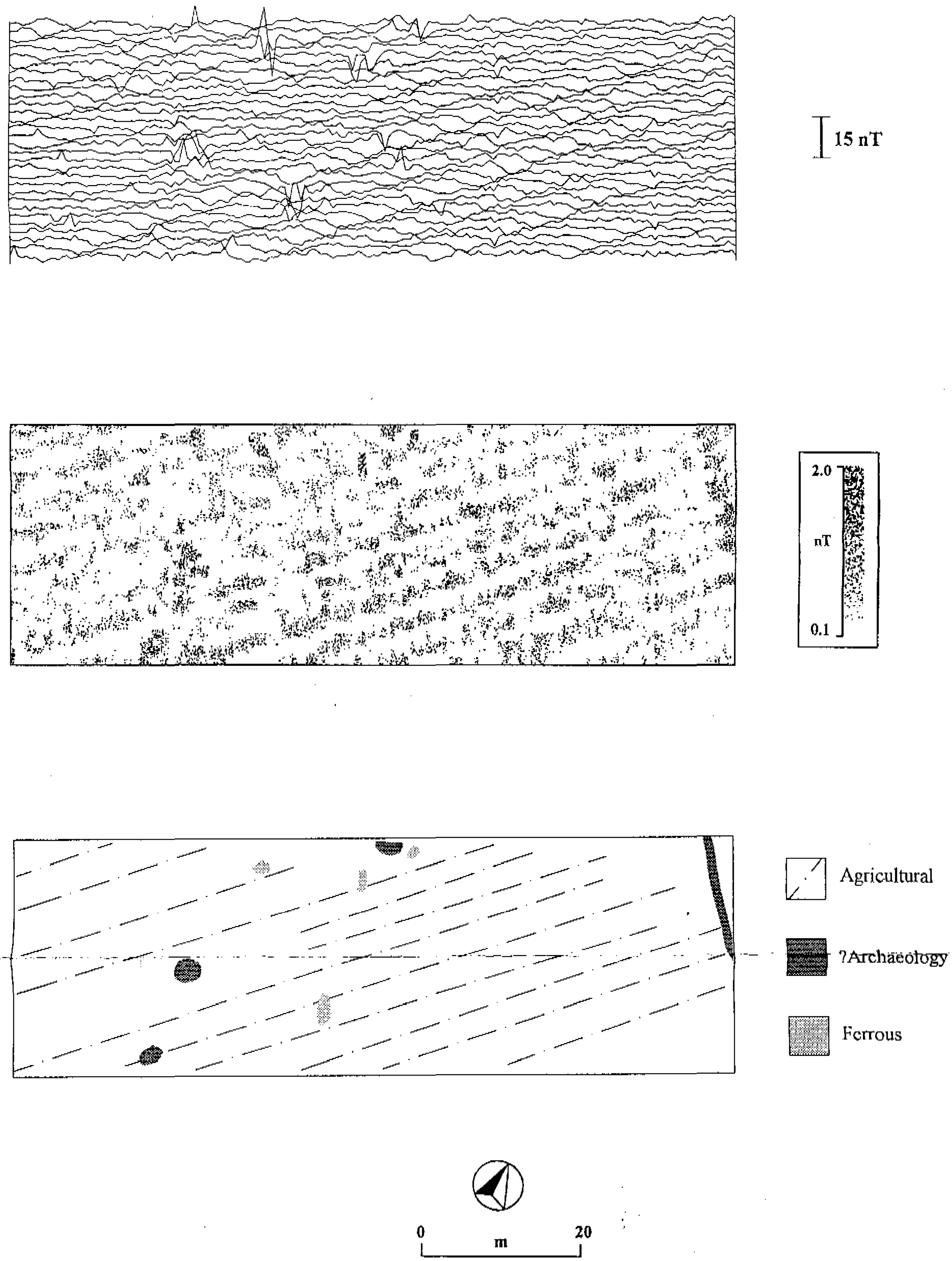
# A629 SKIPTON-KILDWICK
## Area A




ORIGINAL AT A3

Figure A1

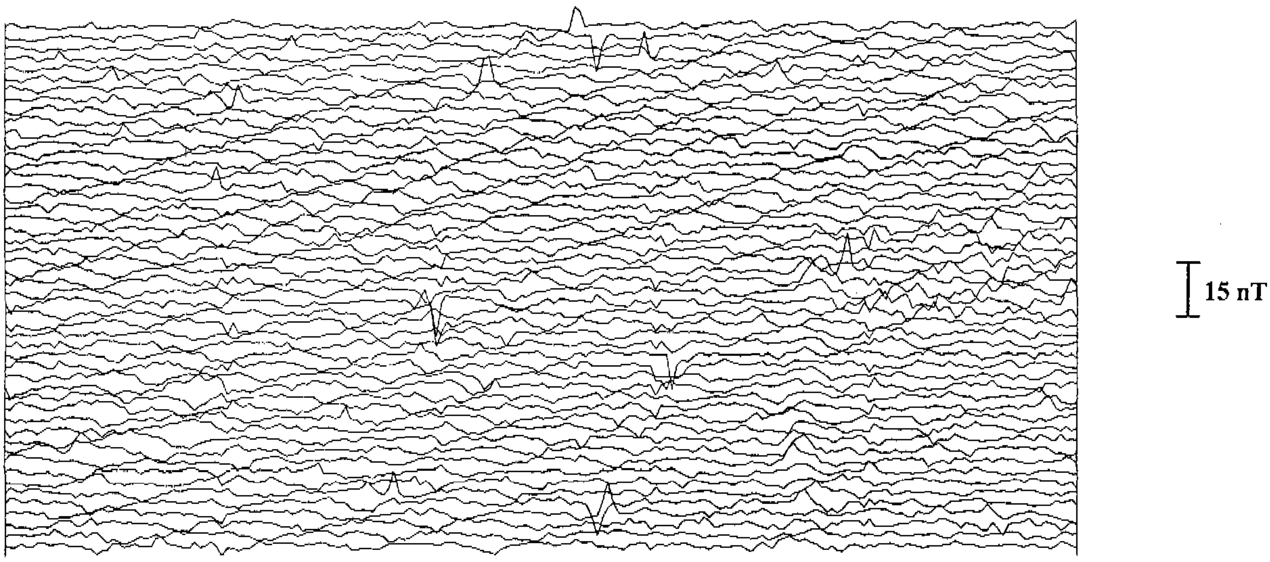
