

**A Summary and Interpretation of
the Results of a Geophysical Survey
by Stratascan Ltd. at the Proposed
Cadeby Quarry Extension,
Leicestershire (centre SK 434 025)**

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For Tarmac Limited

<p>Checked by Project Manager</p> <p>Signed:Date:</p> <p>Name:</p>
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University of Leicester Archaeological Services

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A Summary and Interpretation of the results of a Geophysical Survey by Stratascan Ltd. at the Proposed Cadeby Quarry Extension, Leicestershire (centre SK 434 025)

Summary

This report presents a summary and interpretation of the geophysical survey results following a survey of the proposed extension areas to Cadeby Quarry, Cadeby, Leicestershire (SK 434 025). The report has been commissioned by Tarmac Central. The geophysical survey was undertaken by Stratascan Limited during February 2005. A previous archaeological desk-based assessment was commissioned from University of Leicester Archaeological Services by Tarmac Central. The proposed extraction areas are the Northern Working Area of 7.2ha located to the north of Brascote Lane, the Brascote House Area adjacent to Brascote House and the third area is the Western Working Area of 17.0ha, located between the village of Cadeby to the west and the existing quarry to the east.

The previous desk-based assessment confirmed numerous known archaeological sites existed within the vicinity of the proposed quarry extensions. The surrounding area contains evidence for Iron Age occupation and land division in the form of rectangular enclosures and numerous pit alignments. Earlier prehistoric finds have also been made within the area. Few recorded Roman sites lie in close vicinity to the site although occupation sites and villas are known slightly further afield. There is no recorded evidence for Anglo-Saxon activity close to the two extraction areas, although it is likely that the surrounding villages all have some element of Saxon origins. Medieval settlements existed at Cadeby, Newbold Verdon, Brascote and Naneby, with the proposed extraction areas lying within the surrounding agricultural lands of these settlements.

The geophysical survey revealed evidence for past agricultural activity across the proposed extraction areas, including areas of former medieval ridge and furrow, as well as more modern agricultural activity. Some areas of probable recent disturbance were also noted across all three areas.

Within the Western Working Area potential archaeological deposits were revealed by the geophysical survey lying in an area to the east of Hinckley Road and west of a previously quarried area. The number of features present suggest a fairly intensive area of archaeological activity in the form of ditches and enclosures. From the potential for Iron Age archaeology at the site identified in the desk-based assessment, and the layout of the features, it is likely that the potential archaeological remains represent an Iron Age farmstead or small settlement.

It is recommended that the area of potential Iron Age features, some 2ha in size, should be subject to further archaeological evaluation to confirm the date, character, extent and state of preservation of the archaeological remains.

1 Introduction

1.1 This document is a summary and interpretation of the results of a geophysical survey of the proposed extensions to Cadeby Quarry at Cadeby, Leicestershire. The geophysical survey was carried out by Stratascan Limited in February 2005. Cadeby Quarry lies to the west of Cadeby and south-west of Newbold Verdon in west Leicestershire, centred on national grid reference SK 434 025 (fig. 1). It lies within the parishes of Cadeby and Newbold Verdon.

1.2 The geophysical survey was carried out following the production of an archaeological desk-based assessment, which had been commissioned from University of Leicester Archaeological Services by Tarmac Central (Meek 2004). The desk-based assessment concluded that the proposed extension areas to the quarry had a high potential for archaeological remains of an Iron Age date.

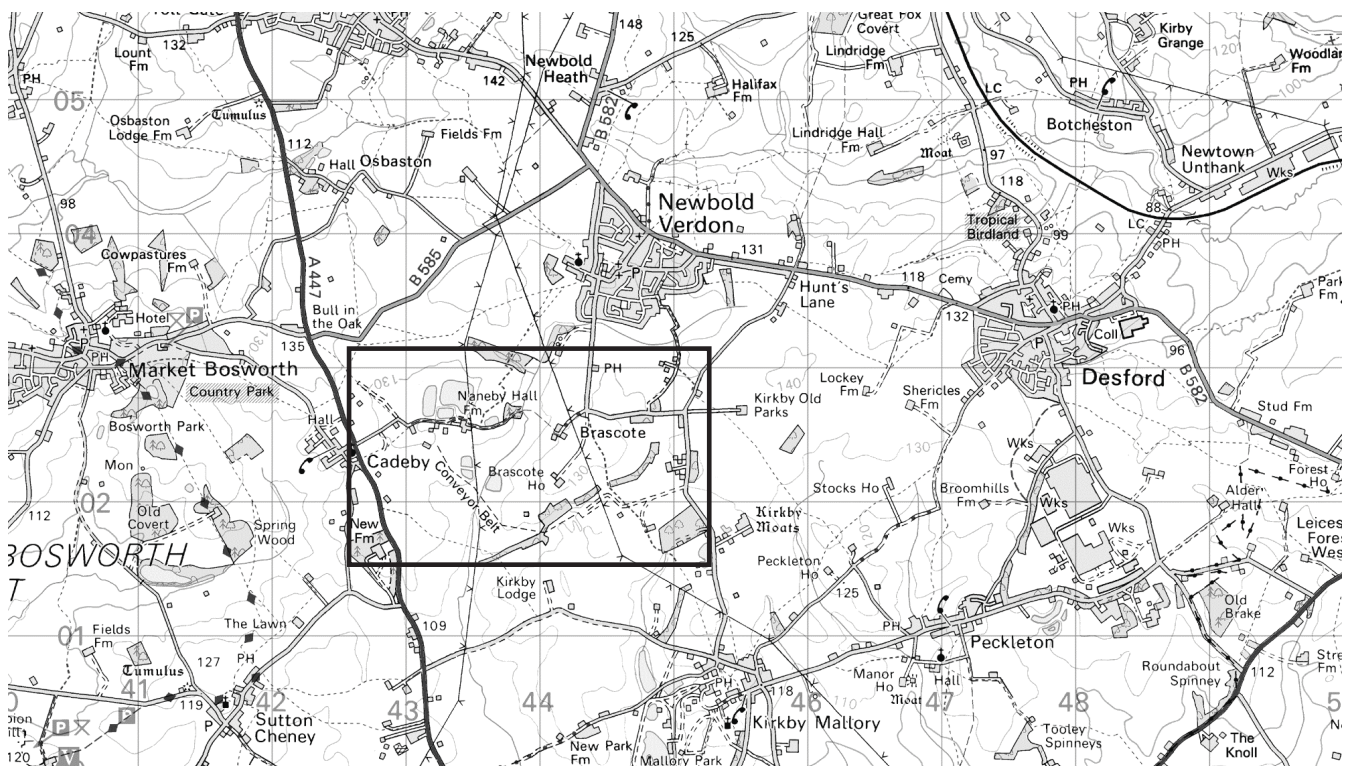


Figure 1. Site location

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1.3 The existing quarry working area, for which there already exists planning permission, surrounds Brascote House, and is referred to as the Brascote House Area (Figure 2). The western extension lies between the existing plant site and the Hinckley Road at Cadeby covering an area of *c.*17.0ha, and is referred to as the Western Working Area (Figure 2). The northern extension lies directly to the north of the existing quarry and Brascote Lane, and to the south of Newbold Verdon, covering an area of *c.* 7.2ha, and is referred to as the Northern Working Area (Figure 2).

