Archaeological Services
University of Durham

Brompton, Northallerton, Romanby Flood Alleviation Scheme, North Yorkshire

geophysical surveys (Phase 2) and updated project design

on behalf of
Mouchel Parkman UK Ltd

ASUD Report 1201
January 2005

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Contents

1. Summary

The project

1.1 This report presents the results of the second phase of geophysical surveys conducted on land at Brompton, Northallerton and Romanby, North Yorkshire, in advance of proposed flood alleviation works. The initial study area comprised land adjacent to five becks, totalling 259ha. A 25% sample of each of the five areas was surveyed during the first phase of work. The additional surveys reported on here have been carried out in response to a change in the proposed extents of 'cut and fill' earthwork operations for the flood alleviation scheme.

1.2 The works were commissioned by Mouchel Parkman UK Ltd and conducted by Archaeological Services University of Durham (ASUD) in accordance with a Project Design provided by ASUD; this was prepared following discussions between Mouchel Parkman, the Heritage Unit at North Yorkshire County Council and ASUD.

Results

1.3 Ridge and furrow cultivation remains, typically medieval in origin, have been detected in both phases of survey, throughout the study area. Former field boundaries, possible enclosures, droveways and miscellaneous ditch features have also been detected in places. In general, the proposed excavation/flood areas will not impact on the more significant archaeological features, such as a possible Roman roadside settlement at Long Lane, a former Roman road. However, potentially significant features within the proposed development areas include a complex of rectilinear ditched enclosures and a possible ring-ditch in North Beck Areas 8 and 9, and a possible sub-circular enclosure at Ing Beck Area 9.

1.4 Further archaeological works which might be required in relation to the proposed development are outlined in Section 12 of this report, and comprise: further geophysical survey if works areas or hardstanding are to be located outside the areas sampled during Phases 1 and 2; trial trench evaluation of potential archaeological features in areas which are to be landscaped for water storage; and watching briefs during geotechnical test-pitting, groundworks for water storage areas and temporary works yards.

2. Project background

Location (Figure 1)

2.1 The study area comprises land at Brompton, Northallerton and Romanby in North Yorkshire, primarily on the north and east sides of Northallerton and concentrated around the following five becks: North Beck, Sun Beck, Turker Beck, Ing Beck and Winton Beck.

2.2 Plans indicating the five study areas for archaeological investigation during Phase 1 were supplied by Mouchel Parkman (MPL Drawing nos. Sketch 004, 005 & 006; Job no. 77052). The total area under consideration covered 259.2ha, which was divided between the becks as shown below. 25% of each study area was surveyed for Phase 1.

2.3 Revised plans (MPL Drawing nos. GS-003, GS-004, GS-005, Sketch 28 & Sketch 29; Job no. 77052) showing the new extents of the proposed cut-and-fill groundworks (Figure 1) necessitated fresh surveys (Phase 2); although many of the areas to be directly affected by groundworks were considerably smaller than the original study areas, their locations were also revised and included substantial areas not sampled by the Phase 1 surveys. The revised areas to be directly affected by groundworks are also shown below.

Beck	**Area (ha)**	**Revised groundworks areas (ha)**
North Beck	70.27	74
Sun Beck	29.84	2.2
Turker Beck	26.74	5.2
Ing Beck	83.57	27.7
Winton Beck	48.77	36.3
Total	**259.19**	**145.4**

Development proposal

2.4 The proposal is for the provision of a flood alleviation scheme, to include embankments, water storage areas and associated works.

Objective

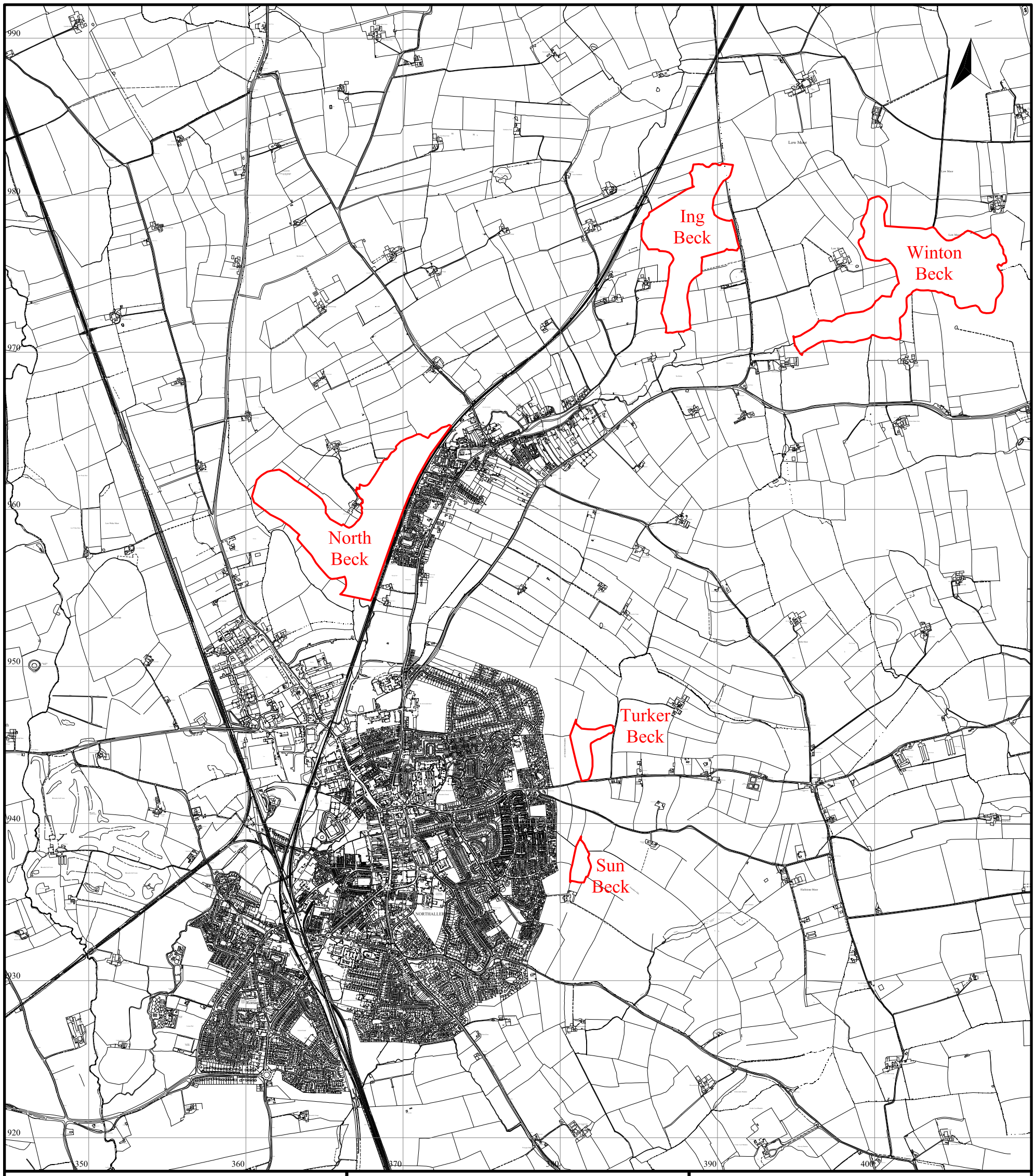
2.5 The principal aim of the surveys was to determine the extent and nature of any sub-surface features of likely archaeological interest, including cut, built and fired features, which would assist the client and the planning authority in determining appropriate mitigation strategies should archaeological deposits be found to survive within the study area.

2.6 The Phase 2 survey areas were located in response to a change to the proposed extents of the scheme, in order to sample regions not covered adequately by the previous phase of works.

Dates

2.7 The surveys were undertaken between 7th December and 22nd December 2004. This report was prepared between 5th January and 19th January 2005.

Personnel



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Geophysical surveys (Phase 2) report 1201

Figure 1
Locations of the North Beck, Sun Beck, Turker Beck, Ing Beck and Winton Beck development areas

on behalf of
Mouchel Parkman UK Ltd

0 1km

scale 1:25 000 - for A3 plot

outline of revised proposed development area

2.8 The fieldwork was conducted by Sam Roberts (Supervisor), Louise Robinson, Ed Blinkhorn and Lorne Elliott. This report was prepared by Sam Roberts and Duncan Hale, with illustrations by Martin Railton and David Graham. The Project Manager was Duncan Hale.

Acknowledgements

2.9 Archaeological Services is grateful to the client and the landowners and farmers for their cooperation with this project.

Archive

2.10 The survey archive is currently held at Archaeological Services, University of Durham. It is anticipated that the survey data archive will be transferred to the Archaeology Data Service in due course.

3. Landuse, topography and geology

3.1 At the time of fieldwork the study area comprised a rural mixed farming landscape. Fields were typically in use for cereal crops (recently sown) or pasture, with occasional brassica:

North Beck Area 9	pasture	Ing Beck Area 9	cereal
North Beck Area 10	pasture	Ing Beck Area 10	pasture
North Beck Area 11	cereal		
		Winton Beck Area 6	pasture
Sun Beck Area 5	pasture	Winton Beck Area 7	brassica
		Winton Beck Area 8	cereal
Turker Beck Area 4	cereal	Winton Beck Area 9	cereal
		Winton Beck Area 11	cereal
		Winton Beck Area 12	pasture

3.2 The landscape is gently undulating, lying at between 40-75m AOD.

3.3 The local solid geology comprises Triassic mudstones, with Jurassic Great and Inferior Oolite further east. These are overlain by glacial and alluvial deposits.

4. Geophysical survey

Standards

4.1 The surveys and reporting were conducted in accordance with English Heritage (1995) Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation*; the Institute of Field Archaeologists (2002) Paper No.6, *The use of geophysical techniques in archaeological evaluations*; and the Archaeology Data Service (2001) *Geophysical Data in Archaeology: A Guide to Good Practice*.

Technique selection

4.2 Given the anticipated shallowness of targets (<1.5m in depth) and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting any cut, built

and fired archaeological features which might be present. This technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field; such anomalies often reflect archaeological features.

Field methods

4.3 A 30m grid was established across each survey area and tied-in to known, mapped Ordnance Survey points using a Leica TR307 total survey station instrument and datalogger with *Penmap* software.

4.4 Measurements of vertical geomagnetic field gradient were determined using Geoscan FM36, FM256 and Bartington Grad601 fluxgate gradiometers 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 or 0.5m and the traverse interval to 1.0m, thus providing 3600 or 1800 sample measurements per 30m grid unit.

4.5 Data were downloaded on-site into laptop computers for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

4.6 Geoplot v3.00(P) 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 2-44; general location plans for each beck study area are shown at 1:5000; 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.

4.7 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.

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

Low pass filter – is useful for smoothing data or for enhancing larger weak features (all except Winton Beck Area 9).

Interpolate – increases the number of data points in a survey; to match sample and traverse intervals and so create a smoother appearance to the data. In this instance the gradiometer data have been interpolated to 0.5 x 0.25m intervals.

4.8 The following basic processing functions have been applied to specific datasets:

Destagger – corrects for displacement of anomalies caused by alternate zig-zag traverses (Winton Beck Area 9).

Search and Replace –used together with the *Clip* function in this instance to replace regions strongly affected by ferrous materials (e.g. fencelines, pipelines) with dummy readings, allowing other statistical functions to perform correctly (Winton Beck Area 6b, North Beck Area 10).

5. Geophysical interpretation

5.1 Colour-coded geophysical interpretation plans are provided for each survey area. 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.

6. North Beck interpretation (Figures 2-11)

6.1 Three additional areas have been surveyed for Phase 2, as below. Access was denied for a fourth area (Area 12) in the north-western part of the proposed cut-and-fill zone.

Area 9	0.9 ha
Area 10	0.9 ha
Area 11	1.8 ha

6.2 Colour-coded archaeological interpretation plans are provided for each survey area.

North Beck Area 9 (Figures 2-5)

6.3 Intense anomalies on the eastern edge of the survey area, adjacent to the beck, may reflect a former meander of the beck, subsequently backfilled with rubbish during the straightening of the stream course. An intense anomaly on the southern limit of the survey area reflects materials used in the make-up of the existing, adjacent, track.

6.4 A series of parallel, positive magnetic lineations have been detected aligned east-west across this area. The anomalies are relatively weak and are regularly spaced at *c*.6m intervals. These anomalies almost certainly reflect the sub-

surface remains of ridge and furrow cultivation, a common practice during the medieval period.

6.5 A complex of rectilinear positive magnetic anomalies towards the south-east corner of the survey area almost certainly reflect the ditched enclosures of a former field system. The relationship between these and the ridge and furrow cannot be determined in the geophysical data.

North Beck Area 10 (Figures 6-8)

6.6 Broad diffuse positive magnetic anomalies were detected to the east of the survey area, close to the course of Brompton Beck. These anomalies are likely to be geological in origin and may represent former courses of the beck.

6.7 The only other anomalies detected here are small, discrete dipolar magnetic anomalies. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments. A larger dipolar anomaly in the north corner of the survey area corresponds to the location of a telegraph pole.

North Beck Area 11 (Figures 9-11)

6.8 A series of parallel positive magnetic lineations have been detected aligned north-west/south-east across this area, and probably reflect the sub-surface remains of ridge and furrow. The anomalies are relatively weak, probably as a result of ploughing in more recent times.

6.9 Two short positive magnetic anomalies in the south-eastern corner of the survey area may reflect remnants of former ditches.

6.10 A spread of small, discrete dipolar magnetic anomalies has again been detected almost certainly reflecting items of near-surface ferrous and/or fired debris. A larger dipolar anomaly in the central/southern part of the survey area corresponds to the location of a telegraph pole.

7. Sun Beck interpretation (Figures 12-15)

7.1 One additional area has been surveyed for Phase 2, as below:

Area 5 0.6 ha

Sun Beck Area 5 (Figures 13-15)

7.2 A limited number of very weak, parallel, positive magnetic lineations aligned north-south in this area may be a continuation of the ridge and furrow remains detected to the east of this survey during Phase 1.

7.3 A scatter of small dipolar magnetic anomalies has been detected across the area, increasing in concentration towards the south near the existing farm buildings. These anomalies almost certainly reflect near-surface ferrous and fired debris, the presence of which was noted during the survey.

8. Turker Beck interpretation (Figures 12, 16-18)

8.1 One additional area has been surveyed for Phase 2, as below:

Area 4 2.9 ha

Turker Beck Area 4 (Figures 16-18)

8.2 No anomalies other than a scatter of small dipolar magnetic anomalies has been detected across the area; these typically reflect near-surface ferrous and fired litter.