# A629 SKIPTON-KILDWICK
## Area B

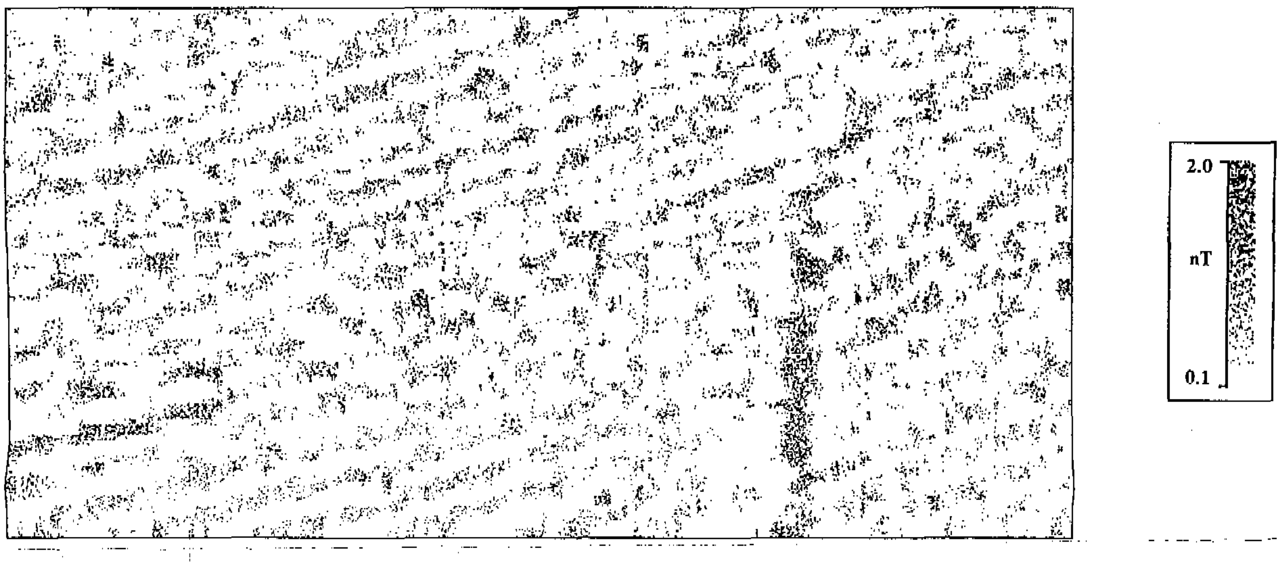


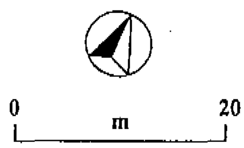

ORIGINAL AT A3

