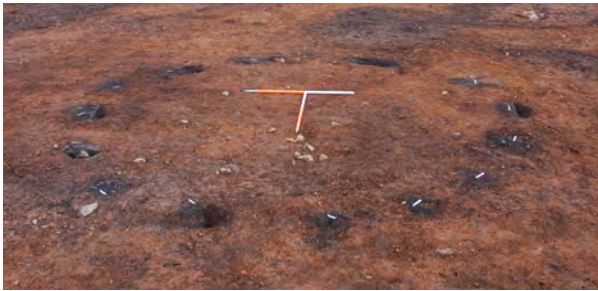


GUARD ARCHAEOLOGY



Flodden 500 Geophysical Survey Data Structure Report Project 3508

www.guard-archaeology.co.uk

Flodden 500 Geophysical Survey

Data Structure Report

On behalf of: Flodden 1513 Ecomuseum Limited

NGR: NT 89036 47682 (Ladykirk)
NT 90568 47450 (Norham)
NT 72729 60029 (Ellemford)

Project Number: 3508

Report by: Christine Rennie

Illustrations: Fiona Jackson

Project Manager: John Atkinson

Approved by:



Date:

25/06/2012

*This document has been prepared in accordance
with GUARD Archaeology Limited standard operating procedures.*

GUARD Archaeology Limited
52 Elderpark Workspace
100 Elderpark Street
Glasgow
G51 3TR

Tel: 0141 445 8800
Fax: 0141 445 3222
email: info@guard-archaeology.co.uk



www.guard-archaeology.co.uk

Contents

Executive Summary	5
Introduction	5
Site Location, Topography and Geology	5
Aims and Objectives	6
Methodology	6
Topographic Survey	7
Results	8
Discussion	28
Recommendations	30
Acknowledgements	32
Appendices	38
Appendix A: Desk-based Assessment of Ellemford Haugh	38
Appendix B: DBA References	43
Appendix C: Survey Sources	44
Appendix D: National Archives of Scotland	44
Appendix E: Gazetteer Of Cultural Heritage Sites	45
Appendix F: DES entry	50

List of Figures

Figure 1: Site location	4
Figure 2: Location of survey grids at Ladykirk	9
Figure 3: Area A. Annotated resistivity results	11
Figure 4: Area A. Annotated gradiometry results	12
Figure 5: Area B. Annotated resistivity results	14
Figure 6: Area B. Annotated gradiometry results	15
Figure 7: Area C. Annotated resistivity results	16
Figure 8: Area C. Annotated gradiometry results	17
Figure 9: Location of survey grids at Norham Castle	19
Figure 10: Annotated resistivity results	20
Figure 11: Annotated gradiometry results	21
Figure 12: Location of survey grids at Ellemford Haugh	23
Figure 13: Area A. Annotated results	24
Figure 14: Area B. Annotated results	26
Figure 15: Area C. Annotated results	27
Figure 16: Digital terrain model of Ladykirk Area A looking South East with Gradiometer overlay	33
Figure 17: Digital terrain model of Ladykirk Area C looking South East with Resistivity overlay	34
Figure 18: Digital terrain model of slope south of Ladykirk Area B	35
Figure 19: Digital terrain model of Norham Castle looking North East with Resistivity overlay	36