1.4 An area surrounding Brascote House itself lies outside the approved extraction boundary, but within the Brascote House Permission. The area comprises the extant

Brascote House and outbuildings with an open area of *c.* 1.6ha to the north-east (Figure 2).

2 Aims and Objectives

2.1 Following the recommendations of the desk-based assessment a geophysical survey of all three proposed extensions to the quarry was undertaken by Stratascan Limited during February 2005. The technical results of the survey were presented in a standalone report (Stratascan Job No. J1975; Donaldson 2005).

2.2 The aim of this report is to summarise the findings of the survey and to present an interpretation of the results within the context of the findings of the desk-based assessment.

2.3 The objectives of the report are:

- To present the results of the geophysical survey in a non-technical, readily understandable summary for each of the three areas;
- To attempt to use the results to assess the date, character and extent of the potential archaeological features revealed by the survey;
- To assess the significance of the potential archaeological features revealed by the survey.

2.2 All work follows the Institute of Field Archaeologist's Code of Conduct and adheres to their *Standard and Guidance for Archaeological Evaluations*.

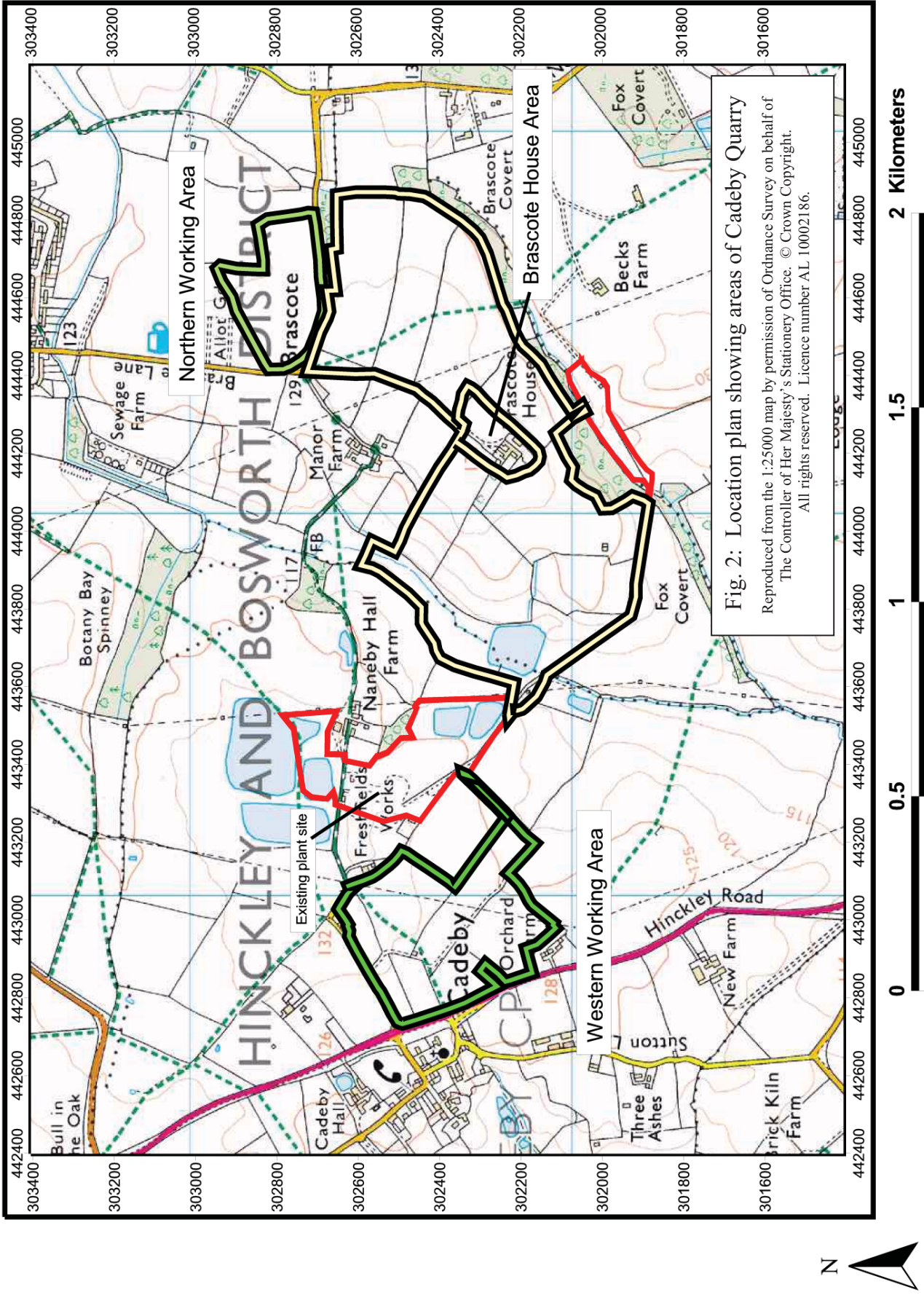
3. Methodology

3.1 The geophysical survey results are taken from the Stratascan Report 'Cadeby Quarry, Leicestershire' (Donaldson) dated February 2005. The report includes basic interpretation plots and a basic textual description of the possible origins of these features.

3.2 These results will be used in conjunction with the findings of the desk-based assessment to give a clearer understanding of the possible archaeological interpretation of the anomalies revealed from the geophysical survey.

4. Geology and Topography

4.1 The Ordnance Survey Geological Survey of Great Britain Sheet 155 (Coalville) indicates that the underlying geology consists of glacial sands and gravels underlain by Mercian Mudstone.



4.2 The Western Working Area lies at a height of between *c.* 122.2m aOD (above Ordnance Datum) and 131.8m O.D. The Northern Working Area lies at a height of between 127.7m aOD and 130.4m aOD. The areas are both relatively level and would not appear to be subject to any build ups of alluvial or colluvial soils that could cover underlying archaeological deposits.

4.3 A soil resource survey undertaken for the Environmental Statement has recorded topsoil/plough soils varying from 0.2m to 0.3m in depth. It is anticipated that any archaeological deposits that may exist within the proposed quarry extension will survive directly below the topsoil/plough soil

5. Summary of the Geophysical Survey Results

5.1 The detailed magnetic survey located a number of geophysical anomalies within each of the three survey areas. These anomalies were generally classified as positive linear anomalies of a possible archaeological origin, positive and negative linear anomalies of an uncertain origin, discrete positive area anomalies of an uncertain origin, positive and negative linear anomalies with an agricultural origin, strong dipolar linear anomalies relating to buried services or cables, areas of magnetic debris and disturbance and strong dipolar anomalies relating to ferrous objects within the topsoil (Donaldson 2005).

5.2 ***The Northern Working Area*** (Figure 31 in Donaldson 2005 – see below)

5.2.1 This survey area revealed a number of anomalies that were of uncertain origin, and possibly of geological/pedological origin, although an archaeological origin cannot be ruled out. These features (indicated as yellow on the plan) are irregular curvilinear and linear features, dispersed widely across the area.

5.2.2 A series of linear features representing the remains of medieval ridge and furrow were also recorded in this area, aligned west-south-west to east-north-east in the northern part of the field, and south-west to north-east across the central and western part. Later agricultural features were also present across the area associated with continued arable cultivation of the field.