9. Ing Beck interpretation (Figures 19-25)

9.1 Two additional areas have been surveyed for Phase 2, as below:

Area 9 2.8 ha
Area 10 0.9 ha

9.2 Colour-coded archaeological interpretation plans are provided for each survey area.

Ing Beck Area 9 (Figures 20-22)

9.3 The remains of ridge and furrow cultivation have been recorded in this area, detected as weak parallel positive magnetic anomalies, broadly aligned north-east/south-west at *c*.5m intervals. This corresponds to the ridge and furrow found by geophysical survey during Phase 1 in an adjacent field (Area 8).

9.4 A weak curvilinear positive magnetic anomaly detected near the western end of the survey area may reflect the soil-filled remains of a sub-circular enclosure ditch.

9.5 A low concentration of small dipolar magnetic anomalies has also been detected, typically reflecting near-surface ferrous and fired litter.

Ing Beck Area 10 (Figures 23-25)

9.6 A series of parallel positive magnetic lineations has been detected across this area, aligned broadly north-east/south-west at *c*.5m intervals, which almost certainly reflect ridge and furrow remains. These are a continuation of those detected in the survey areas to the south.

9.7 A low concentration of small dipolar magnetic anomalies has also been detected across this area, typically reflecting near-surface ferrous and fired debris.

10. Winton Beck interpretation (Figures 26-44)

10.1 Six additional areas have been surveyed for Phase 2, as below. Access was denied for a seventh area (Area 10) in the eastern part of the proposed cut-and-fill zone.

Area 6	1.5 ha	Area 9	2.7 ha
Area 7	2.7 ha	Area 11	0.9 ha
Area 8	1.1 ha	Area 12	1.3 ha

10.2 Area 6 was surveyed in two parts (6a and 6b) due to the presence of a hardcore track and electric fencing in the central part of the area.

10.3 Colour-coded archaeological interpretation plans are provided for each survey area.

Winton Beck Area 6a+b (Figures 27-29)

10.4 Occasional small dipolar magnetic anomalies have been detected across the area, almost certainly reflecting ferrous and fired litter.

10.5 Two chains of intense dipolar magnetic anomalies aligned north-east/south-west almost certainly reflect the presence of service pipes running from the farm buildings located to the west of the main survey area.

Winton Beck Area 7 (Figures 30-32)

10.6 A linear positive magnetic anomaly has been detected traversing the area on a broadly east-west alignment. This represents a soil-filled feature, probably a former ditched field boundary.

10.7 A small cluster of strong positive and dipolar magnetic anomalies in the north-western quarter of the survey area may represent an in-filled well reported by the land-owner to be present in this area.

10.8 A scatter of small dipolar magnetic anomalies was also detected across this area.

10.9 The data collected along the western side of this survey contain a systematic error; this appears to have been inadvertantly introduced by the instrument operators during survey.

Winton Beck Area 8 (Figures 33-35)

10.10 A very weak curvilinear positive magnetic anomaly has been detected in the southern part of the survey, reflecting a soil-filled feature of some sort. This could be the remains of a ditch, or a remnant of a former stream course connecting Harlsey Beck and Winton Beck.

10.11 A scatter of small dipolar magnetic anomalies has been detected across the area, again typically reflecting ferrous and fired soil litter.

Winton Beck Area 9 (Figures 36-38)

10.12 A series of very weak, curvilinear and diffuse magnetic anomalies detected towards the western end of the survey area are most likely geological in origin, possibly reflecting palaeochannels.

10.13 A chain of intense dipolar magnetic anomalies running roughly north-south near the centre of the survey shows the location of a service pipe.

10.14 A network of extremely weak, segmentary, dipolar magnetic anomalies was detected in some parts of the survey; this is of uncertain origin, but most likely reflects fired clay land drains running through the survey area.

10.15 A positive magnetic anomaly at the south-eastern edge of the survey area reflects the nearby presence of a steel pylon.

10.16 Occasional small dipolar magnetic anomalies have been detected across the area, reflecting ferrous and fired debris.

Winton Beck Area 11 (Figures 39-41)

10.17 Two weak, curvilinear, diffuse positive magnetic anomalies detected in this area are likely to reflect soil-filled former stream courses. Indeed the existing parish boundary loops to the south here from the beck, and was presumably defined by the beck before it was straightened.

10.18 A discontinuous chain of positive and dipolar magnetic anomalies running roughly north-south near the centre of the survey may indicate the course of a field drain here, or the former line of a wire fence.

10.19 Small dipolar magnetic anomalies have been detected across the area, indicating the ubiquitous soil litter comprising ferrous and fired debris.

Winton Beck Area 12 (Figures 42-44)

10.20 A series of weak, parallel, positive magnetic lineations has been detected, again reflecting ridge and furrow remains, aligned north-west/south-east. A similar ridge and furrow alignment was detected throughout the areas to the north, surveyed during Phase 1.

10.21 The remains of a probable soil-filled ditch have been detected in the eastern part of the area.

10.22 A scatter of dipolar anomalies, again reflecting surface and soil litter, was detected across the survey area.

11. Potential impact of proposed development

11.1 The potential impacts of the proposed works for the flood alleviation scheme on known archaeological remains are discussed here with reference to revised plans received on 6th August 2004 (MPL Drawing nos. GS-003, GS-004, GS-005, Sketch 28 & Sketch 29; Job no. 77052) and take into account all survey work carried out in Phase 1. The plans show the approximate extents of proposed cut-and-fill earthworks for water storage areas, embankments and flow control structures. The locations of works yards/hardstanding are not indicated and so their potential impacts are currently unknown; it is possible that these could impact on archaeological remains, depending on their locations.

North Beck

11.2 The proposed development works would impact on ridge and furrow remains in Areas 3, 4, 5, 6, 7, 9 and 11, to varying degrees. Some of these areas also appear to contain headlands, former field boundaries, occasional other ditches and disturbed areas which would also be impacted by the proposed works. Area 8 in particular contains a number of features of uncertain origin, some of which may be archaeological, including a possible ring-ditch, whilst Area 9 may contain a relict field system of small ditched enclosures.

Sun Beck

11.3 The majority of the geophysical surveys were undertaken on land outside the revised proposed excavation/flood area. The only known archaeological impact of the proposed works would be on ridge and furrow cultivation remains in Areas 2 and 5.

Turker Beck

11.4 The only known archaeological impact of the proposed works would be very limited and concerns the ridge and furrow remains and probable trackway remains at the southern limit of Areas 1 and 3.

Ing Beck

11.5 The known impacts of the proposed works would be on ridge and furrow cultivation remains in Areas 3, 4, 5, 7a, 7b, 8, 9 and 10, and on a possible sub-circular enclosure in the west end of Area 9. The probable remains of a Roman roadside settlement on the west side of Long Lane lie outside the currently proposed excavation/flood area.

Winton Beck

11.6 The only known impacts of the proposed works would be on ridge and furrow cultivation remains in Areas 3, 5 and 12; possible ditch features in Areas 7, 8 and 12, and a possible well in Area 7. The probable remains of a Roman roadside settlement on the east side of Long Lane lie outside the currently proposed excavation/flood area.

12. Updated Project Design

Project background

12.1 Fluxgate gradiometer surveys have been undertaken on land to the north and east of Northallerton, in order to assess the potential survival of archaeological features prior to proposed works for a flood alleviation scheme. The study area comprised land where cut-and-fill earthwork operations are proposed adjacent to the following five becks: North Beck, Sun Beck, Turker Beck, Ing Beck and Winton Beck. A total of 90 ha has now been surveyed during the two phases of survey.

Archaeological remains

12.2 In general, the proposed water storage areas will not impact on the potentially more significant archaeological features, such as the probable Roman roadside settlement at Long Lane, a former Roman road (near Ing/Winton Beck), and the possible late prehistoric/early Romano-British enclosed farmstead at Sun Beck Area 1.

12.3 Ridge and furrow cultivation remains, typically medieval in origin, have been detected throughout the study area. These are considered to be of limited archaeological significance.

12.4 Former field boundaries, possible enclosures, droveways/tracks and miscellaneous ditch features have been detected at various locations throughout the study area, however, many lie outside the proposed areas of earthmoving for water storage. Potentially significant features within the proposed development areas include a complex of rectilinear ditched enclosures and a possible ring-ditch in North Beck Areas 8 and 9, and a possible sub-circular enclosure at Ing Beck Area 9.

Other features/palaeochannels

12.5 A number of features have been interpreted as being of geological origin; these principally comprise probable former stream channels at North Beck Areas 9 and 10, and Winton Beck Areas 8, 9 and 11.

12.6 Other sub-surface features include land drains and ferrous service pipes in Winton Beck Areas 6, 9 and 11.

Further archaeological works

12.7 Since the ridge and furrow remains do not survive as upstanding earthworks (with the exception of one small area at NGR: SE 3873 9740), and have already been recorded in plan form by the geophysical surveys, there is no added value to be gained from further work on them, such as topographic survey or section excavation.

12.8 Further archaeological works are recommended in relation to the proposed development, comprising:

- further geophysical survey if areas affected by locations of groundworks, works yards or hardstanding fall outside the areas sampled during Phases 1 & 2

- trial trench evaluation of possible archaeological features in areas which are to be landscaped for water storage, for example the rectilinear ditched enclosures, possible ring-ditch and other ditches at North Beck Areas 8, 9 and 11; a possible sub-circular enclosure at Ing Beck Area 9; ditches at Winton Beck Areas 7, 8 and 12; and other potential archaeological features detected during additional survey work outlined above

- watching briefs during geotechnical test-pitting, groundworks for water storage areas and temporary works yards

13. References

Archaeology Data Service (2001) *Geophysical Data in Archaeology: A Guide to Good Practice*. Arts and Humanities Data Service.

English Heritage (1995) Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation*. London.

Institute of Field Archaeologists (2002) *The use of geophysical techniques in archaeological evaluations*. Paper No.6, Institute of Field Archaeologists, Birmingham.

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Figure 2

Locations of geophysical surveys within North Beck

on behalf of

Mouchel Parkman UK Ltd

0 250m

scale 1:5000 - for A3 plot

outline of revised proposed development area

Area 9 phase 2 surveys

Area 1 phase 1 surveys

964

963

962

369

370

371

Area 9

Area 8

Level Crossing

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Figure 3

Greyscale of North Beck Area 9

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

964

963

962

369

370

371

Area 9

Area 8

Level Crossing

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Figure 4

Geophysical interpretation of North Beck Area 9

on behalf of

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0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

964

963

962

369

370

371

Area 9

Area 8

Level Crossing

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Figure 5

Archaeological interpretation of North Beck Area 9

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

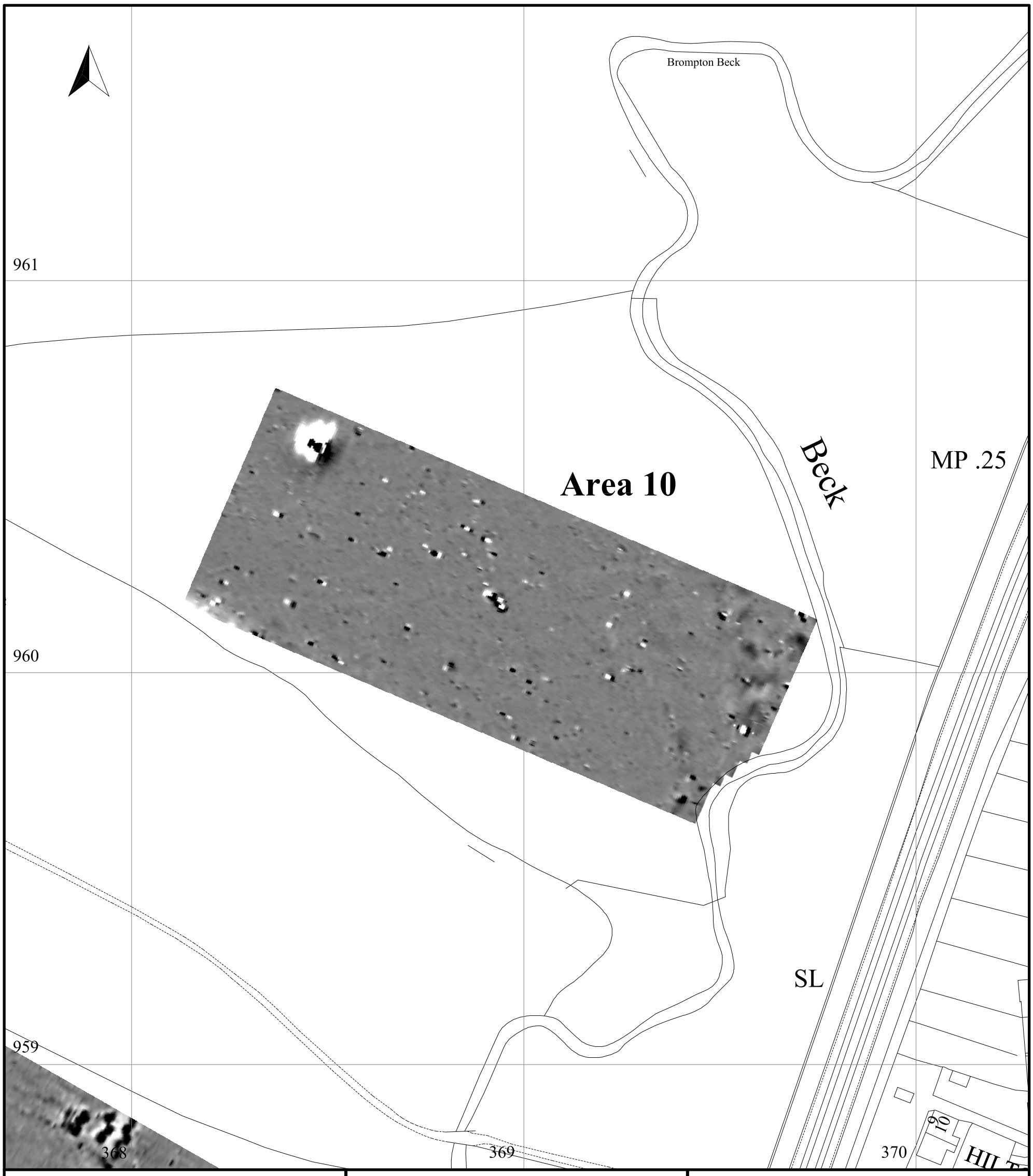
soil-filled features

telegraph pole

orientation of ridge and furrow

?possible former stream channel back-filled with rubbish

trackway



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Geophysical surveys (Phase 2) report 1201