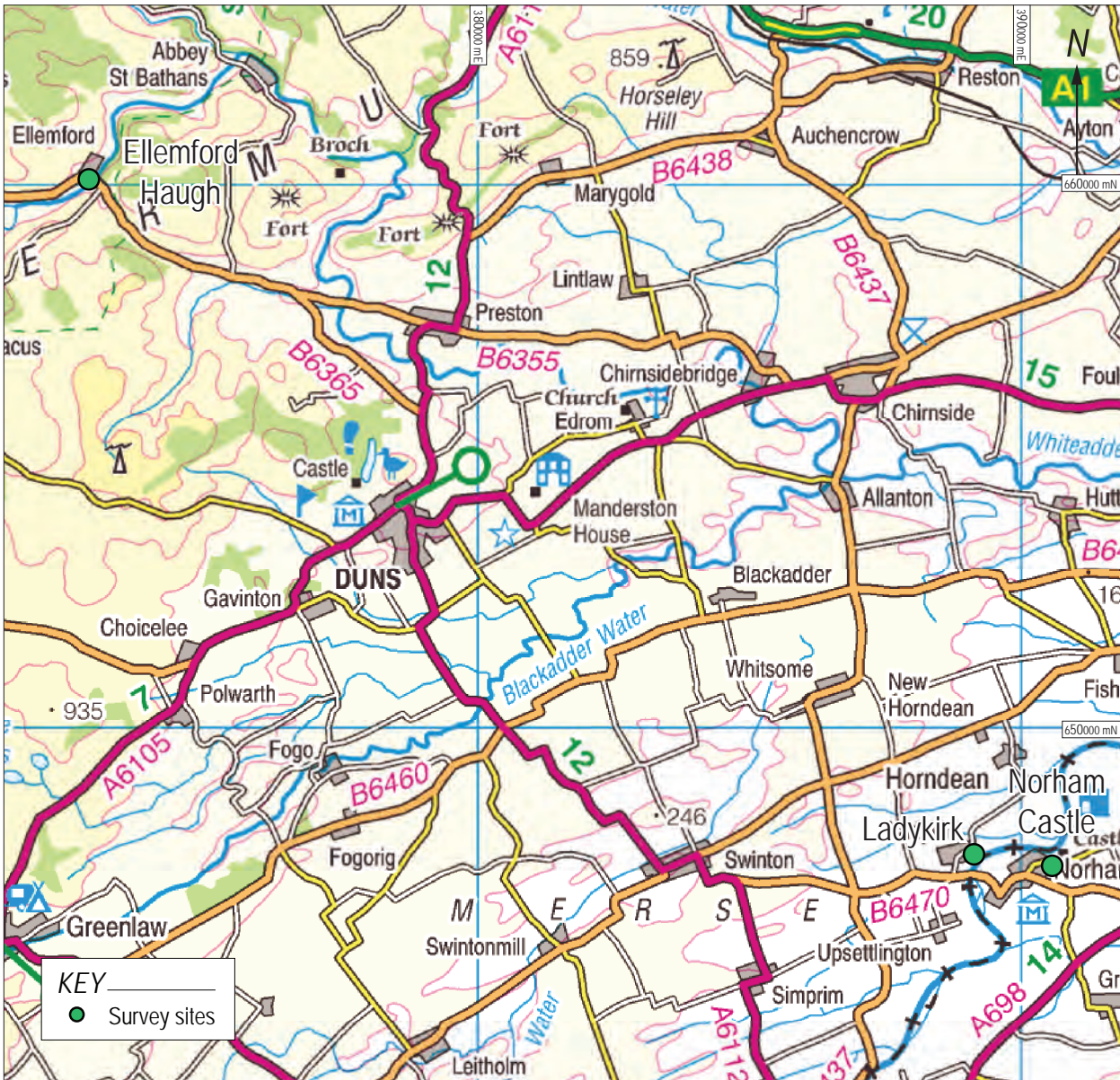
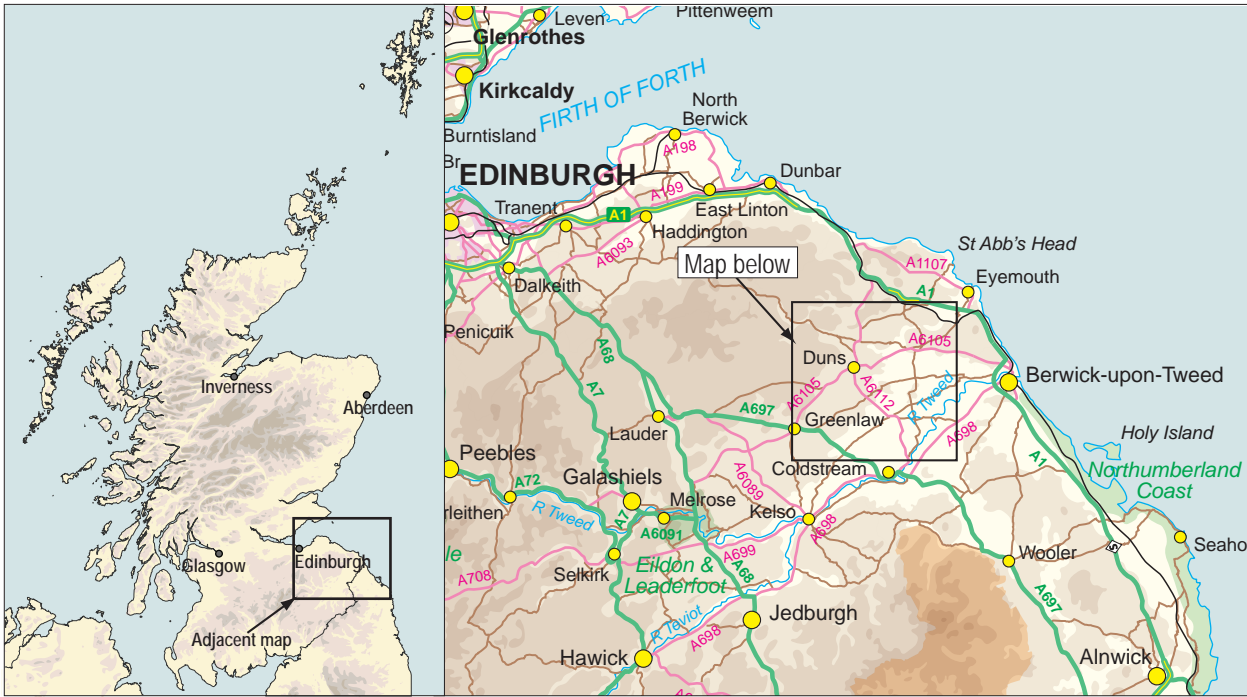