5.2.3 A number of small anomalies were also noted within the area, which suggest the presence of iron objects.

5.3 ***The Brascote House Area*** (Figure 25 in Donaldson 2005 – see below)

5.3.1 The survey around the existing Brascote House clearly demonstrated the presence of two service trenches or pipelines, one aligned roughly north south along the eastern side of the area, and the second running roughly north-west to south-east across the central part.

5.3.2 A number of areas suggesting spreads of ‘thermoremnant’ material, or material that has been fired such as brick and tile, and would imply that areas of demolition and dumping of material. Other areas suggest the presence of ferrous material being present, possibly in dumps of material associated with activity around the farmhouse. It is likely that they both associated with modern activity relating to the working and use of the Brascote House farm. The earlier Ordnance Survey maps of Brascote House show a number of buildings surrounding the farmhouse that are no longer present, and these features may be associated with their demolition and dumping of the resulting material.

5.3.3 A few dispersed features were noted to the north and north-east of the farm, but their origin is uncertain, although they may have archaeological origin.

5.4 *The Western Working Area* (Figures 08, 13, 18 and 19 in Donaldson 2005)

5.4.1 In the geophysical survey report the Western Working Area is split into three different areas to make discussion of the results easier. It was divided into Area 1nw, Area 1sw and Area 1ne and in order to display the site at an appropriate scale.

5.4.2 The majority of areas 1nw and 1ne contained very similar geophysical survey results, mainly comprising the remains of medieval ridge and furrow agricultural activity. Some later agricultural activity may also be apparent.

5.4.3 A buried service or pipeline was shown running roughly east-west across the northern part of the 1nw area. A few areas of likely dumps of material such as brick were also noted on the eastern side of this area. These are all considered to be of modern date.

5.4.4 The continuation of the buried service or pipeline from area 1nw could be followed through area 1ne, with a perpendicular spur running northwards to Rock Cottage. Scatters of material, again possibly representing modern dumps of demolition material/rubbish etc. A few scattered ferrous objects and areas containing ferrous material were also noted across the area 1ne. They are again likely to be of modern origin.

5.4.5 The remains of medieval ridge and furrow agricultural activity was seen across the entire area of 1ne, excluding the most northerly field.

5.4.6 Within the southern part of the area 1sw, a similar series of results to the two northern areas were revealed, showing medieval ridge and furrow, areas of likely rubbish material (bricks etc.). A number of spreads containing ferrous material were recorded to the north and east of Orchard Farm, and are presumably associated with modern activity on the farm. A buried service or pipeline also runs north from the area of Orchard Farm.

5.4.7 To the east of the building called Highfields on Hinckley Road an area containing potential archaeological remains was recorded. The anomalies recorded included linear features, curvilinear features and rectilinear features. The features would be consistent with a small settlement or farmstead of likely Iron Age date, with a number of enclosures, paddocks and fence lines.

5.4.8 A few anomalies of uncertain origin were also located close to Hinckley Road and in the south-east corner.

6. Discussion

6.1 The desk-based assessment detailed numerous sites in the vicinity of the proposed extension areas to Cadeby Quarry. These were detailed in section 5.1.4 from the Desk-based Assessment, Meek 2004) which is laid out below.

“5.1.4 *Iron Age sites* (Including Leicestershire Sites and Monuments Record Entries)

5.1.4 *Iron Age Sites*

SMR	Grid Ref	Site Name	Description
LE9249	SK439036	South west of Newbold Hall	Prehistoric pit alignment
LE2707	SK428018	East of New Farm	A T shaped stretch of ditch of probable Prehistoric date. The longest stretch has a distinct kink as if avoiding an earlier feature.
LE2976	SK453032	South of Newbold Spinney,	Large prehistoric pit alignment crossing three fields
LE2998	SK423033	Gallows Close	Possible pit alignment which bisects a small ring ditch
LE3024	SK455016	South east of Kirkby Moats.	Possible double Prehistoric pit alignment cropmarks.
LE3031	SK452020	North West of Kirkby Moats	A prehistoric pit-alignment.
LE3047	SK450020	Kirby Becks	A double pit alignment, extending the line from 40SW AC.
LE3064	SK448022	Kirby Becks	Cropmark of a double pit alignment
LE2975	SK445031	North east of The Mill Inn,	Large rectangular enclosure with entrance in west side
LE2991	SK436036	South West of Newbold hall,	Iron age or Roman rectangular enclosure

The majority of the Iron Age sites recorded in the vicinity of Cadeby Quarry are in the form of pit alignments. These features have all been identified as cropmarks on aerial photographs, and none have been subject to archaeological excavation. Only fragments of the pit alignments have been identified from the photographs, and it is presumed that all project beyond the limited stretches recorded. Pit alignments are thought to represent a method of land division that was commonly used during this period, often leading perpendicular from stream courses, as may be happening in this area. A number of double pit alignments are also recorded and could potentially suggest animal drove-ways.

A ditch feature as opposed to pit alignment is also recorded on aerial photographs lying to the south of the Western Working Area. The ditch is said to be kinked ‘as though avoiding an earlier feature’. There are a number of recorded cases of Iron Age ditches and pit alignments kinking around Bronze Age barrows, utilising the mounds themselves as landscape features.

Two rectangular enclosures have also been identified on aerial photographs which are again a common feature of this period. The enclosures were thought to be used as both animal enclosures and also as occupation sites in the form of farmsteads. The closest enclosure lies to the north of the Northern Working Area to the east of the Old Mill Inn.

Cropmarks, by their very nature, depend on numerous factors relating to ground conditions, vegetation growth, geology, historic land use etc. to be visible from the air. The absence of cropmarks in areas, such as both the Western and Northern Working Areas does not preclude the possibility that similar features exist within them.” (Meek 2004)

6.2 The possible archaeological features revealed within the Western Working Area by the geophysical survey, have the appearance of typical Iron Age features (see

Figure 3). The field or ownership boundaries indicated by the pit alignments in the wider landscape around Cadeby are far less dense than the anomalies revealed in the survey of the Western Working Area, which suggests that this area is the location of a settlement or farmstead. Very similar arrangements of linear, curvilinear and rectilinear features have been revealed on other geophysical surveys of Iron Age settlement sites, such as at Manor Farm at Humberstone, Leicestershire (Thomas forthcoming) and also at Warren Farm, Lockington in Leicestershire (Butler 1998). Both of these sites would appear to be larger than the one recorded at Cadeby, but the general arrangement of features are very similar. The large site at Lockington is shown on Figure 4 below, which clearly demonstrates similarities. In general the visible features would include property boundaries, animal enclosures, fence lines and possibly drove ways. .