Figure 6

Greyscale of North Beck Area 10

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

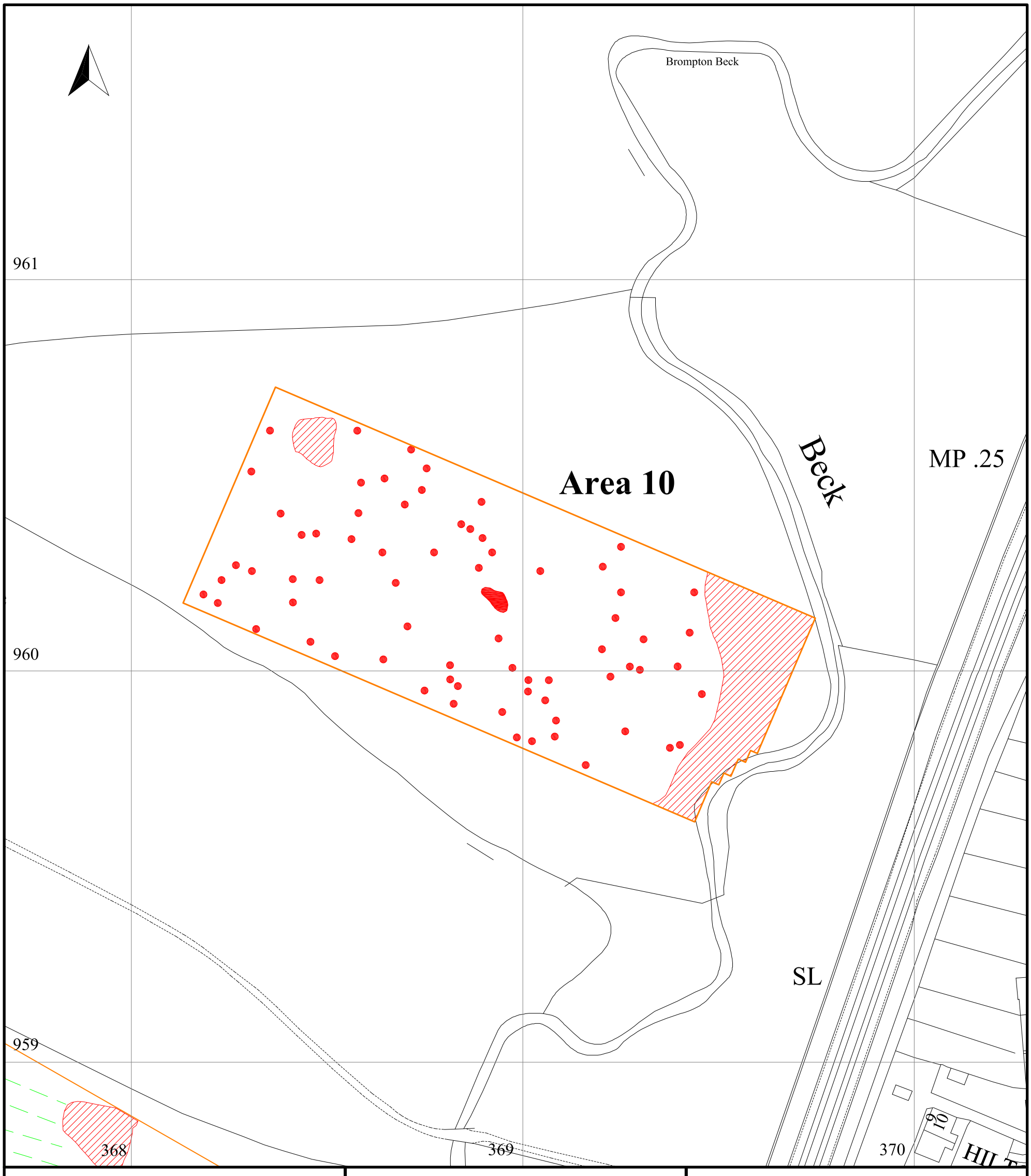

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Figure 7

Geophysical interpretation of North Beck Area 10

on behalf of

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0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Brompton Beck

961

Area 10

Beck

MP .25

960

SL

959

368

369

370

10

HIL

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Figure 8

Archaeological interpretation of North Beck Area 10

0 50m

scale 1:1000 - for A3 plot

outline of survey area

pylon

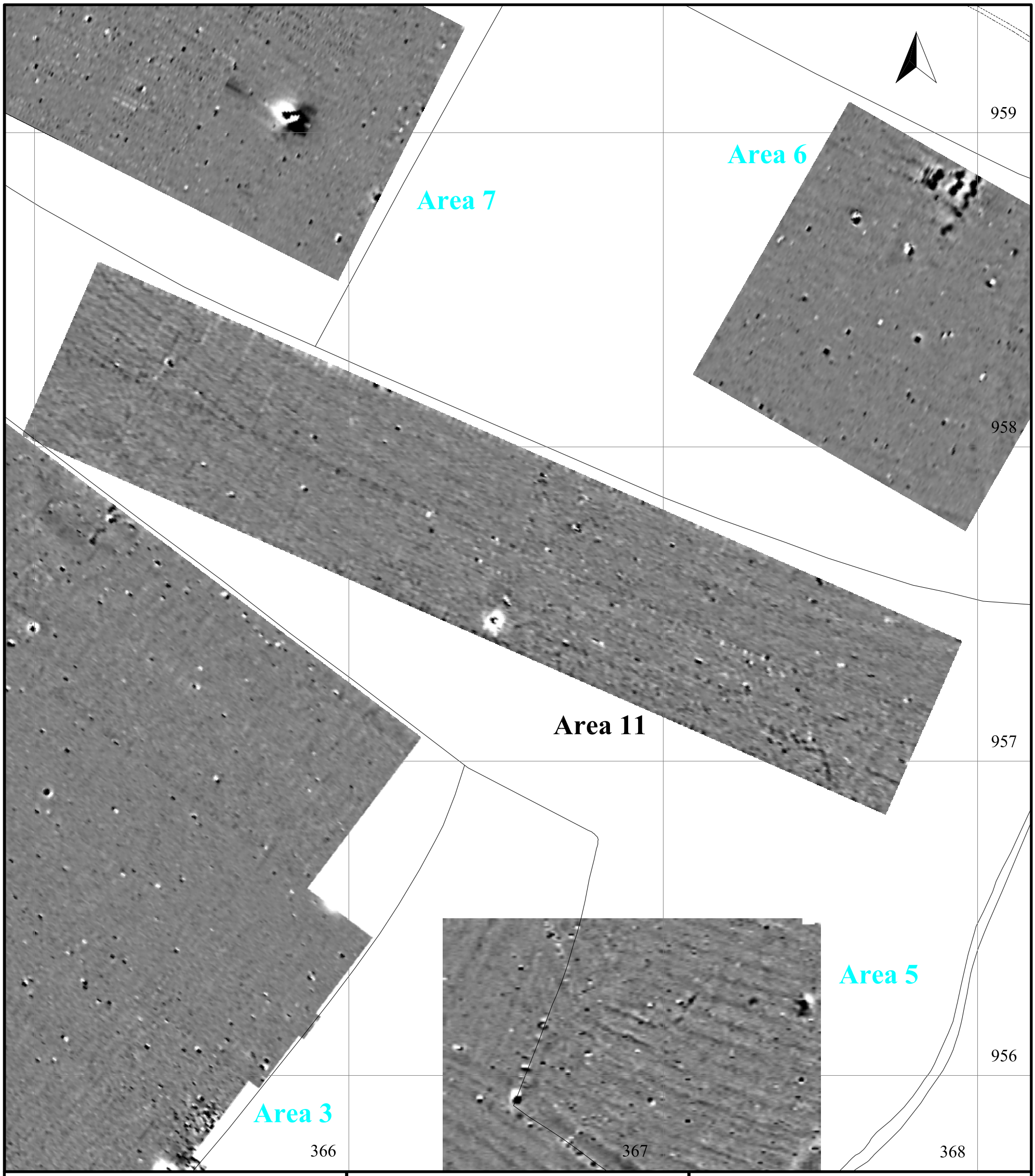

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Figure 9

Greyscale of North Beck Area 11

on behalf of

Mouchel Parkman UK Ltd

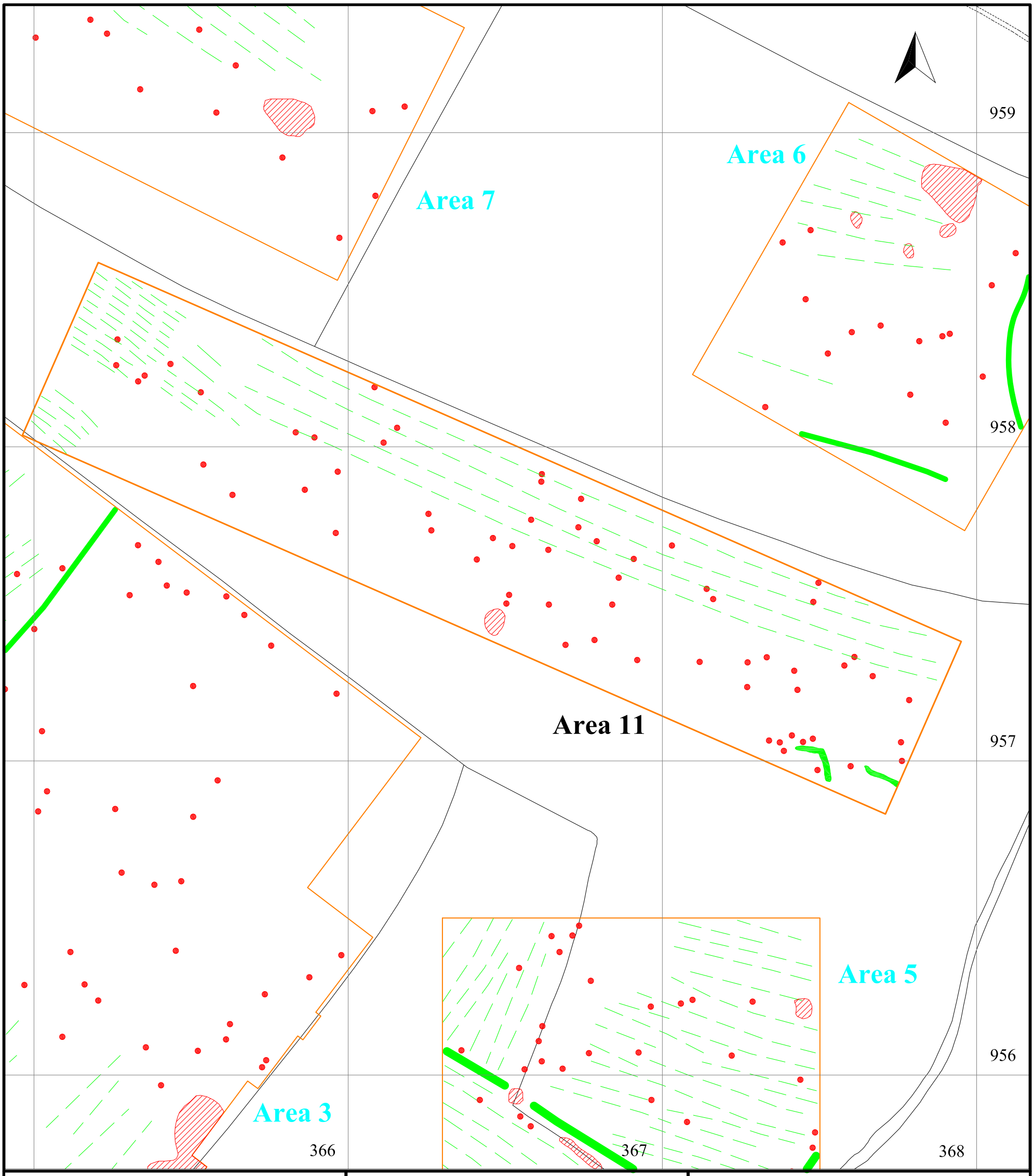

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Figure 10

Geophysical interpretation of North Beck Area 11

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Area 7

Area 6

959

958

Area 11

957

Area 5

956

Area 3

366

367

368

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Figure 11

Archaeological interpretation of North Beck Area 11

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0 50m

scale 1:1250 - for A3 plot

outline of survey area

soil-filled features

pylon

orientation of ridge and furrow

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Geophysical surveys (Phase 2)

Figure 12
Locations of geophysical surveys within Sun Beck and Turker Beck

on behalf of

Mouchel Parkman Uk Ltd

0 250m

scale 1:5000 - for A3 plot

outline of revised proposed development area

Area 5 phase 2 surveys

Area 1 phase 1 surveys

Archaeological Services
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Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 13