Figure B1

# A629 SKIPTON-KILDWICK
## Area C




ORIGINAL AT A3

Figure C1

# A629 SKIPTON-KILDWICK
## Area C

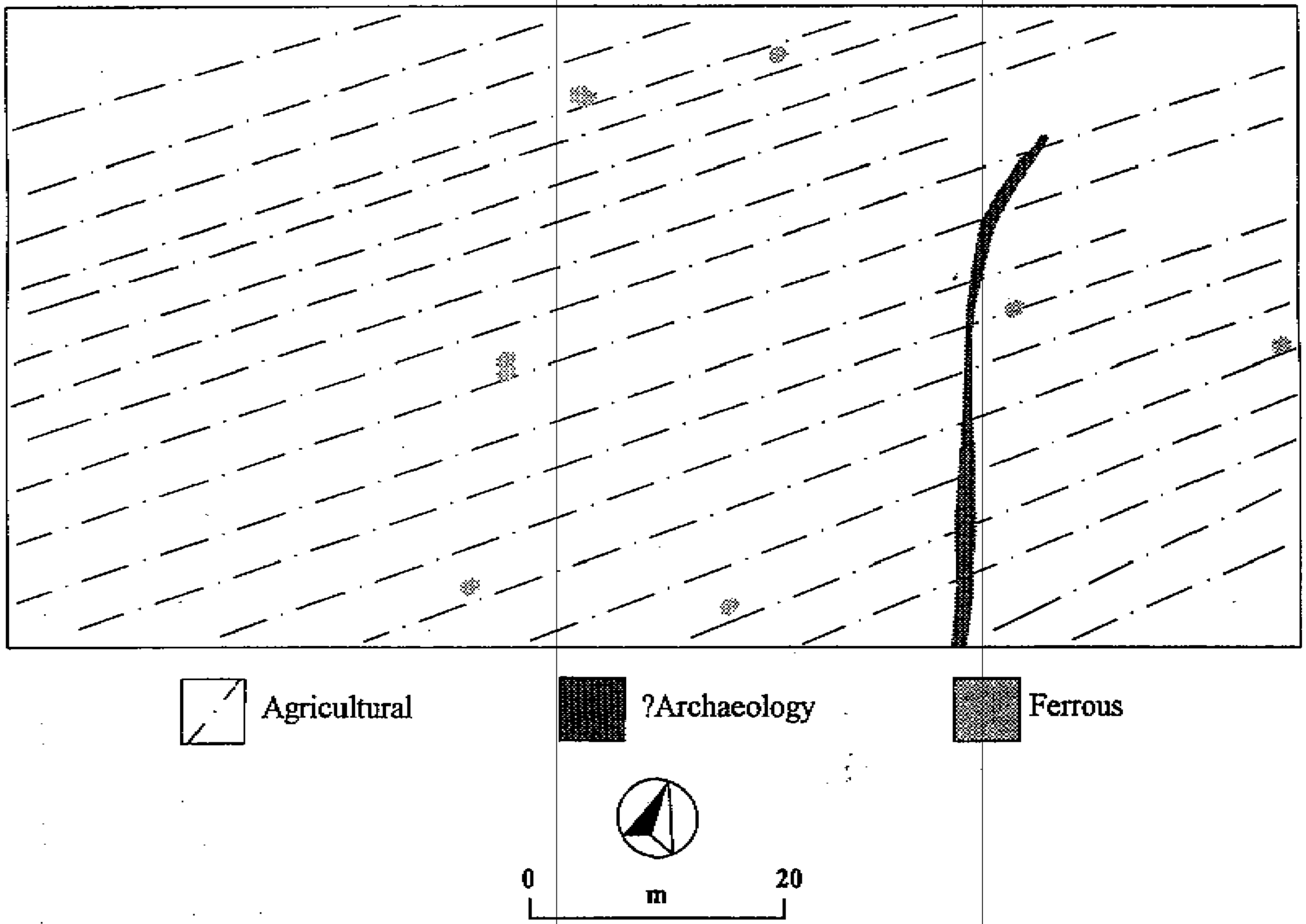