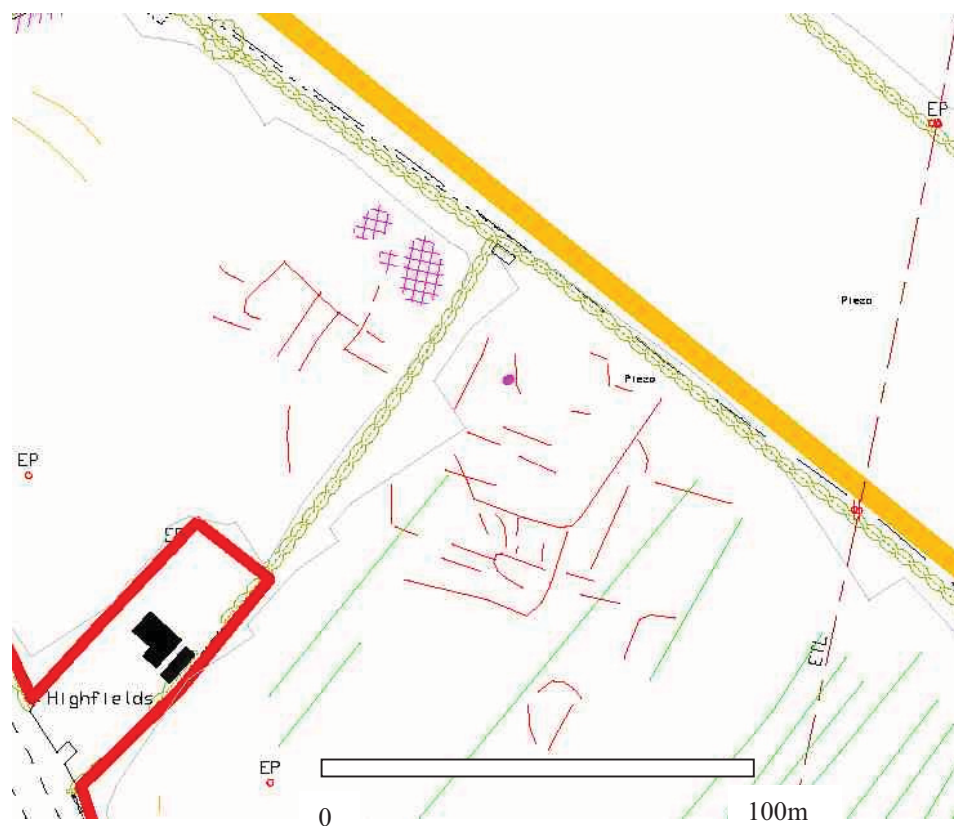


Figure 3: Detail of geophysical survey results from Western Working Area at Cadeby



Figure 4: Geophysical Survey Results at Warren Farm, Lockington, Leicestershire
(based on Butler 1998)

6.3 It is unlikely that smaller features such as postholes and shallow gullies would be evident from the geophysical survey, although it is very likely that such archaeological features would exist, assuming the anomalies are of archaeological origin. Postholes and gullies if present are likely to indicate the remains of houses and structures. Roundhouses are the typical dwellings of Iron Age communities in Leicestershire, which would have been constructed of timber, with wattle and daub walls and large conical thatched roofs. Earthfast archaeological remains are typically

ring gullies and post holes, which in many cases are very shallow due to truncation from later agricultural activity. These features may only be revealed through archaeological evaluation/excavation, where topsoil is removed and underlying earth cut archaeological features are exposed. The two following illustrated examples of excavated Iron Age enclosures demonstrate the different levels of survival that may occur on sites. At Enderby Enclosure II (Figure 5) a small enclosure contains the remains of four clear roundhouses, whereas at Huncote (Figure 6), a larger enclosure contains slighter remains and incomplete remains of two buildings.

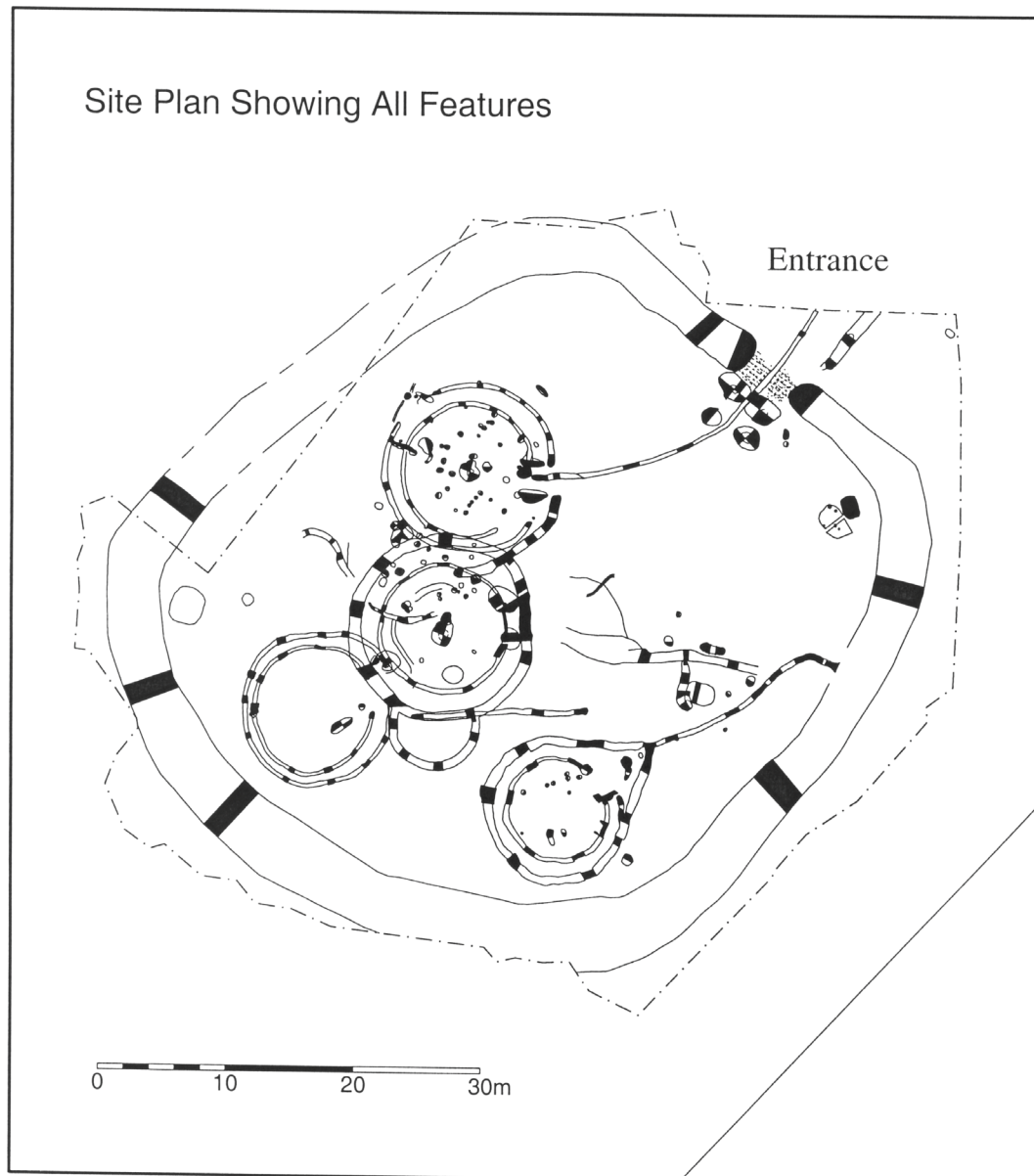


Figure 5: Full excavation plan of an Iron Age farmstead at Enderby Enclosure II, Leicestershire (from Meek et al 2004)