Greyscale of Sun Beck Area 5

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

Area 2

Area 5

936

BM 55.40m

Area 1

935

Prospect
House

380

381

382

Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 14
Geophysical interpretation of Sun Beck Area 5

on behalf of

Mouchel Parkman UK Ltd

0 50m

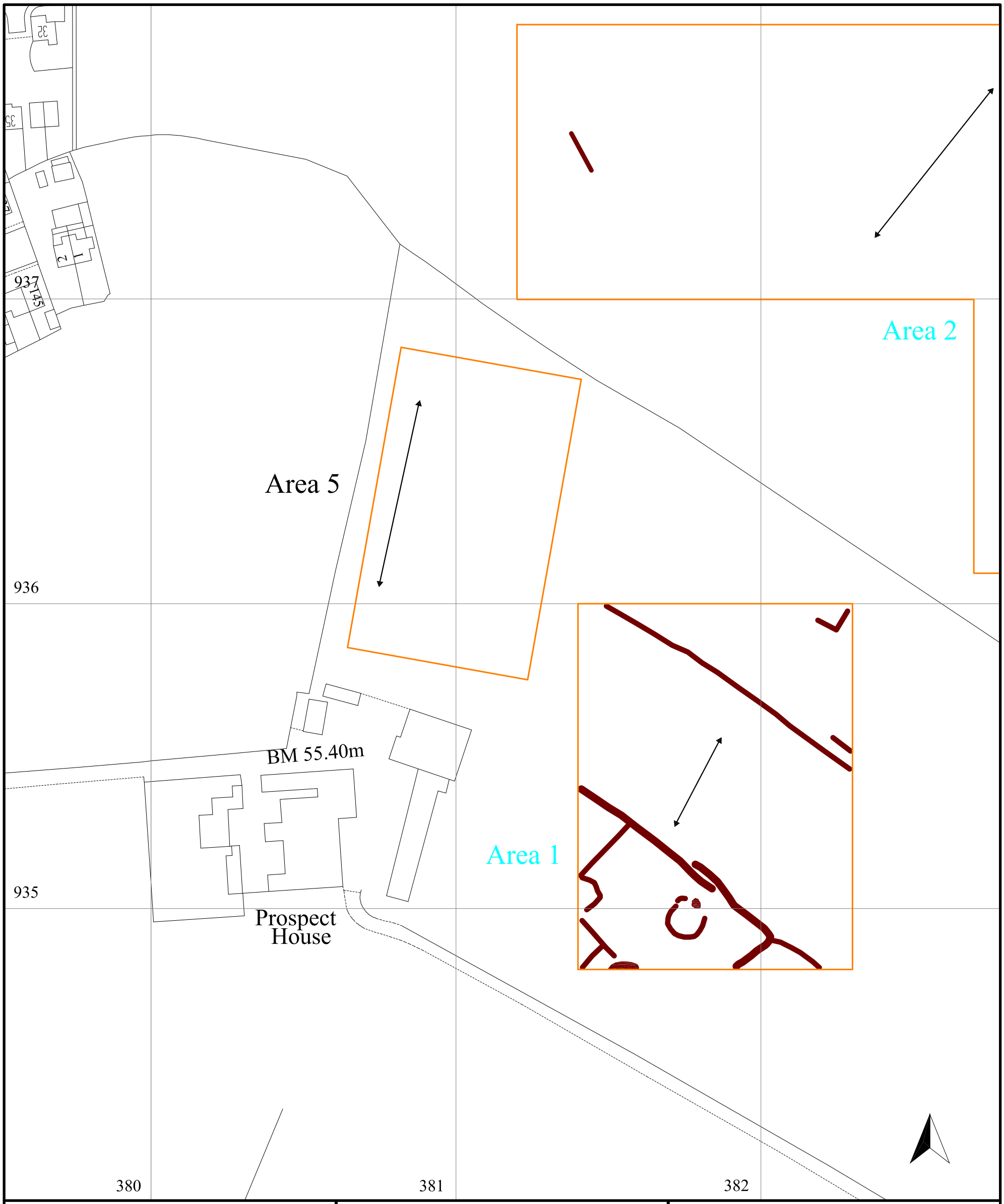
scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies



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Geophysical surveys (Phase 2) report 1201

Figure 15
Archaeological interpretation of Sun Beck Area 5

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow

945

944

943

Area 4

56.4m

381

382

Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 16

Greyscale of Turker Beck Area 4

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

945

944

943

Area 4

56.4m

381

382

Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 17
Geophysical interpretation of Turker Beck Area 4

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

945

944

943

Area 4

56.4m

381

382

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Geophysical surveys (Phase 2) report 1201

Figure 18
Archaeological interpretation of Turker Beck Area 4

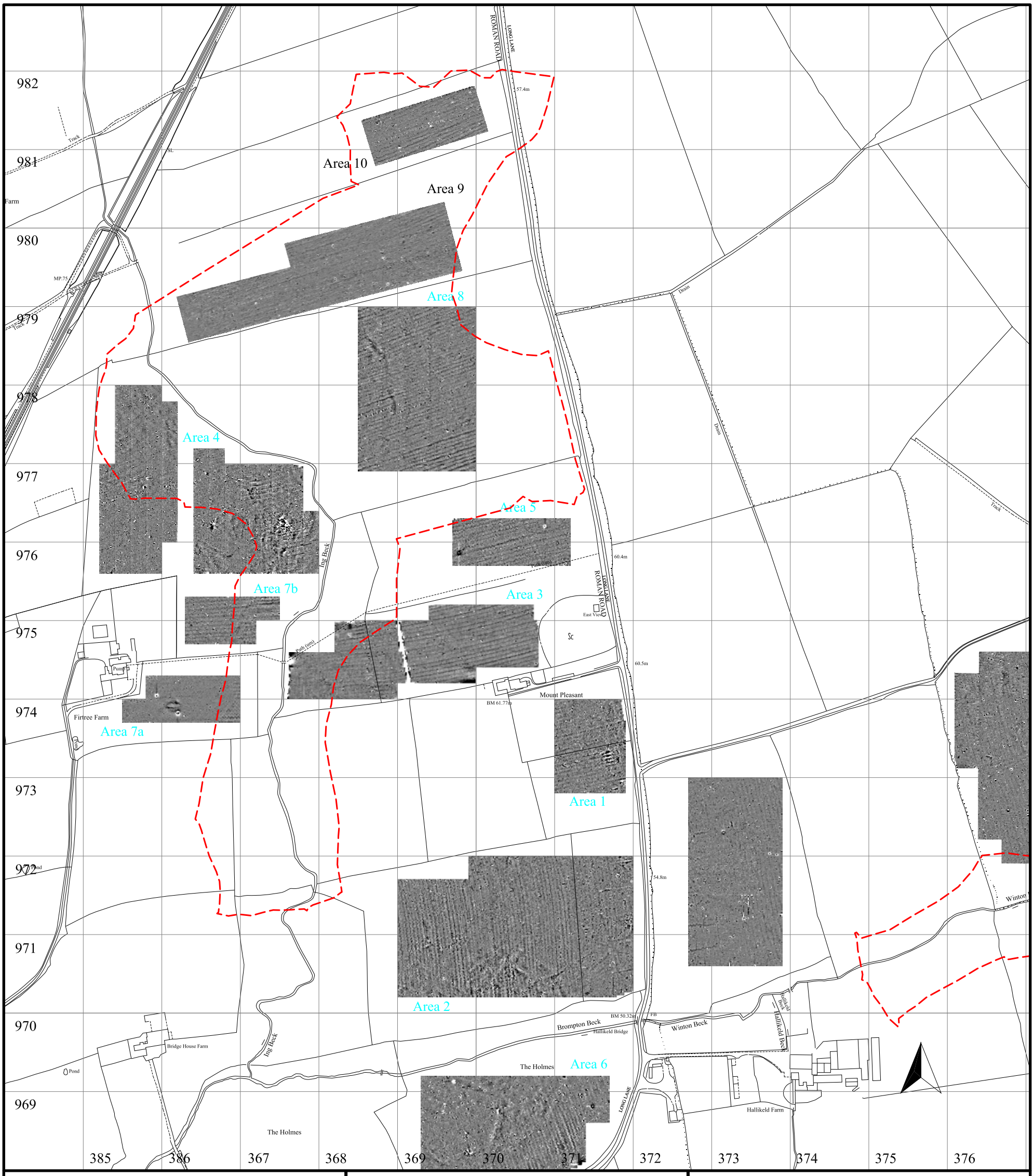
on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area



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Geophysical surveys (Phase 2) report 1201

Figure 19

Locations of geophysical surveys within the Ing Beck

on behalf of

Mouchel Parkman Uk Ltd

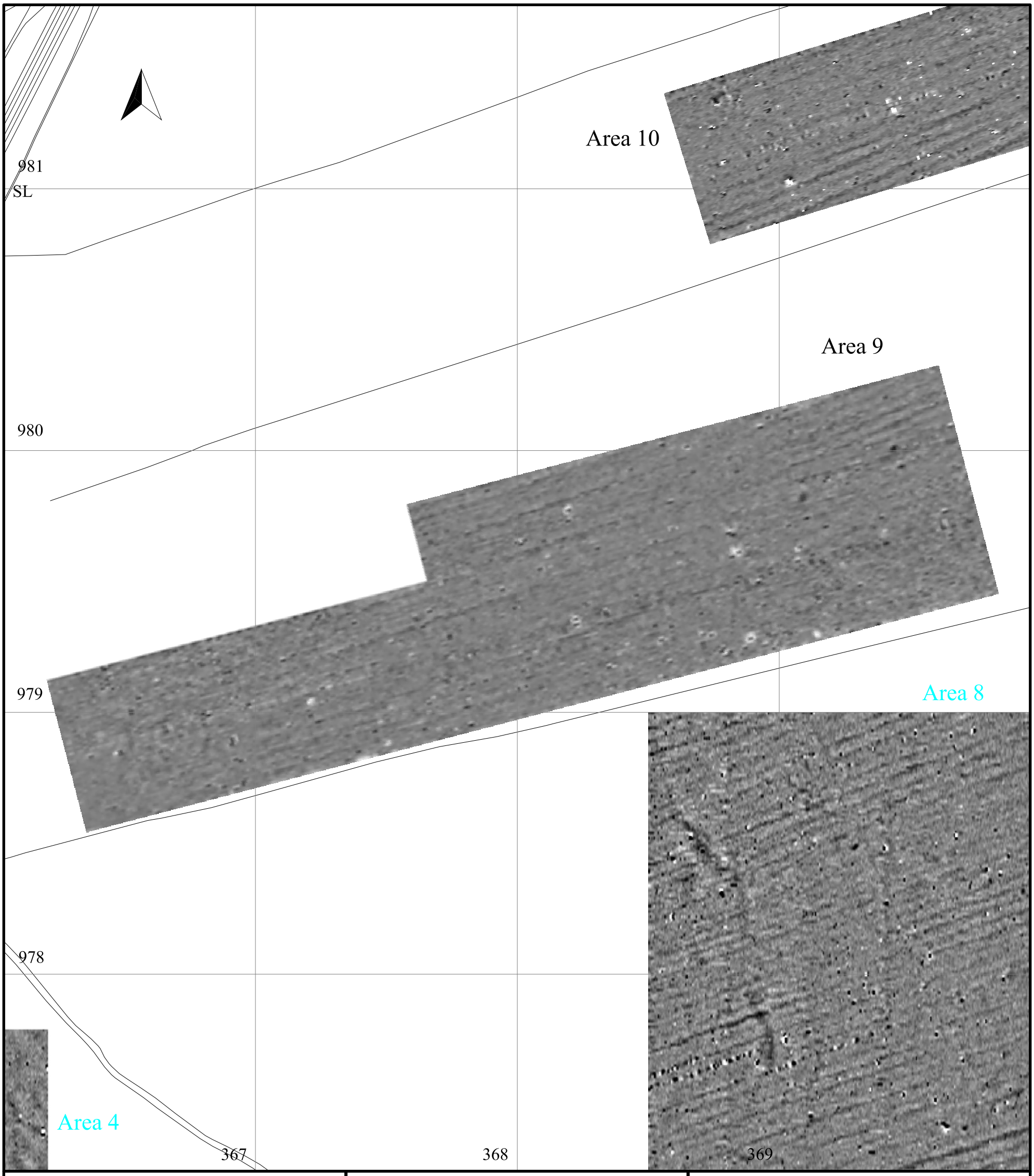
0 250m

scale 1:5000 - for A3 plot

outline of revised proposed development area

Area 9 phase 2 surveys

Area 1 phase 1 surveys



Archaeological Services
University of Durham

on behalf of

Mouchel Parkman UK Ltd

Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 20

Greyscale of Ing Beck Area 9

0 50m

scale 1:1500 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

Area 10

Area 9

Area 8

Area 4

981

SL

980

979

978

367

368

369

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Geophysical surveys (Phase 2) report 1201

Figure 21

Geophysical interpretation of Ing Beck Area 9

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1500 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

981

SL

980

979

978

Area 10

Area 9

Area 8

Area 4

367

368

369

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Geophysical surveys (Phase 2) report 1201

Figure 22

Archaeological interpretation of Ing Beck Area 9

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1500 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow

ROMAN ROAD

LONG LANE

57.4m

982

Area 10

981

Area 9

980

369

370

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Geophysical surveys (Phase 2) report 1201

Figure 23

Greyscale of Ing Beck Area 10

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

ROMAN ROAD

LONG LANE

57.4m

982

Area 10

981

Area 9

980

369

370

Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 24

Geophysical interpretation of Ing Beck Area 10

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

ROMAN ROAD

LONG LANE

57.4m

982

Area 10

981

Area 9

980

369

370

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Geophysical surveys (Phase 2) report 1201