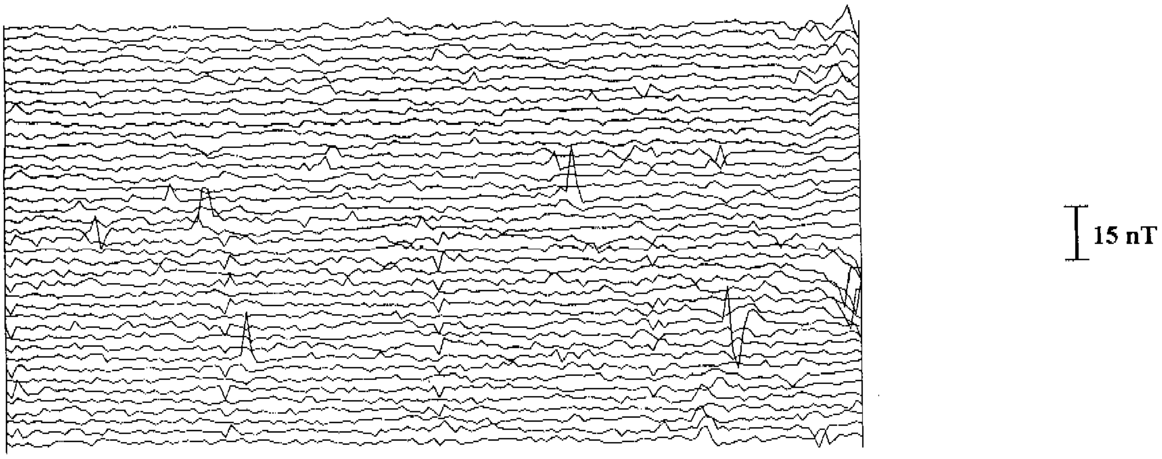
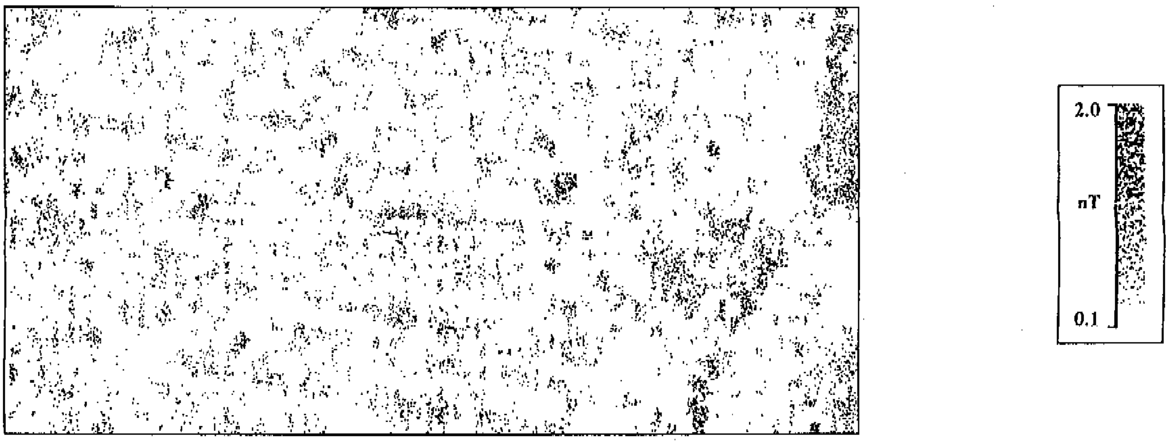
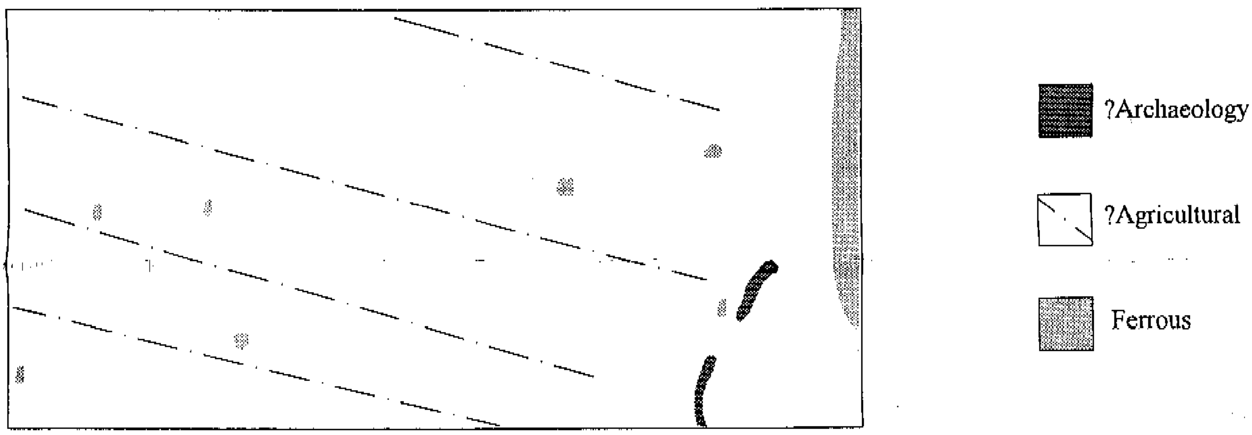