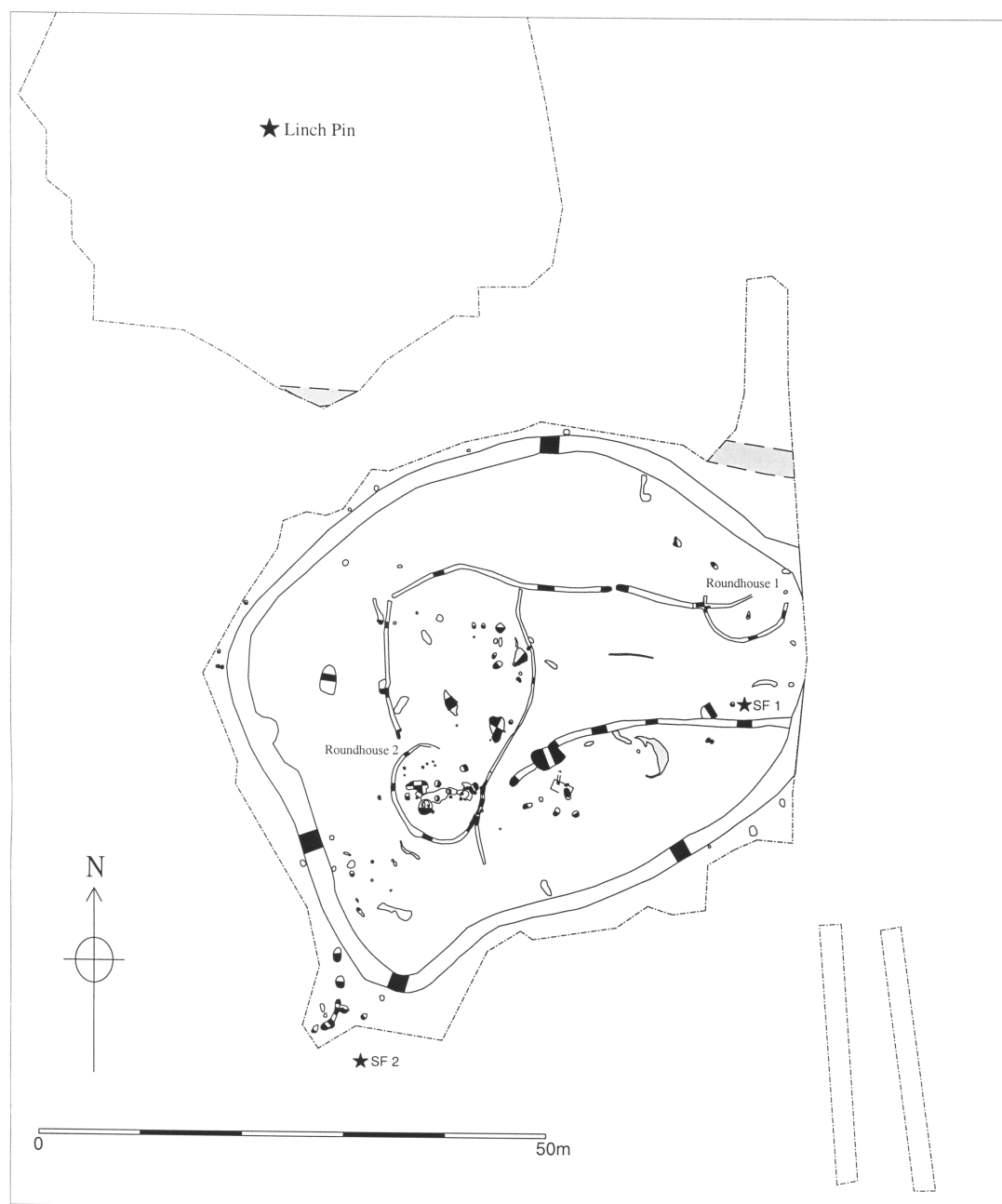


Fig 6: Full excavation plan of Iron Age Enclosure at Huncote, Leicestershire
(from Meek et al)

7. Significance and Recommendations

7.1 The geophysical survey has demonstrated the likely presence of remains of Iron Age, medieval and post-medieval/modern features.

7.2 The Iron Age would appear to be represented by a *c.*2ha area of intense activity in the form of linear, curvilinear and rectilinear features thought to represent an Iron Age farmstead or small settlement associated with the wider landscape of pit alignments, enclosures and linear features revealed on aerial photographs in the wider vicinity. The remains would be considered to be of regional significance.

7.3 It is recommended that the area of potential Iron Age features, some 2ha in size, should be subject to further archaeological evaluation to confirm the date, character, extent and state of preservation of the archaeological remains.

7.4 A further stage of excavation to preserve the archaeological remains through record may be required prior to gravel extraction in this area.

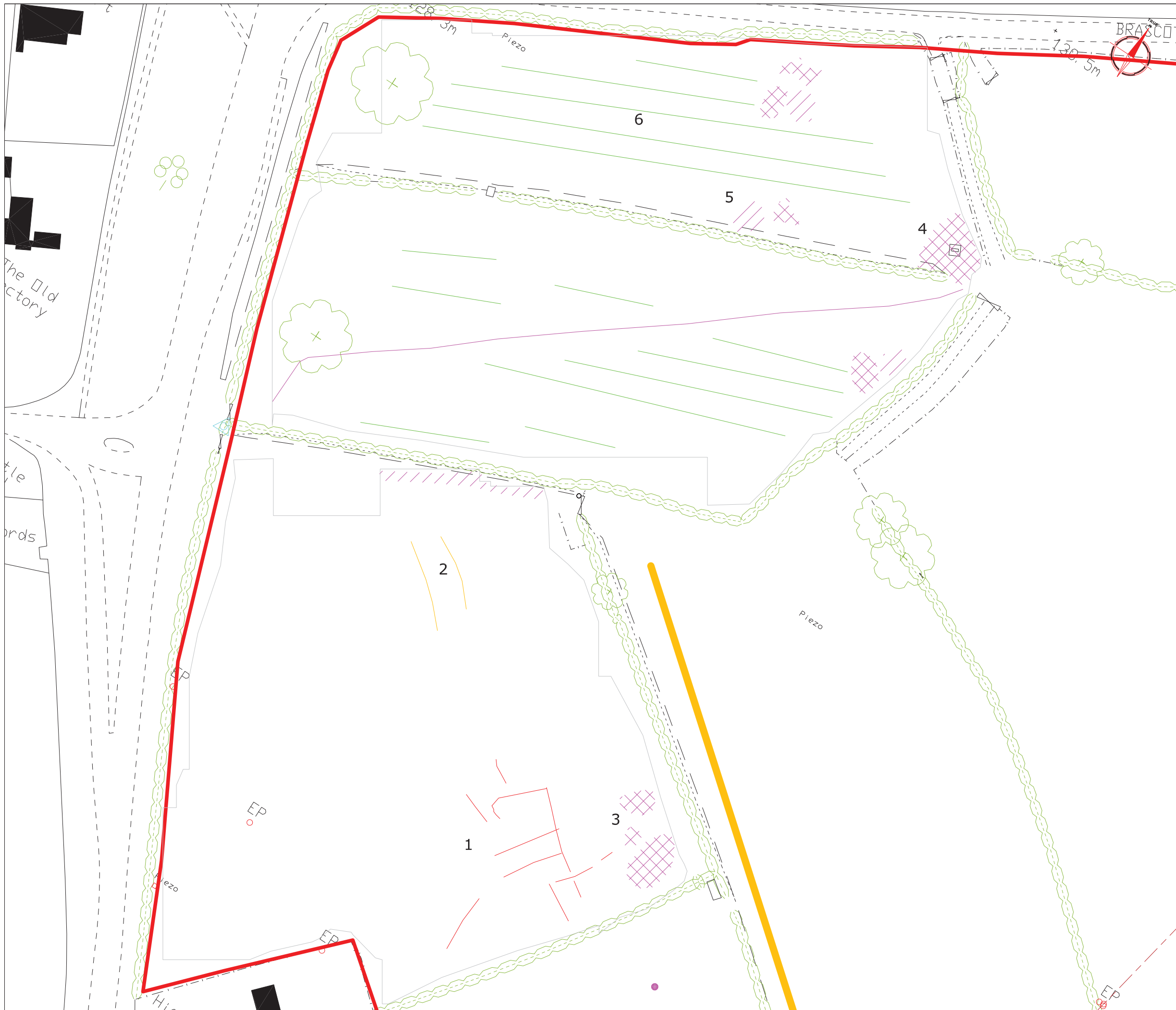
7.5 The medieval ridge and furrow that is suggested by the geophysical survey increases our knowledge of the medieval landscape and the open field systems surrounding Cadeby, Brascote and Newbold Verdon. Some of the features are still visible as remnant earthworks, although most have been levelled, probably through plough activity over many years. The features are of local significance and do not warrant any further evaluation. Prior to extraction, the remaining areas of the site outside of the identified area of probable Iron Age activity, would need to be topsoil stripped under the control and supervision of archaeologists, in order that if any archaeological features are present that were not revealed by the geophysical survey, they can be recorded. If areas of significant archaeological deposits were revealed a contingency for further excavation should be made available.