Figure 25

Archaeological interpretation of Ing Beck Area 10

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow

Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 26

Locations of geophysical surveys within Winton Beck

on behalf of

Mouchel Parkman UK Ltd

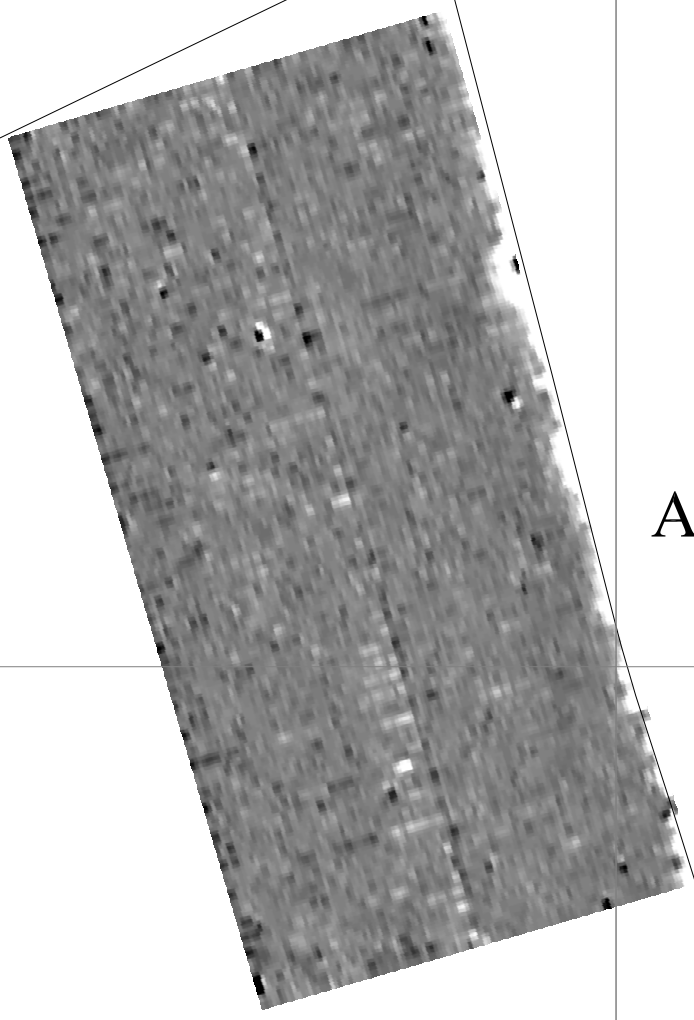
0 250m

scale 1:5000 - for A3 plot

outline of revised proposed development area

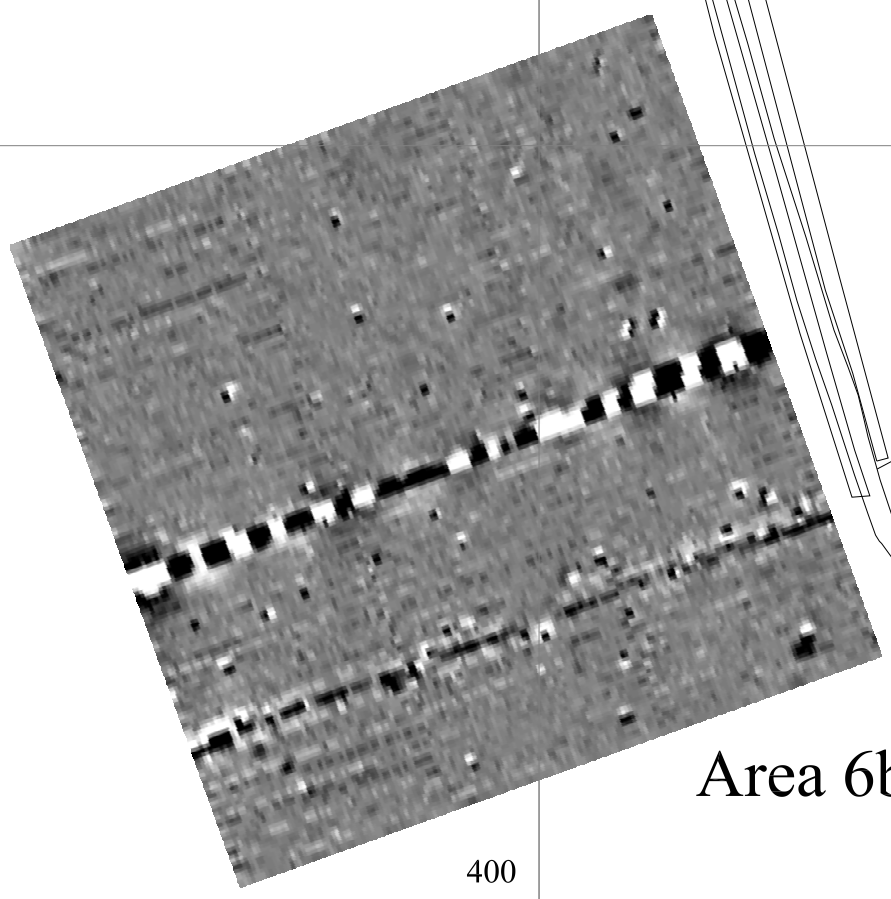
Area 6a phase 2 surveys

Area 2 phase 1 surveys



Area 6a

978



Area 6b

977

399

400

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Geophysical surveys (Phase 2) report 1201

Figure 27

Greyscales of Winton Beck Area 6a and Area 6b

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

Area 6a

978

977

Area 6b

399

400

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Geophysical surveys (Phase 2) report 1201

Figure 28

Geophysical interpretation of Winton Beck Area 6a and Area 6b

on behalf of

Mouchel Parkman UK Ltd

0 50m

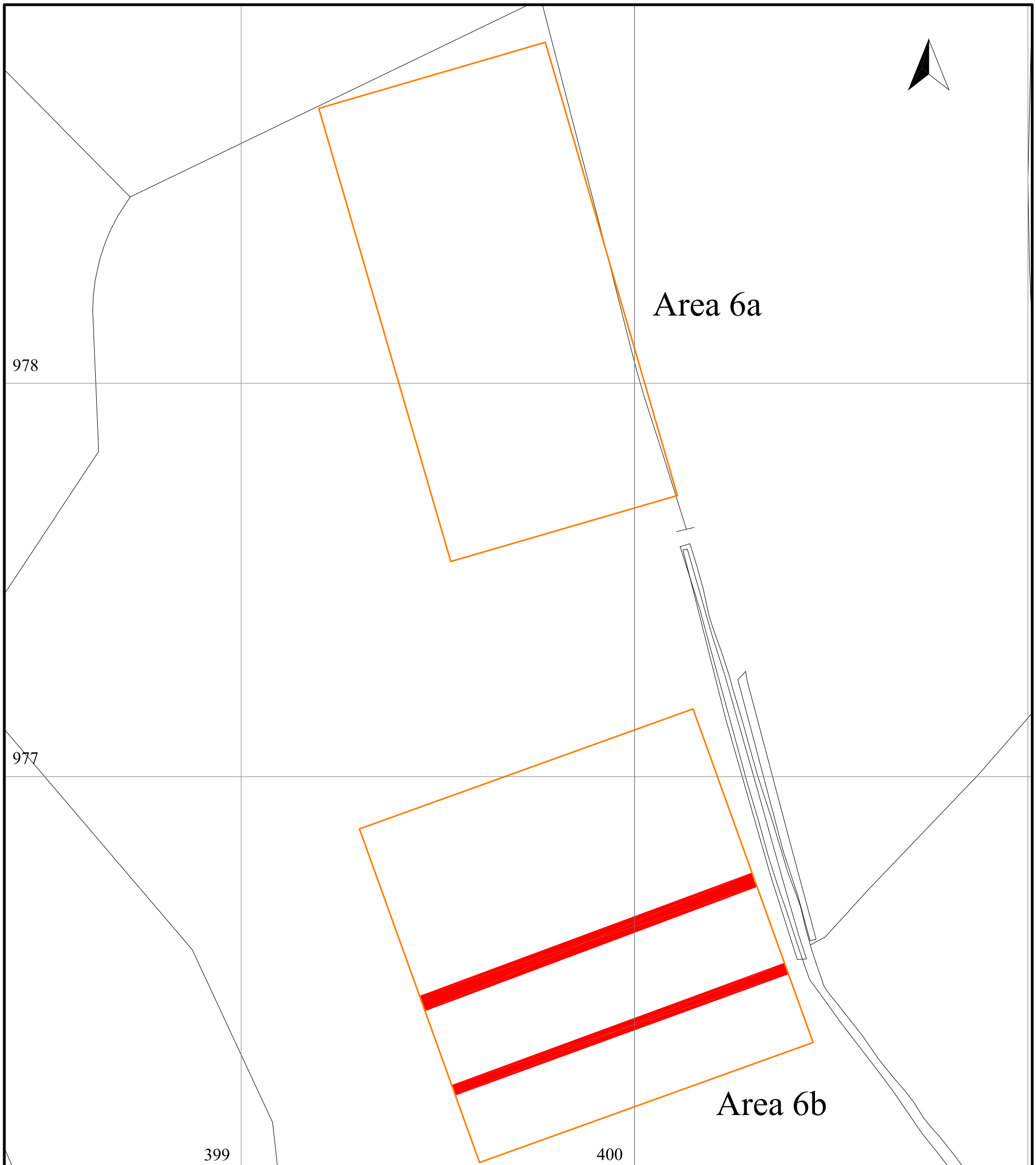
scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies



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Geophysical surveys (Phase 2) report 1201

Figure 29

Archaeological interpretation of Winton Beck Area 6a and Area 6b

on behalf of

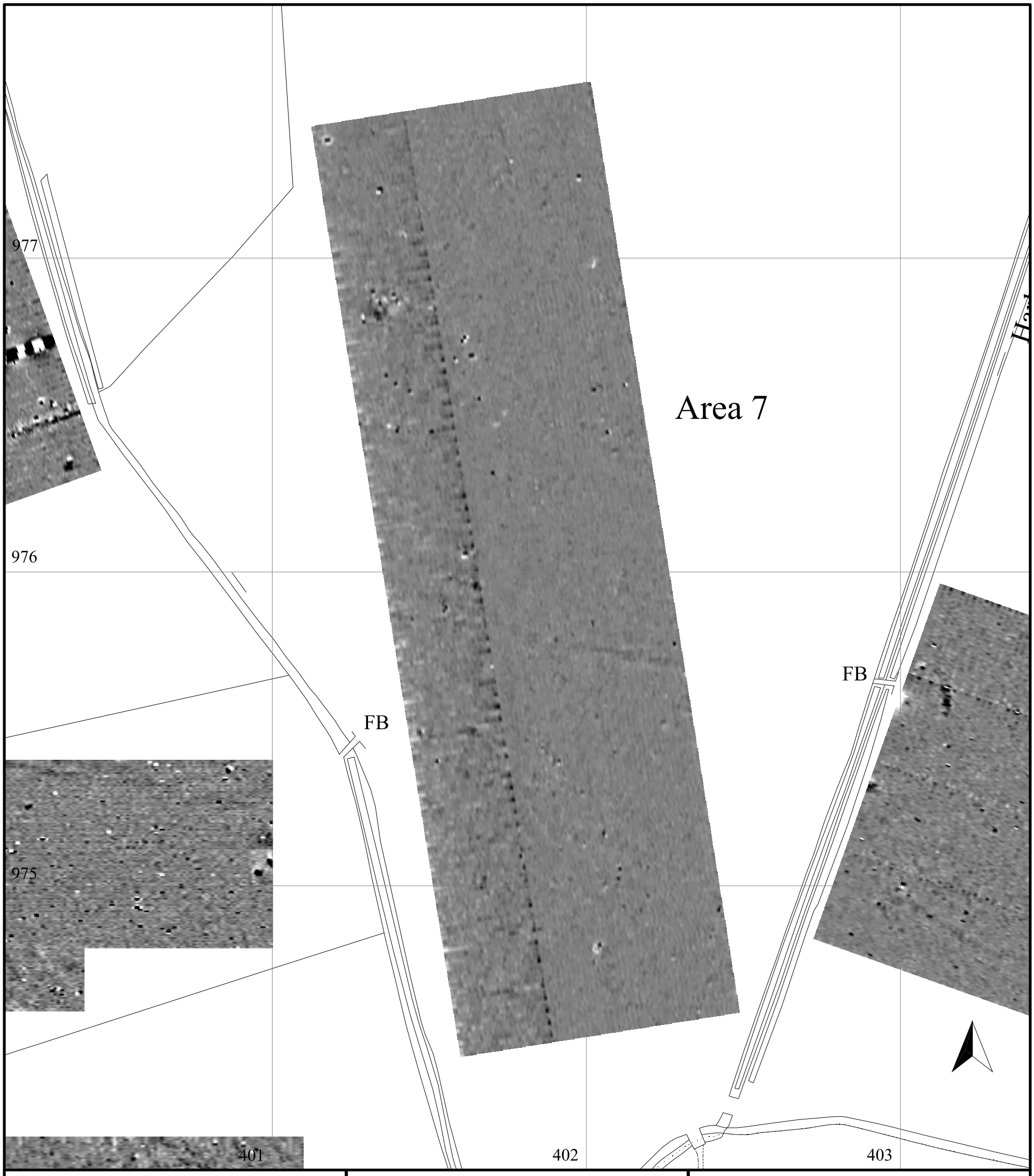
Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

service pipes



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Geophysical surveys (Phase 2) report 1201

Figure 30

Greyscale of Winton Beck Area 7

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

9.00
7.50
6.00
4.50
3.00
1.50
0.00
-1.50
-3.00
-4.50
-6.00
-7.50
-9.00 nT

977

976

975

401

402

403

Area 7

FB

FB

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Geophysical surveys (Phase 2) report 1201

Figure 31

Geophysical interpretation of Winton Beck Area 7

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

977

976

975

401

402

403

Area 7

FB

FB

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Geophysical surveys (Phase 2) report 1201

Figure 32

Archaeological interpretation of Winton Beck Area 7

on behalf of

Mouchel Parkman UK Ltd

0 50m

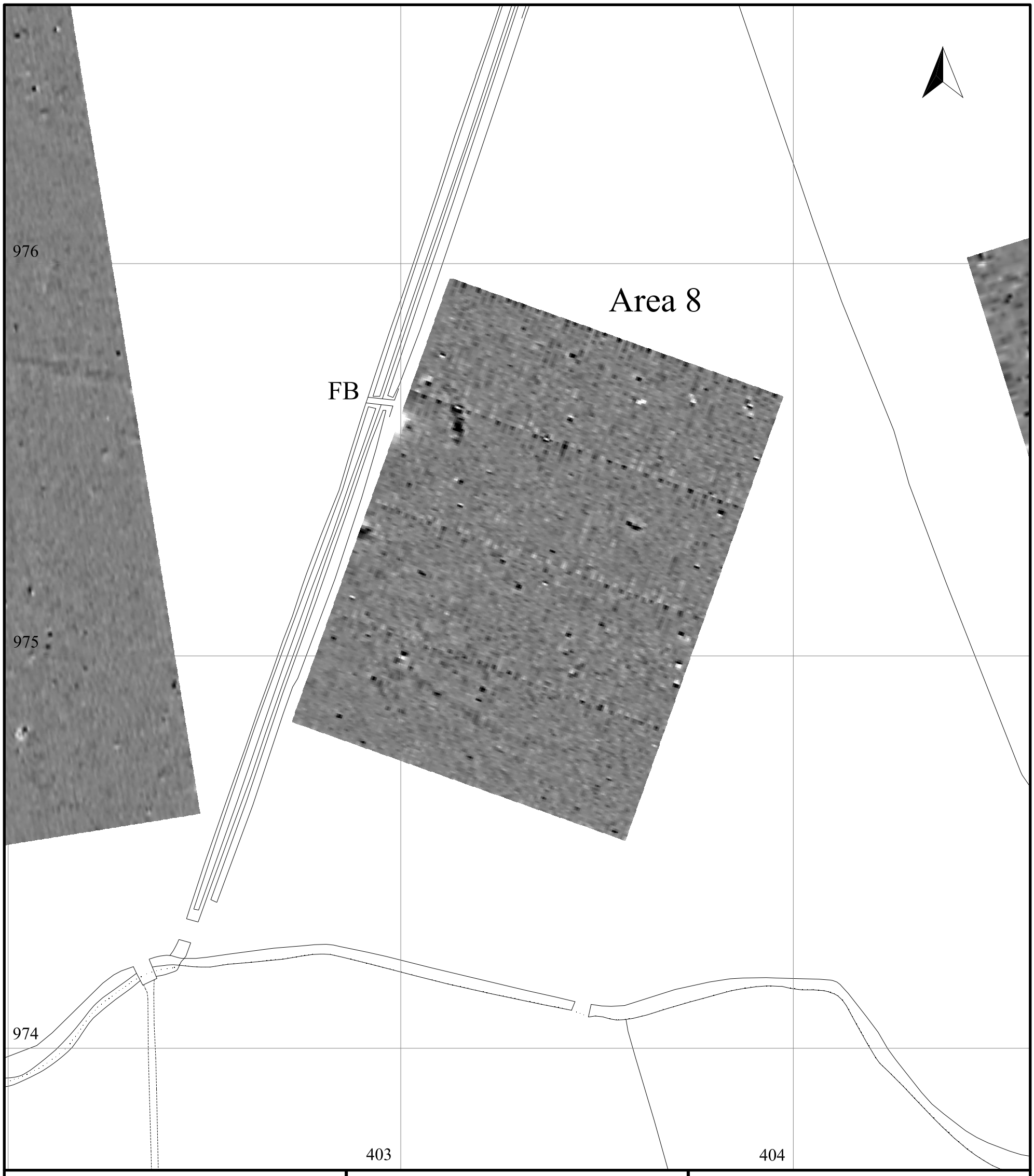
scale 1:1250 - for A3 plot

outline of survey area

soil-filled features

service pipes

?well



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Geophysical surveys (Phase 2) report 1201