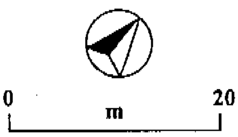

Figure C2

# A629 SKIPTON-KILDWICK
## Area D



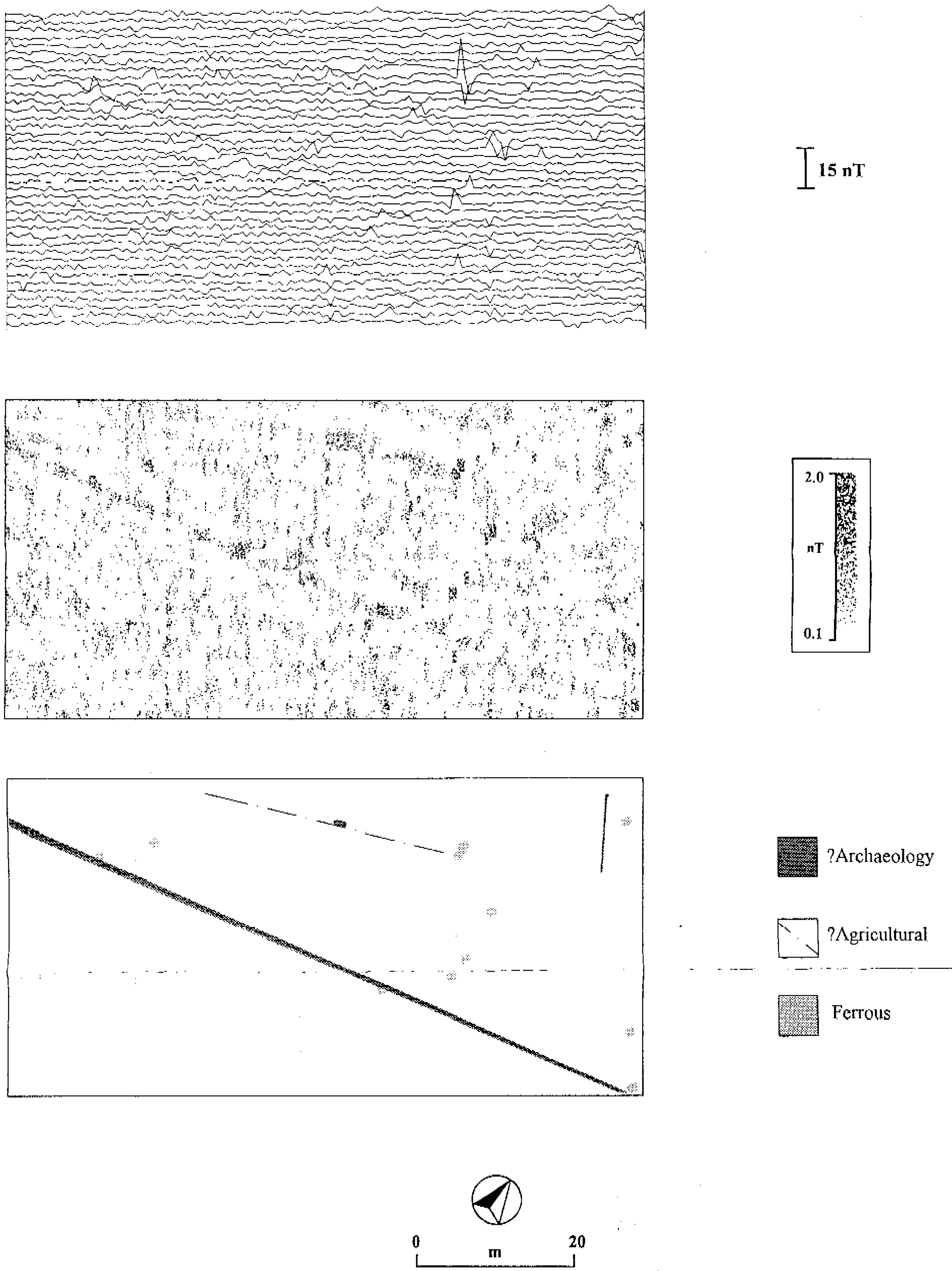




ORIGINAL AT A3