7.6 The post-medieval and modern features revealed by the survey suggest areas of demolition and dumping of material. They are considered to be of low or negligible significance, and other than confirming their origin during the control and supervision of the topsoil strip of the area, no further work would be required.

James Meek
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April 2005
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References

- Butler, A., 1998 *A Geophysical Survey at Warren farm Lockington, Leicestershire*, ULAS Report No. 1998-079
- Donaldson, K. T., 2005 *Geophysical Survey Report: Cadeby Quarry, Leicestershire*, Stratascan Limited Report, Job No. J1975, February 2005
- Meek, J. 2004 *An Archaeological Desk-based Assessment for the Proposed Cadeby Quarry Extension, Leicestershire (centre SK 434 025)*, ULAS Report No. 2004-204
- Meek et al 2004 Iron Age Enclosures at Enderby and Huncote, Leicestershire, *Transactions of Leicestershire and Historical Society*, Volume 78, pp1-34
- Thomas, J., forthcoming *An Archaeological Excavation of an Iron Age Settlement at Manor Farm, Humberstone, Leicestershire*
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Amendments		
Issue No.	Date	Description

KEY	
	Positive linear anomaly - agricultural mark
	Positive linear anomaly - cut feature of possible archaeological origin
	Positive linear anomaly - cut feature of uncertain origin
	Area of magnetic debris
	Area of magnetic disturbance
	Strong dipolar linear anomaly - service/pipeline

Client
ULAS

Project Title
GEOPHYSICAL SURVEY - CADEBY QUARRY, LEICESTERSHIRE

Job No. 1975

Subject
ABSTRACTION AND INTERPRETATION OF MAGNETOMETER ANOMALIES - AREA 1 NW

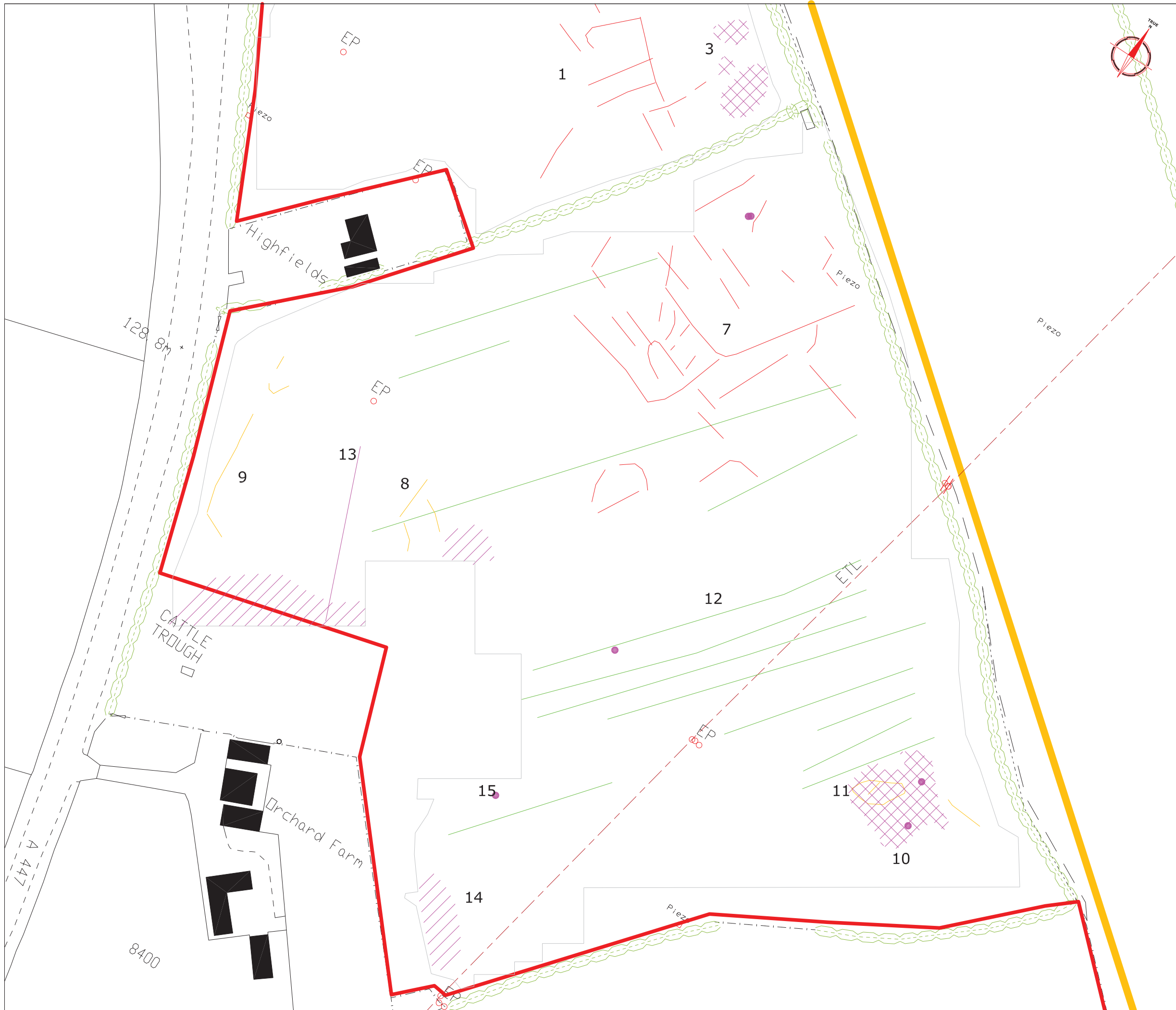
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Scale
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Plot A3	Checked by DJS	Issue No. 01
Survey date FEB 05	Drawn by KTD	Figure No. 08