Figure 1:
Site location.



Executive Summary

- 1.1 A geophysical and topographical survey was carried out by GUARD Archaeology Limited on behalf of Flodden 1513 Ecomuseum Limited over locations associated with the Battle of Flodden. At Ladykirk, portions of three fields were surveyed and four possible artillery emplacements, a possible prehistoric ring-ditch, four trackways and the remains of three buildings were recorded. The field to the south of Norham Castle contained earthworks, 'intrenchments' and sixteenth century buildings depicted on the 1st Edition Ordnance Survey map, as well as a possible artillery emplacement and two large areas of magnetic disturbance. The survey at Ellemford Haugh recorded a possible earthwork, an old water channel, a possible structure and areas of burning that may be associated with the muster of the Scottish army.
- 1.2 The work was undertaken over twelve days between 3rd and 24th May 2012.
- 1.3 Oasis Reference Numbers:
 - guardarc1-128772 (Ladykirk)
 - guardarc1-128773 (Ellemford Haugh)
 - guardarc1-128788 (Norham Castle)

Introduction

- 2.1 This report sets out the results of geophysical and topographical surveys undertaken by GUARD Archaeology Limited, with on-site assistance from local volunteers, on behalf of Flodden 1513 Ecomuseum Limited. The surveys were carried out as part of the Flodden 500 project, and took place in three locations associated with the 1513 Battle of Flodden; the Scottish artillery positions at Ladykirk, the field to the south of Norham Castle and the Scottish army muster point at Ellemford Haugh. The work was carried out over twelve days between 3rd and 24th May 2012, and was funded by the Heritage Lottery Fund.