**Figure D1**

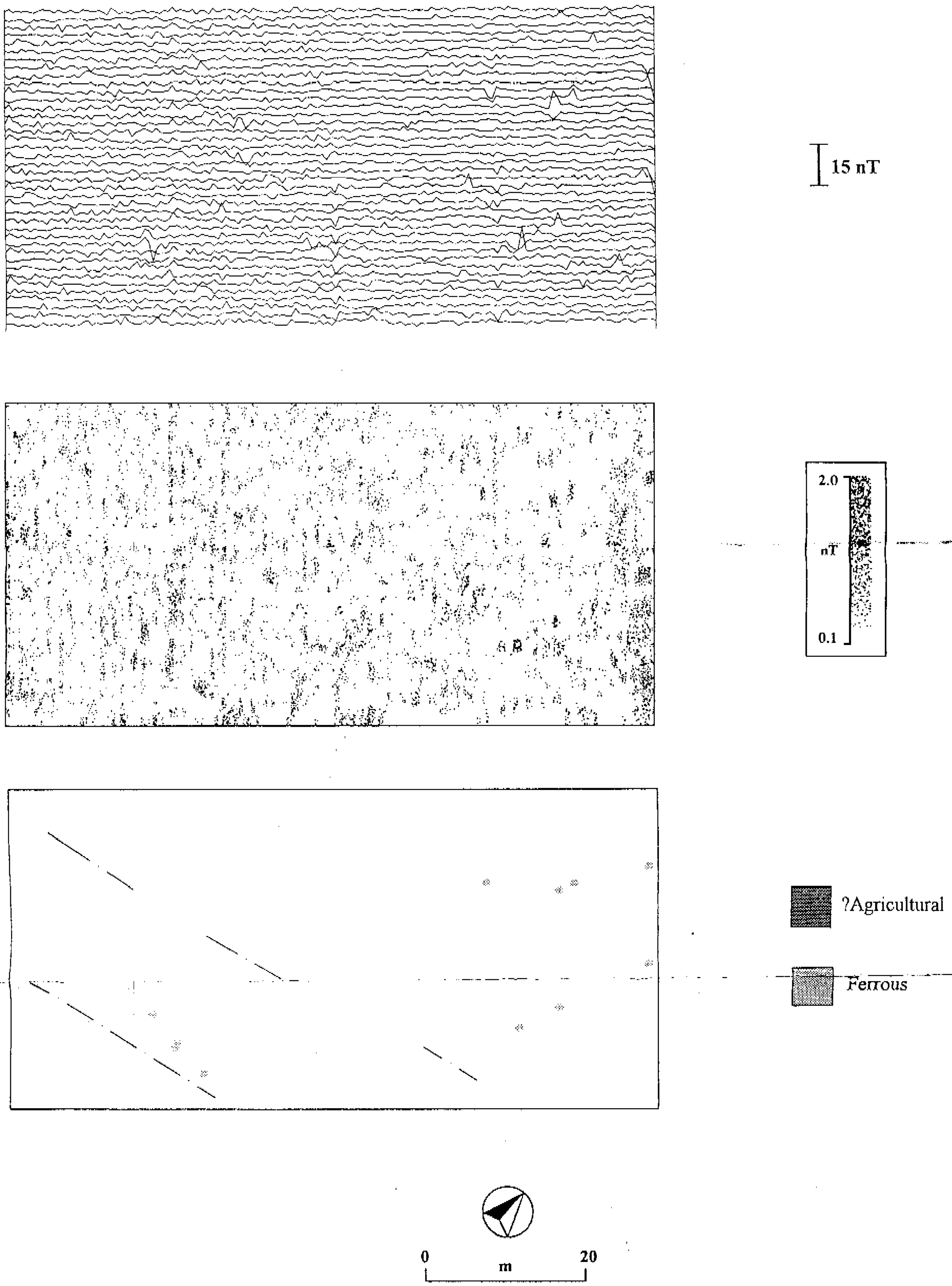
# A629 SKIPTON-KILDWICK
## Area E




ORIGINAL AT A3

Figure E1

# A629 SKIPTON-KILDWICK
## Area F




ORIGINAL AT A3