Amendments		
Issue No.	Date	Description
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KEY	
	Positive linear anomaly - agricultural mark
	Positive linear anomaly - cut feature of possible archaeological origin
	Positive linear anomaly - cut feature of uncertain origin
	Area of magnetic debris
	Area of magnetic disturbance
	Positive linear anomaly - possibly associated with electricity pole
	Strong discrete positive anomaly with negative return - ferrous object

Client
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Project Title
GEOPHYSICAL SURVEY - CADEBY QUARRY, LEICESTERSHIRE

Job No. 1975

Subject
ABSTRACTION AND INTERPRETATION OF MAGNETOMETER ANOMALIES - AREA 1 SW

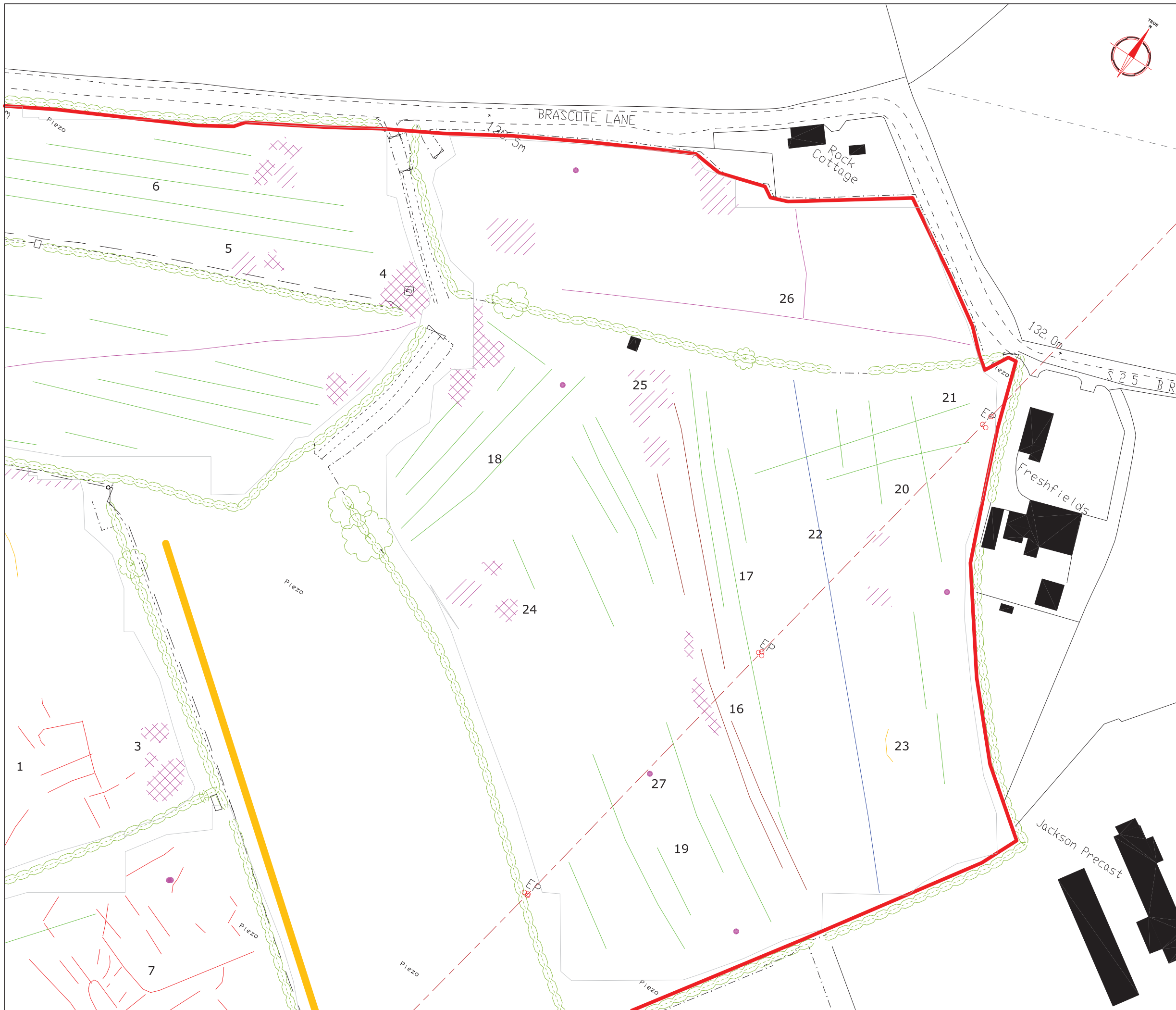
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Survey date FEB 05	Drawn by KTD	Figure No. 13



Amendments		
Issue No.	Date	Description
-	-	-

KEY	
	Positive linear anomaly - agricultural mark
	Positive linear anomaly - of uncertain origin
	Positive linear anomaly - associated with trackway
	Negative linear anomaly - of uncertain origin
	Area of magnetic debris
	Area of magnetic disturbance
	Strong dipolar linear anomaly - buried service/pipeline
	Strong discrete positive anomaly with negative return - ferrous object

Client
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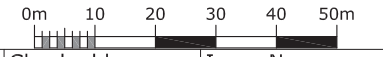
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Subject
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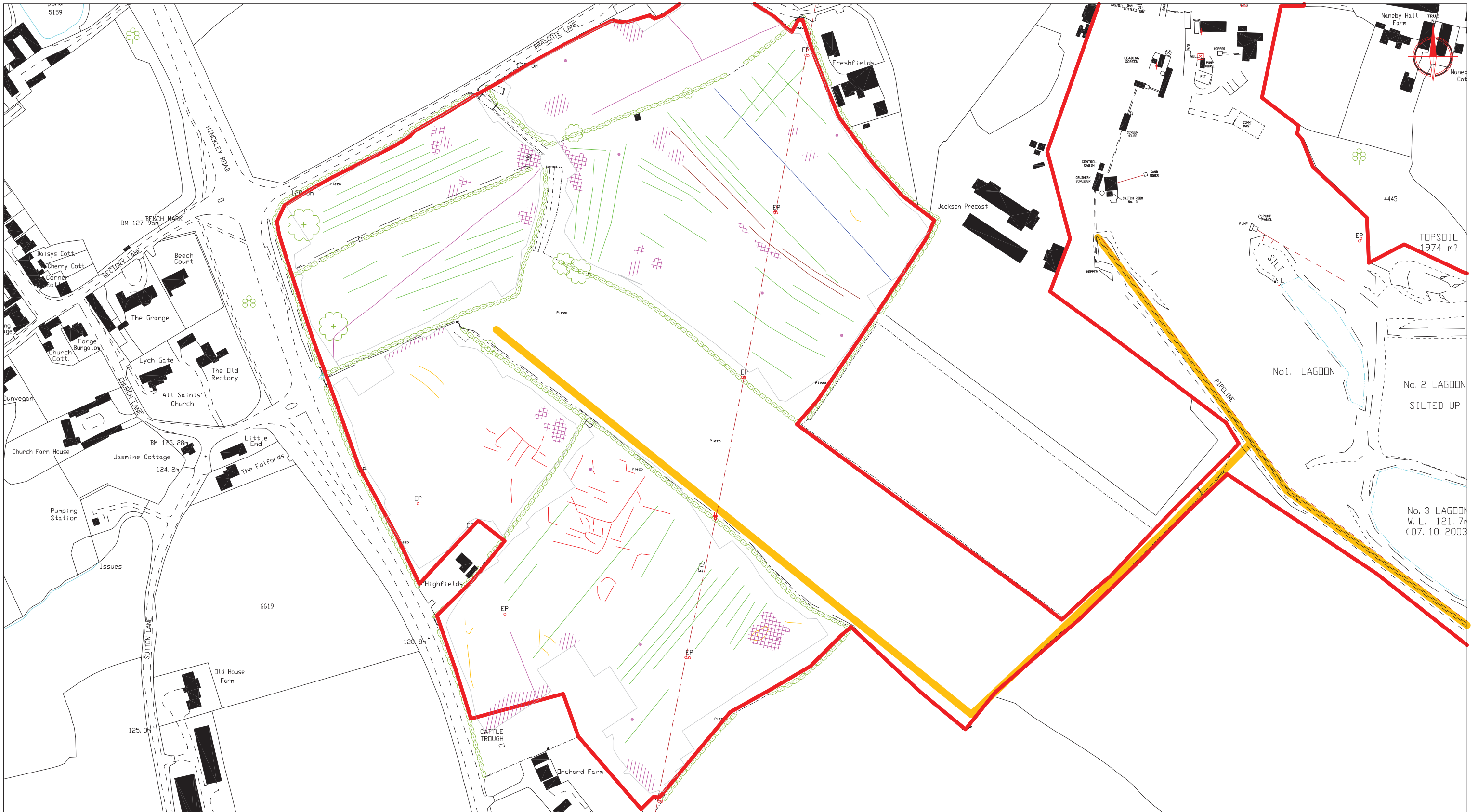
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Scale
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KEY