Site Location, Topography and Geology

- 3.1 The village of Ladykirk, Scottish Borders (centred at NGR NT88797 47610) lies about 0.3 km north of the Scotland-England border, and comprises a small settlement of about a dozen dwellings. Three areas were surveyed at this location; Area A is immediately east of Ladykirk church and an un-named road lies to the south and east of the field. Topographically, the field is relatively flat, with small hummocks representing the remains of buildings; the field is 53 metres AOD. Area B is immediately south of Old Ladykirk farmhouse and the terrain slopes down from north to south, with the area surveyed being between 50 and 39 metres AOD. Area C is to the east of Area B, and comprises an earthwork now fenced-off from the remainder of the field, which was under crop at the time of the survey. The earthwork is between 35 and 40 metres AOD.
- 3.2 The village of Norham, (centred at NGR NT 90024 47365) is about 0.3 km south of the Scotland-England border and Norham Castle lies to the east of the village. The geophysical survey was carried out in the field immediately south of the castle, in an area of visible earthworks and historical remains. The site is bounded by Castle Street to the north and north-west, by Mill Burn to the south and by trees to the east. The terrain slopes down from north to south and from east to west; the northern and western limits of the site are delineated by very steep slopes; the area surveyed lies between 27 and 36 metres AOD.
- 3.3 The bedrock at Ladykirk and Norham is mainly Ballogan Formation comprising Sandstone, Siltstone and Dolomitic Limestone, while the superficial deposits are alluvial sands and silts.
- 3.4 The small settlement at Ellemford (centred at NGR NT72777 60135) is 8.5 km north-west of Duns. The three areas surveyed are all fairly flat, with artificial flood-prevention banks in Areas A and B. The fields are bounded by the B6355 road to the north and the River Whiteadder to the south. Ellam Bridge, which was constructed in 1886, replaced the ford and stepping stones depicted on the 1st Edition Ordnance Survey map of 1862.

- 3.5 The bedrock at Ellemford is mainly Gala Group Wacke (dirty sandstone), while the superficial deposits comprise alluvial sand, silt, clay and gravel.

Aims and Objectives

- 4.1 The Flodden 500 geophysical survey aimed to evaluate three locations associated with the 1513 Battle of Flodden in order to gauge their archaeological potential and identify features that may merit further investigation in the form of targeted excavation. One of the general aims of the project was to provide training in geophysical techniques for volunteers. This was achieved by explaining and demonstrating the two survey methods, and by allowing volunteers to use the survey instruments under supervision.
- 4.2 Although the geophysical survey at the three locations had pre-defined targets, some flexibility in fulfilling the brief was required at Ladykirk, as one of the target fields was inaccessible due to its being under crop. The survey at Ladykirk aimed to locate artillery entrenchments used during the bombardment of Norham Castle, and remains of the Medieval settlement. The specific objectives were to:-
- geophysically survey the western side of the earthwork in Fair Field in order to discover something of its nature, and any association with the bombardment of Norham Castle;
 - geophysically survey the ridge overlooking Norham village in order to establish the presence or absence of artillery entrenchments;
 - geophysically survey the field east of Ladykirk church in order to locate any remains relating to the Medieval settlement, and to
 - investigate the possibility of there having been artillery entrenchments at Holywell Haugh.
- 4.3 The geophysical survey at Norham Castle aimed to identify any archaeological remains within the field to the south of the castle that may be related to the 1513 siege of the castle. The specific objectives were to:-
- geophysically survey the visible earthworks in order to gauge their nature and extent, and to
 - expand the survey to cover areas devoid of visible earthworks in order to record any previously unknown underlying archaeological remains.
- 4.4 At Ellemford Haugh, a traditional muster point for Scottish armies invading England, the surveys targeted the northern bank of Whiteadder Water where a ford and stepping stones are shown on the First Edition Ordnance Survey (OS) 25" map of 1862. The specific objectives at Ellemford Haugh were to:-
- geophysically survey the fields to the west of Ellemford Bridge in order to locate the ford;
 - geophysically survey the field to the east of Ellemford Bridge in order to locate paths shown on the First Edition Ordnance Survey map, and to
 - gradiometrically scan sections of the fields in order to find possible locations of campfires.

Methodology

- 5.1 On each site, both resistivity and gradiometry was used over test grids in order to gauge viability for further geophysical assessment work. In all instances, the results showed that both techniques could successfully be employed for the fuller surveys. The resistivity survey was conducted using a Geoscan RM15 Advanced Resistivity Meter with a twin probe array and probe separation of 0.5 m. Readings were taken at a 1 m sample interval and a 1 m traverse interval,

giving 400 readings for each 20 m x 20 m grid. The gradiometry survey was carried out using a Geoscan FM256 Fluxgate Gradiometer. The readings were taken at a 0.5 m sample interval and a 1 m traverse interval, giving 800 reading per 20 x 20 m grid.