Figure F1

# A629 SKIPTON-KILDWICK
## Area G

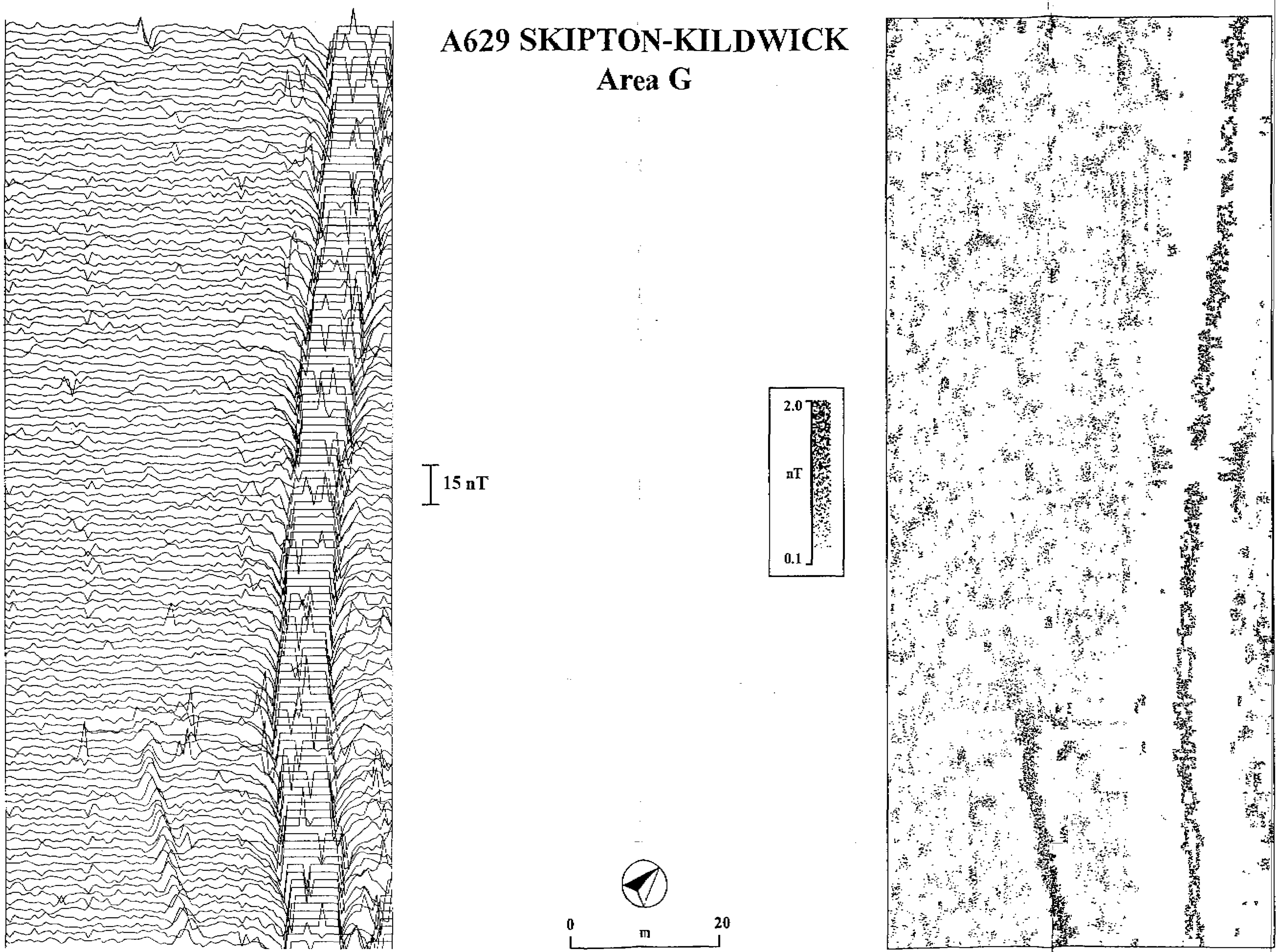



Figure G1

ORIGINAL AT A3