Figure 33

Greyscale of Winton Beck Area 8

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00 nT

976

975

974

403

404

Area 8

FB

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Geophysical surveys (Phase 2) report 1201

Figure 34

Geophysical interpretation of Winton Beck Area 8

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

976

975

974

403

404

Area 8

FB

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Geophysical surveys (Phase 2) report 1201

Figure 35

Archaeological interpretation of Winton Beck Area 8

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

Low Moor

977

976

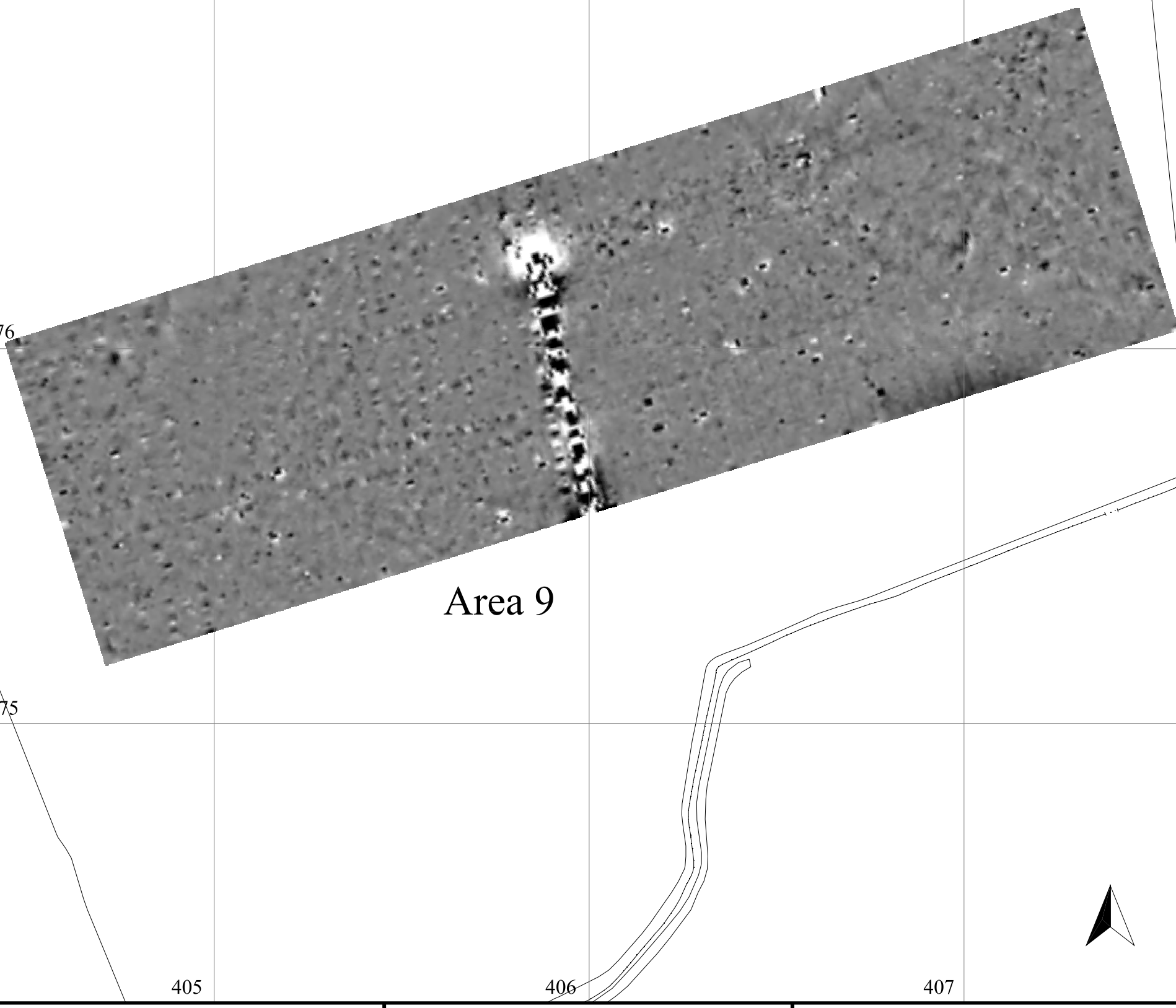
975

405

406

407

Area 9



Archaeological Services
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on behalf of

Mouchel Parkman UK Ltd

Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 36

Greyscale of Winton Beck Area 9

0 50m

scale 1:1250 - for A3 plot

3.00
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00 nT

Low Moor

977

976

975

405

406

407

Area 9

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Geophysical surveys (Phase 2) report 1201

Figure 37

Geophysical interpretation of Winton Beck Area 9

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Low Moor

977

976

975

405

406

407

Area 9

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Geophysical surveys (Phase 2) report 1201

Figure 38

Archaeological interpretation of Winton Beck Area 9

on behalf of

Mouchel Parkman UK Ltd

0 50m

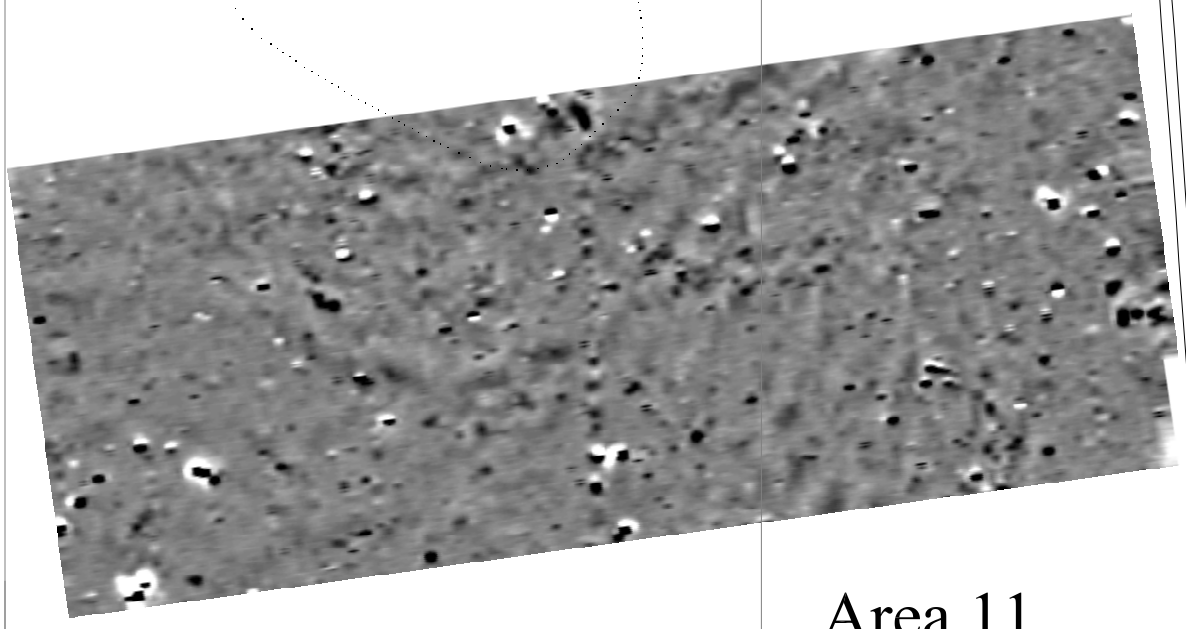
scale 1:1250 - for A3 plot

outline of survey area

soil-filled features

service pipes

field drains



Area 11

972

971

970

400

401

Drain

Archaeological Services
University of Durham

on behalf of

Mouchel Parkman UK Ltd

Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

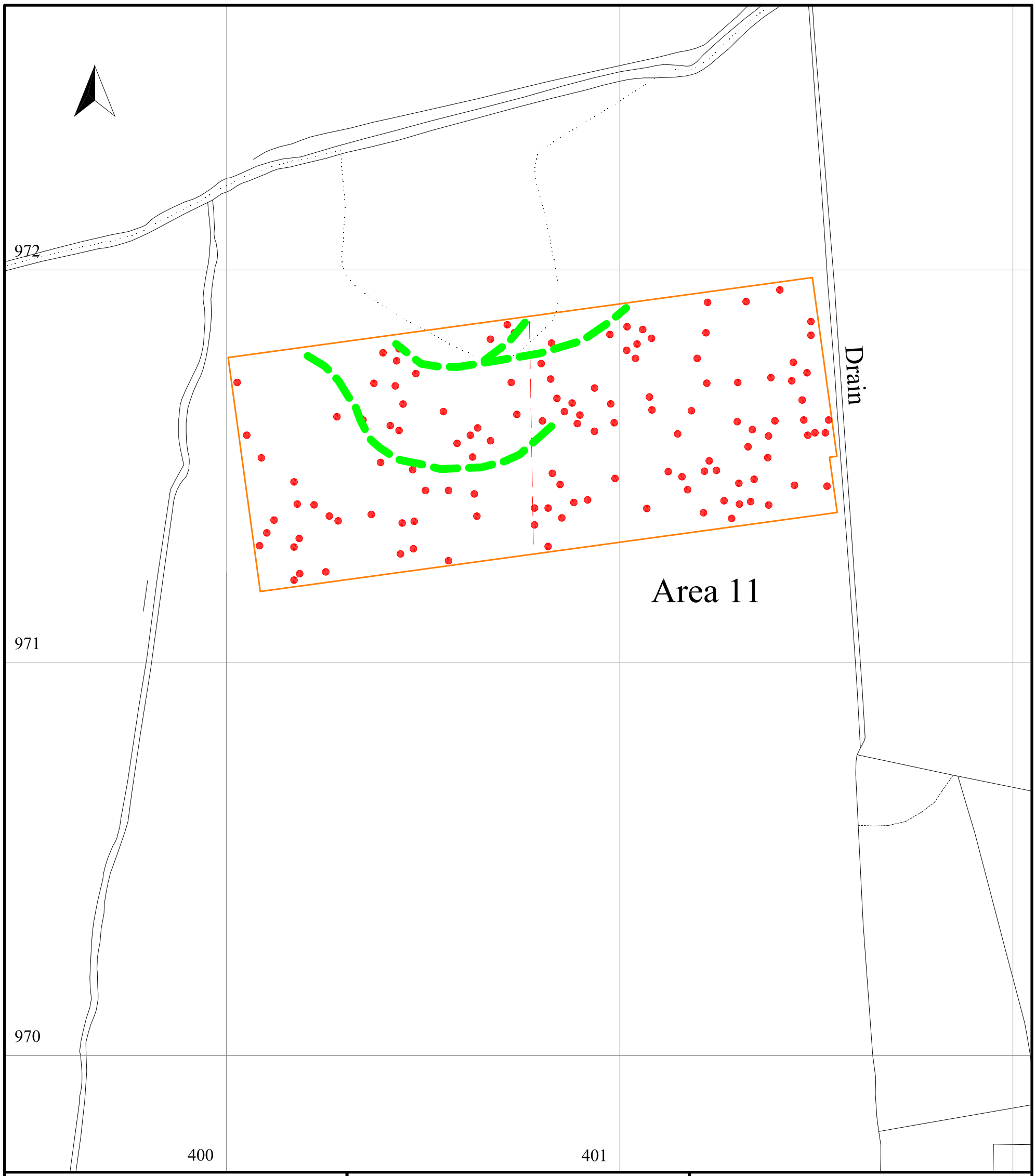
Figure 39

Greyscale of Winton Beck Area 11

0 50m

scale 1:1000 - for A3 plot

3.00
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00 nT



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Geophysical surveys (Phase 2) report 1201