- 5.2 These survey frequencies allowed a good resolution of detail with the minimum impact in terms of the time required to complete the survey and to provide training for volunteers.
- 5.3 The data was downloaded into Geoplot v3 for analysis and plot production. The resulting plots were overlaid onto the existing plan of the site, showing where any anomalies lie in relation to the surface features.
- 5.4 At Ladykirk and Norham Castle, both survey techniques were employed over the same areas, resulting in two complementary data sets that detected slightly different features and anomalies. A different approach was used at Ellemford Haugh where grids were initially scanned by gradiometer in order to detect areas where the campfires, possibly associated with the army muster, may have been located. Grids containing these di-polar anomalies were surveyed using gradiometry, while resistivity was employed in grids without such anomalies.
- 5.5 Topographical survey techniques were used to record the positions of all geophysical survey areas, detailed topographical surveys were also undertaken in Ladykirk areas A and C, on the slope immediately south of Area B and in the field south of Norham Castle out with the scheduled area. The surveys were conducted using a Leica R100 sub-centimetre accuracy Global Positioning System (GPS).
- 5.6 On all sites with the exception of Ellemford Haugh, the geophysics grid was initially set out using GPS with the assistance of local volunteers. This creates fully geo-referenced information for each grid point for the accurate placement of the geophysics results within the Ordnance Survey national grid, allowing for the ease of relocating areas identified for further assessment. Due to poor GPS signal the position of the geophysics grids at Ellemford Haugh were recorded using a Leica TCR407 total station, which was tied into the OS grid using common survey points established where sub-centimetre GPS signal was available.

Topographic Survey

- 6.1 The topographic surveys were undertaken to provide a detailed map of the areas of investigation, showing in detail the nature of the various features visible on the ground surface as depressions and mounds.
- 6.2 At Ladykirk in Area A survey points were recorded at intervals of approximately 0.5 m by 1 m on a north/south alignment within the geophysics grid area, additional survey points were recorded where smaller features were present. Due to the subtlety of the features found within this area a smaller interval was used north/south in order to enhance the visibility within the survey results. The results of the survey in Area A predominantly show rig and furrow marks running in a north/south alignment, there are a number of mounds and depressions, along with a further three distinct features, which relate to features highlighted by the geophysics results. To the north of the survey area a linear mound measuring approximately 42 m by 10 m can be seen running north/south, this can be identified as feature LK4 when the geophysics results are overlain on the survey results. Directly to the south a sub circular mound approximately 15 m by 18 m in size can be seen, this is identified on the geophysics results as feature LK2. Approximately 5 m to the west of feature LK4 there is a sub circular depression of approximately 10 m by 10 m, this is also identified on the geophysics results as feature LK3. Figure 16 shows digital terrain model of Area A with Gradiometer overlay. (page 33)
- 6.3 A detailed survey was carried out in Area C to determine the extents of the mound that had previously been identified as a possible position for an artillery emplacement. The mound is found within a fenced off area of rough ground and as a result in order to provide an accurate representation of it within its current setting, it was decided to record the entire fenced off area. The survey was conducted at a 1 m interval. The results show a distinct ditched mound within the south-east area of the field. Figure 17 shows digital terrain model with resistivity overlay. (page 34)

- 6.4 Due to the lack of visible features other than the rig and furrow in Area B it was decided that the geophysics results would not benefit from a detailed topographical survey. As a result it was decided that the slope immediately to the south of the field adjacent to the river would be surveyed. Because of the nature of the terrain, it was decided that it would be too dangerous for volunteers to assist in surveying this area. Due to the size and complexity of the area the survey could not be carried out at a set interval and as such the survey focused on recording breaks of slope with additional spot levels being recorded in open areas. Restrictions in time available meant that some of the detail on the main steep slopes could not be recorded. The results of the survey show a substantial amount of terracing visible on the slopes along with three large open areas on the main slope with slight mounds visible. At the base of the slope there are three depressed linear areas between 4 m and 7 m wide with possible banks running adjacent. It is possible that these may represent a former track or road running parallel to the riverbank. Due to the tree cover at the base of the bank it was not possible to survey this area fully with the GPS. Figure 18 shows digital terrain model of slope. (page 35)
- 6.5 The topographical survey at Norham Castle was restricted to the area outside the Scheduled Ancient Monument area. The survey was conducted at a 1m interval and consists of eight of the southern geophysics grid squares and was extended towards the south-east of the geophysics area to determine if there was any further evidence of activity not shown on the previous topographical survey carried out by Trevor Pearson and Stewart Ainsworth in 2002. The results of the survey show multiple phases of rig and furrow, in the west of the survey area the rig and furrow is seen in a north-west to south/-east alignment which is then replaced by a north-east to south-west alignment. There are no other clear features visible within the survey area due to cultivation. However the visible presence of the rig and furrow over feature NC10 identified on the resistivity results would suggest that feature NC10 is earlier than the rig and furrow present in this area. Figure 19 shows digital terrain model with resistivity overlay. (page 36)