- Positive linear anomaly - agricultural mark
- Positive linear anomaly - cut feature of possible archaeological origin
- Positive linear anomaly - cut feature of uncertain origin
- Positive linear anomaly - associated with trackway
- Negative linear anomaly - of uncertain origin
- Area of magnetic debris

- Area of magnetic disturbance
- Strong dipolar/positive linear anomaly - pipeline/cable/service
- Strong discrete positive anomaly with negative return - ferrous object

Project Title Job No. 1975

GEOPHYSICAL SURVEY - CADEBY QUARRY, LEICESTERSHIRE

Subject
ABSTRACTION AND INTERPRETATION OF MAGNETOMETER ANOMALIES- AREA 1

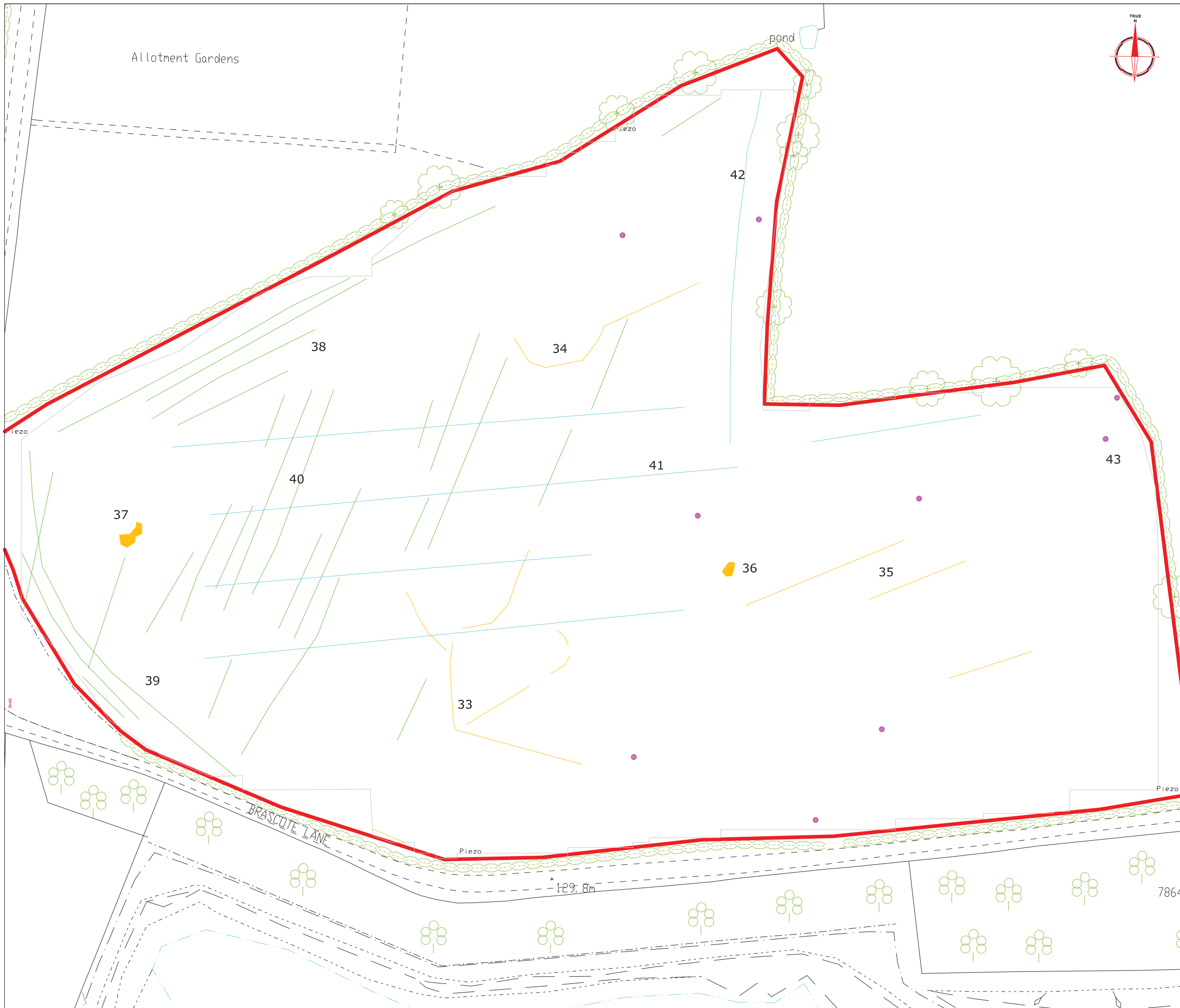
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Client
ULAS

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Survey date FEB 05	Drawn by KTD	Figure No. 19



Amendments		
Issue No.	Date	Description
-	-	-

Client
ULAS

Project Title
GEOPHYSICAL SURVEY - CADEBY QUARRY, LEICESTERSHIRE

Job No. 1975

Subject
ABSTRACTION AND INTERPRETATION OF MAGNETOMETER ANOMALIES - AREA 3

KEY	
	Positive linear anomaly - agricultural mark
	Positive linear anomaly - of uncertain origin
	Negative linear anomaly - of agricultural origin?
	Discrete low magnitude positive response - of uncertain origin
	Strong discrete positive anomaly with negative return - ferrous object

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Scale
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Plot A3	Checked by DJS	Issue No. 01
Survey date FEB 05	Drawn by KTD	Figure No. 31