Figure 40

Geophysical interpretation of Winton Beck Area 11

on behalf of

Mouchel Parkman UK Ltd

0 50m

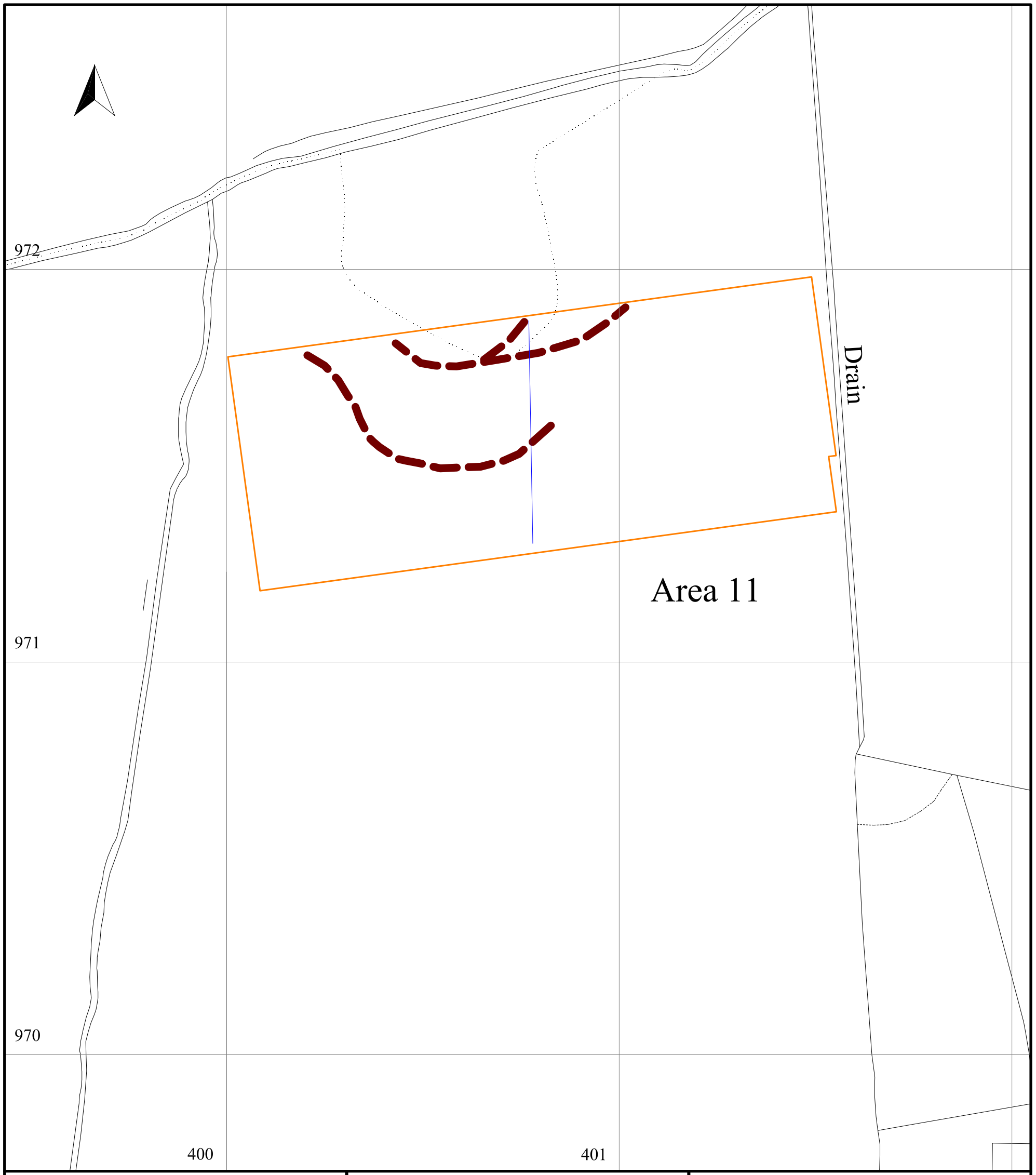
scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies



Archaeological Services
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Geophysical surveys (Phase 2) report 1201

Figure 41

Archaeological interpretation of Winton Beck Area 11

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

possible palaeo-channel

service pipes

?field drain or former fence

Winton Beck

Area 12

972

971

970

397

398

399

Archaeological Services
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on behalf of

Mouchel Parkman UK Ltd

Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 42

Greyscale of Winton Beck Area 12

0 50m

scale 1:1250 - for A3 plot

3.00
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00 nT

Winton Beck

Area 12

972

971

970

397

398

399

Archaeological Services
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Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 43

Geophysical interpretation of Winton Beck Area 12

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Winton Beck

Area 12

972

971

970

397

398

399

Archaeological Services
University of Durham

Brompton, Northallerton, Romanby Flood Alleviation Scheme

Geophysical surveys (Phase 2) report 1201

Figure 44

Archaeological interpretation of Winton Beck Area 12

on behalf of

Mouchel Parkman UK Ltd

0 50m

scale 1:1250 - for A3 plot

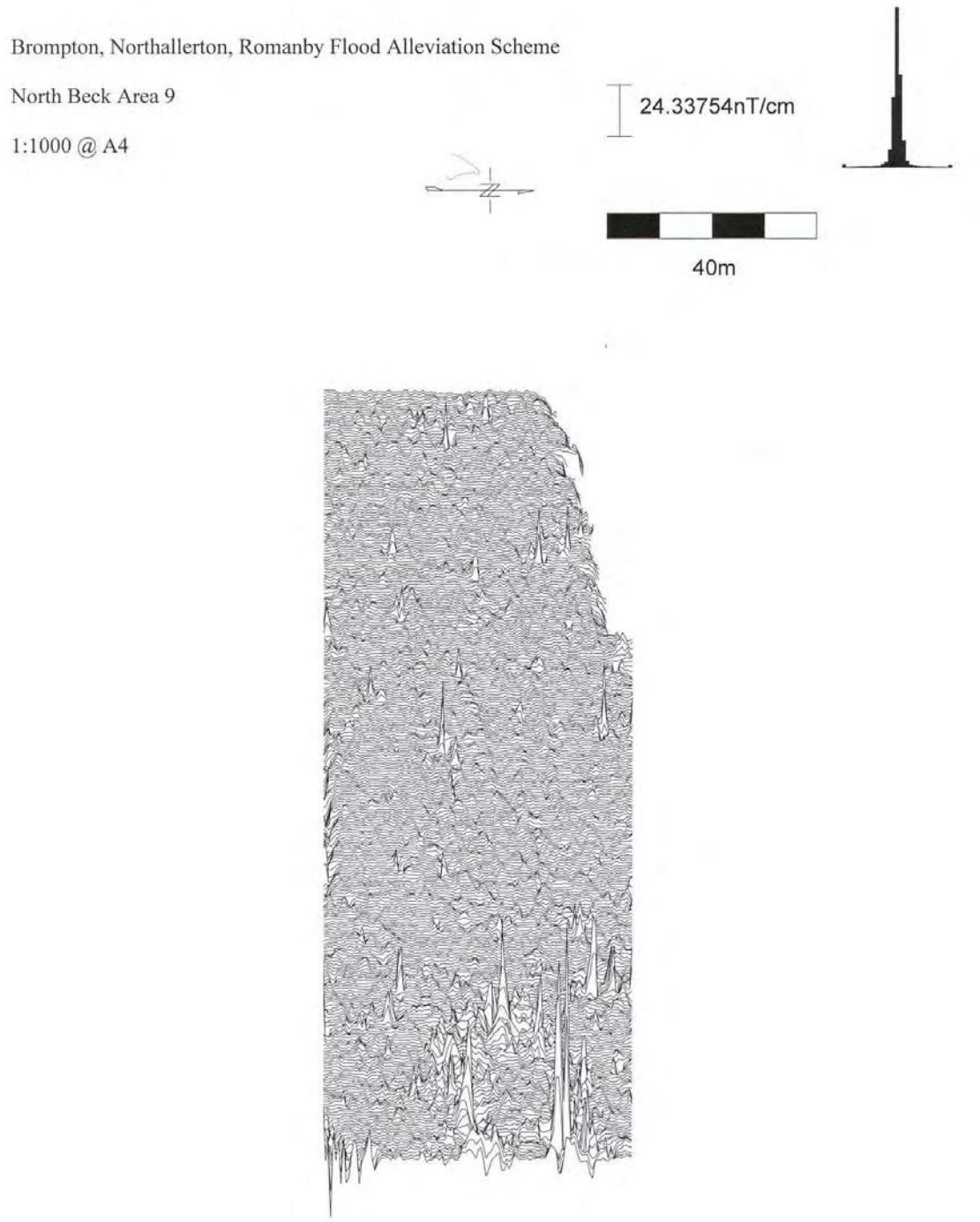
outline of survey area

soil-filled features

orientation of ridge and furrow

Appendix I:

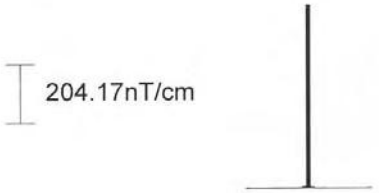
Trace plots of geophysical data



Brompton, Northallerton, Romanby Flood Alleviation Scheme

North Beck Area 10

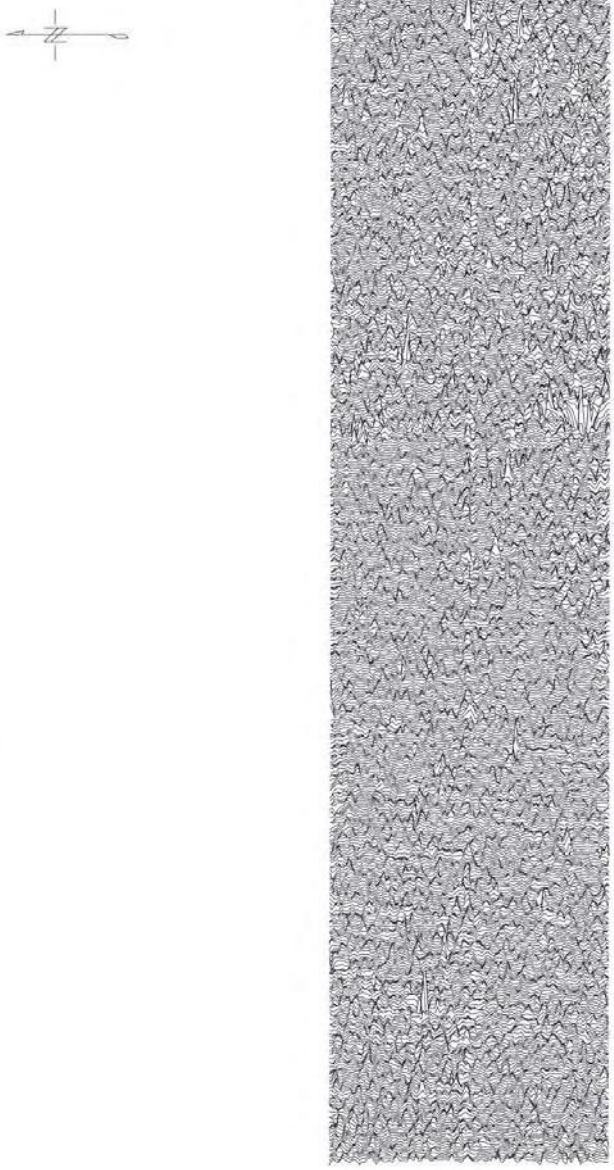
1:1000 @ A4

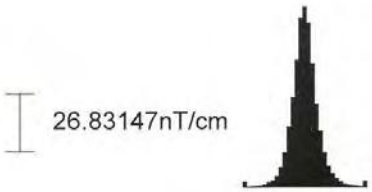


Brompton, Northallerton, Romanby Flood Alleviation Scheme

North Beck Area 11

1:1250 @ A4

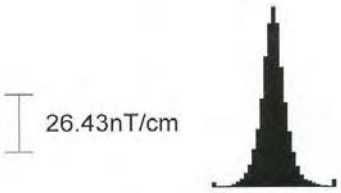


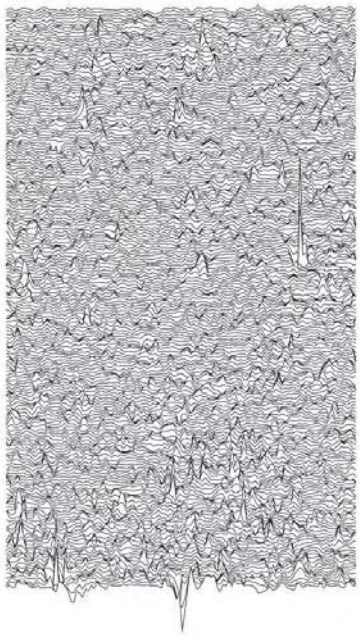


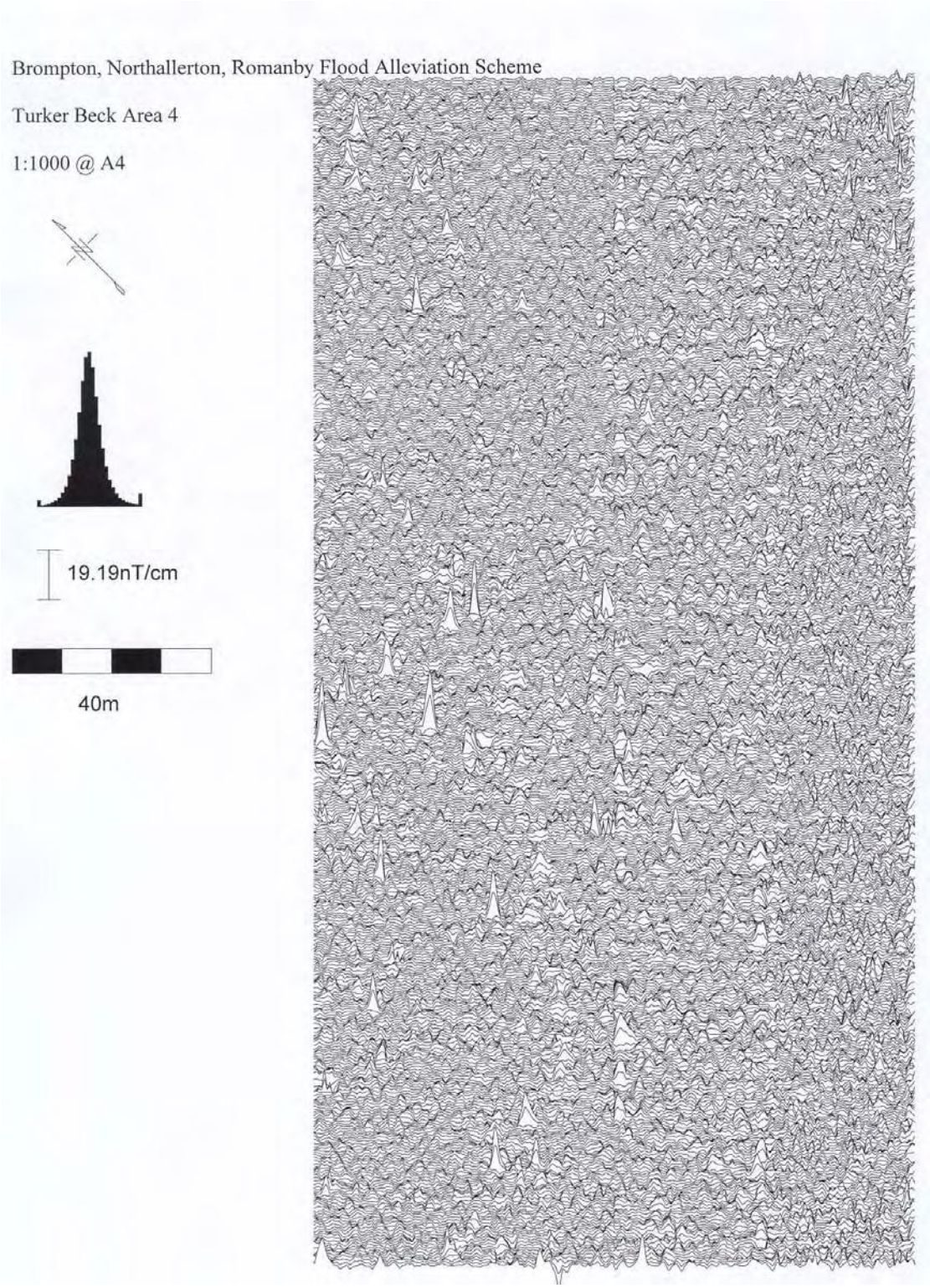
Brompton, Northallerton, Romanby Flood Alleviation Scheme