Results

- 7.1 Following processing of the data collected in the field, the geophysical survey revealed anomalies at all of the locations. Reports on the individual sites are below.

LADYKIRK

- 7.2 The three areas targeted at Ladykirk were:-

Area A – the field immediately east of Ladykirk church (figures 2,3 and 4)

Area B – the field immediately south of Old Ladykirk farmhouse (figures 2,5 and 6)

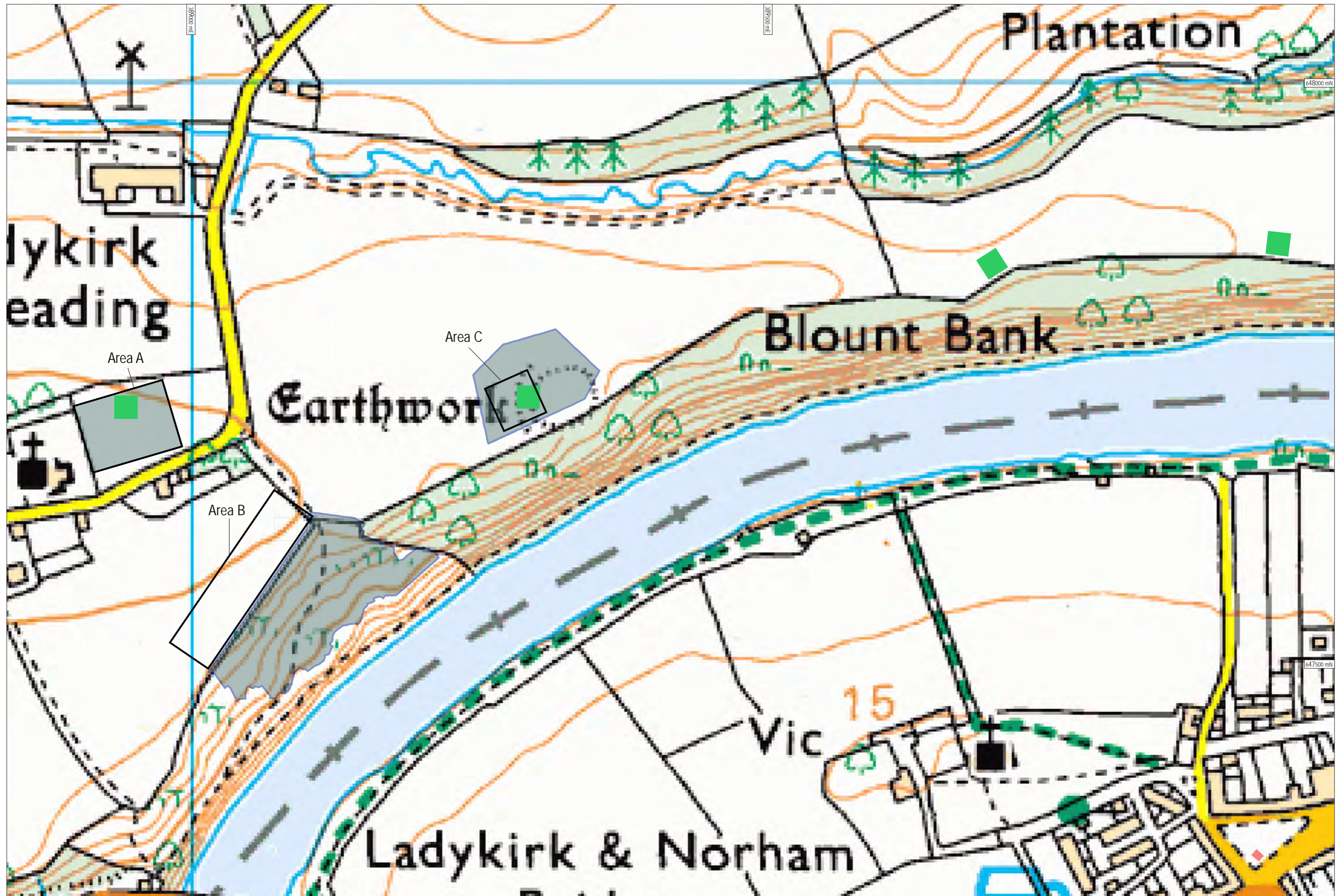
Area C- the earthwork in Fair Field (figures 2,7 and 8)