# A629 SKIPTON-KILDWICK

## Area G

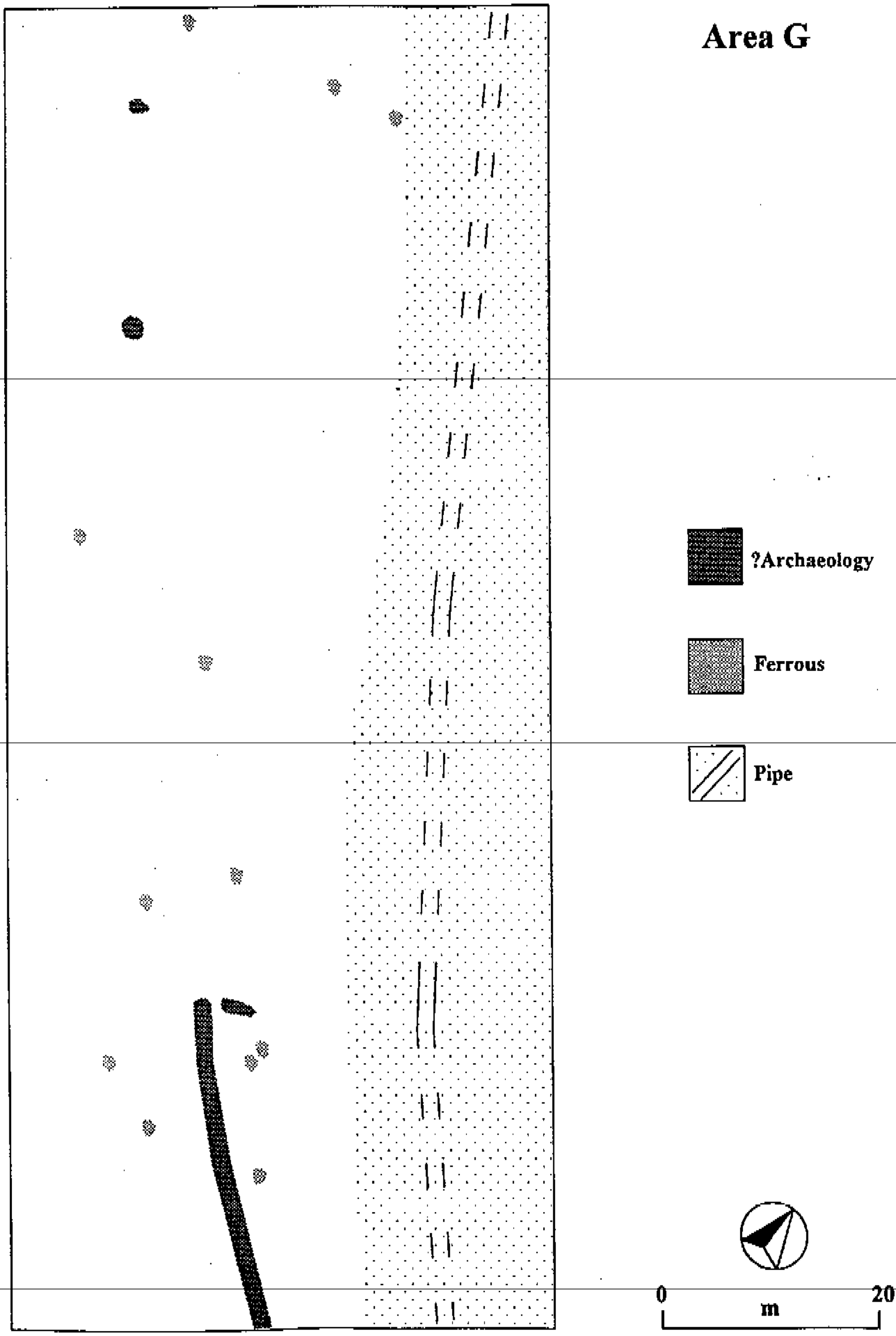



Figure G2

GEOPHYSICAL SURVEYS of Bradford

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