Sun Beck Area 5

1:1000 @ A4





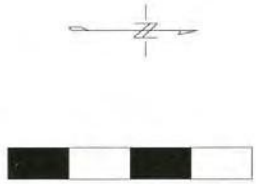

Brompton, Northallerton, Romanby Flood Alleviation Scheme
Turker Beck Area 4
1:1000 @ A4
19.19nT/cm
40m

Brompton, Northallerton, Romanby Flood Alleviation Scheme

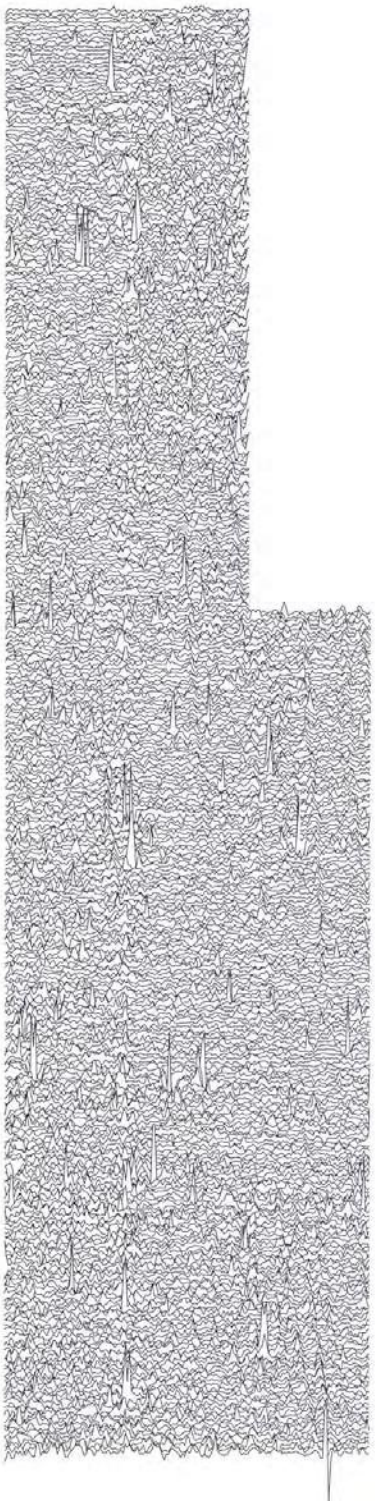
Ing Beck Area 9

1:1500 @ A4

18.37nT/cm



60m



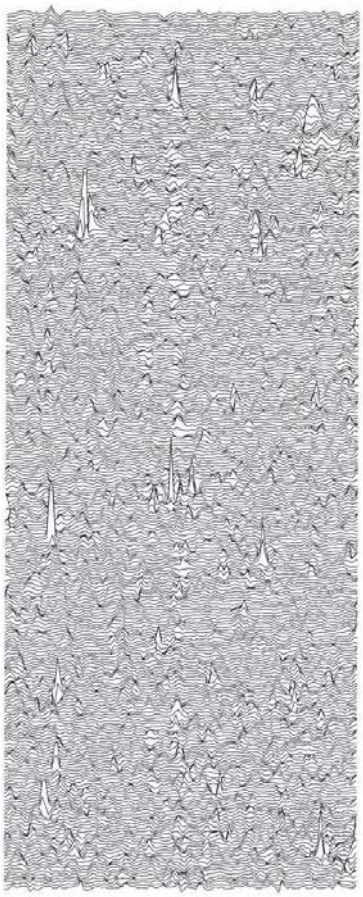
Brompton, Northallerton, Romanby Flood Alleviation Scheme

Ing Beck Area 10

1:1000 @ A4

32.64nT/cm

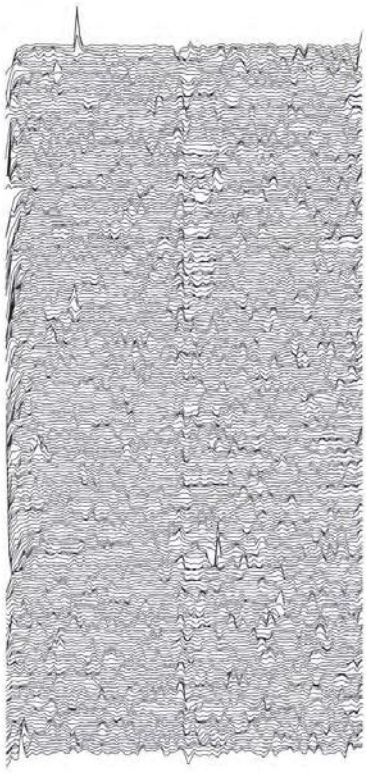
40m



Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 6a

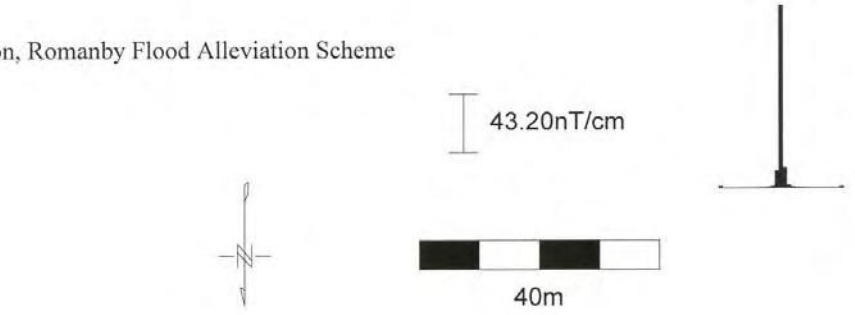
1:1000 @ A4

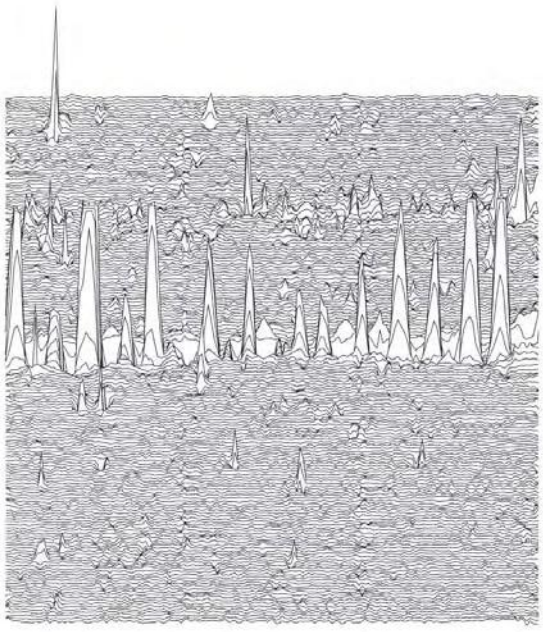


Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 6b

1:1000 @ A4



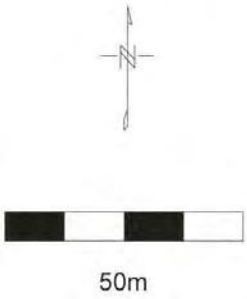


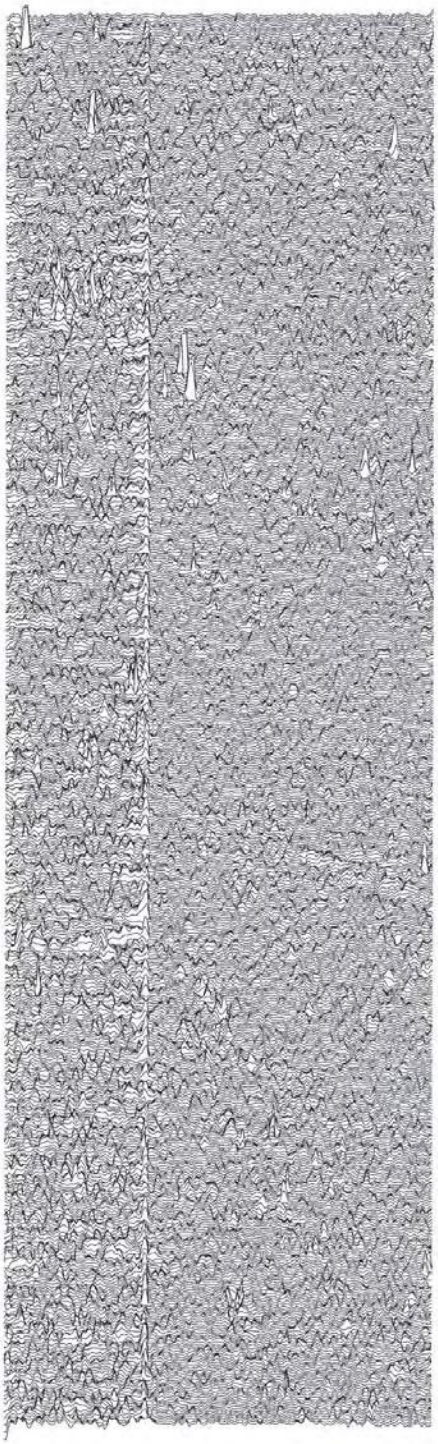
Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 7

1:1250 @ A4

26.41nT/cm





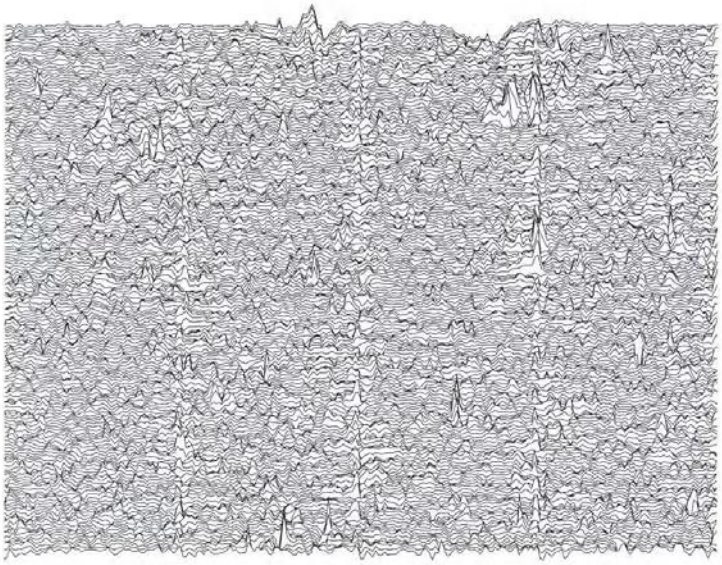
Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 8

1:1000 @ A4

18.86nT/cm

40m



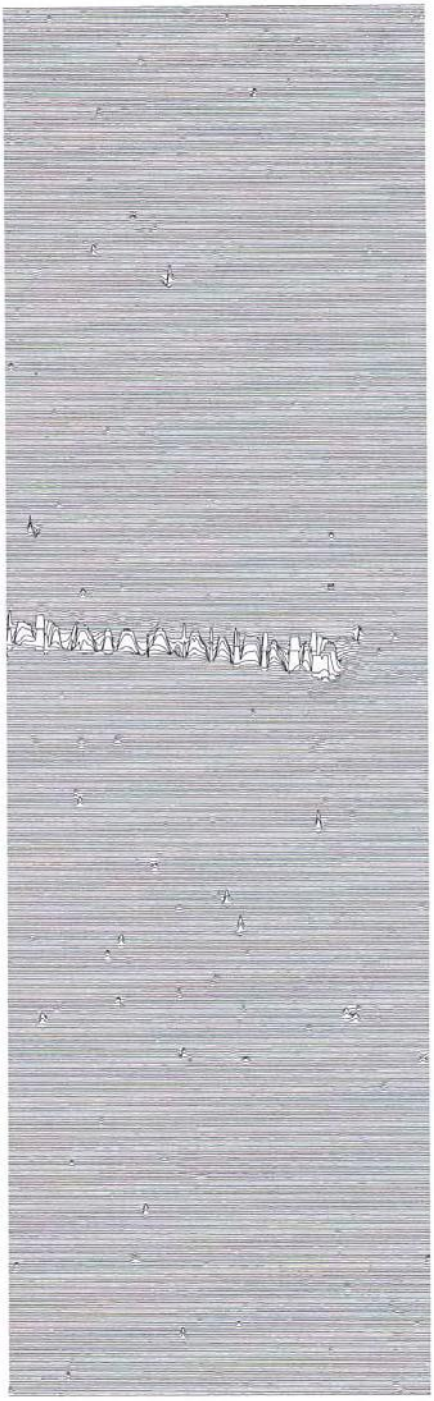
Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 9

1:1250 @ A4

289.96nT/cm

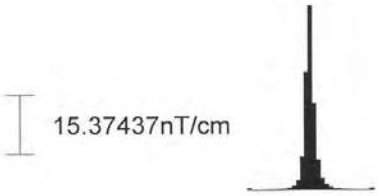
50m

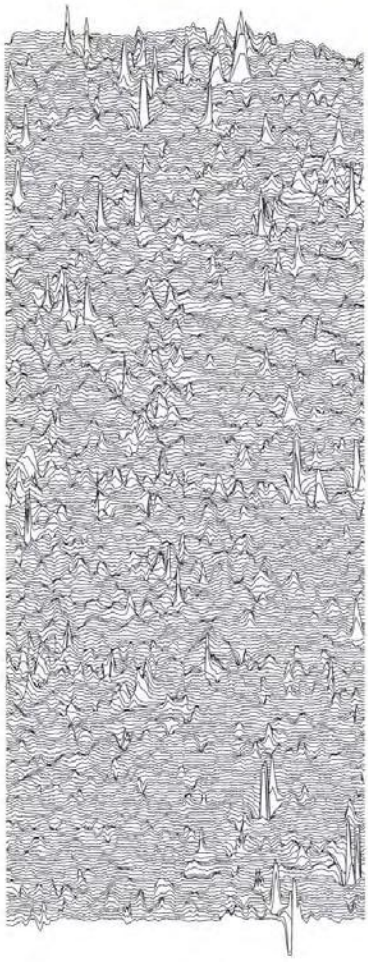


Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 11

1:1000 @ A4





Brompton, Northallerton, Romanby Flood Alleviation Scheme

Winton Beck Area 12

1:1000 @ A4