Area A

- 7.3 Map regression indicates that there have been buildings in this field from about the mid-eighteenth century onwards. Roy's military map of 1747-55 shows an arrangement of three structures around a court-yard and an individual building in this field, while Armstrong & Armstrong's 1771 map depicts the church and four buildings at Ladykirk, including the manse. The 1st Edition Ordnance Survey 25" map of 1858 shows a track and two buildings in this field, only one of which remains *in-situ* by 1900. This field was targeted in an attempt to locate remains associated with the Medieval settlement. At the time of the survey, rig and furrow cultivation marks and irregular hummocks were visible on the ground.

Feature LK1

- 7.4 A band of higher resistivity and magnetic disturbance runs for about 40 metres from the retaining wall of the kirkyard towards the ENE, and is truncated at the east by Feature LK2. The higher readings from resistivity indicate subsoil that is stonier than the surrounding ground,



Key Geophysics area Topographical survey area Geophysics trial grids

Figure 2:
Ladykirk Survey Locations

0 200 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

and the linearity of this anomaly suggests that this may have been a track-way, possibly with a metallised surface.

Feature LK2

7.5 Located at the entrance to the field, this solid block of higher resistance and very disturbed gradiometry data corresponds to a track and an un-named building depicted on the 1st Edition OS map of 1858. The track runs from the field entrance to the north edge of the field, although only the first 20 metres have been detected by the geophysical survey. The building lay on the east side of the track, and neither building nor track are depicted on later OS maps.

Feature LK3

7.6 This anomaly appears rectangular on the resistivity data, but is less well defined on the gradiometry plot. It is about 9 metres by 6 metres, and corresponds to the location of an animal byre (NMRS NT84NE 54) that was demolished in 2002 or 2003. Like Feature LK2, this structure is depicted on the 1st Edition OS map of 1858.

Feature LK4

7.7 This feature is most obvious on the resistivity plot, where relatively higher resistance was found on a rise in the field. The terrain here rises quite noticeably and while it is possible that the change in topography is due to human intervention, it is more probable that this feature is not archaeological.

Feature LK5

7.8 The footprint of what seems to be a rectangular structure measuring about 12 metres by 10 metres is visible on the resistivity plot, and a similarly sized rectangular area of magnetic disturbance was recorded by gradiometry. None of the OS maps consulted depict any building in this area, and earlier maps are not at a sufficiently small scale to have recorded an individual structure. Roy's map shows buildings in this field, and it is possible that the surveys have detected one of these.

Feature LK6a and LK6b

7.9 These two parallel lines of magnetic disturbance are about 25 metres long and 2 metres wide, with the lines being 27 metres apart. The northern line (LK6a) appears to lead to or from the animal byre at LK3, while the southern line may be related to structure LK5. LK6b may also have been recorded by resistivity, as slightly higher resistance.

Feature LK7

7.10 The suggestion of a circular feature appears on the gradiometry plot between structures LK3 and LK5. The feature is about 10 metres in diameter, although the eastern side appears truncated, and may be archaeological. This anomaly was not recorded by resistivity.

Feature LK8

7.11 This area of disturbance was recorded only by gradiometry, and is irregularly shaped, measuring about 5 metres by 5 metres. The anomaly contains a di-pole (positive and negative readings found in conjunction) that may indicate the presence of metal or an area of extreme burning.

Area B

7.12 Comparison of available maps from the seventeenth century onwards suggests that this field has been agricultural land for over 400 years. Roy's Military map shows the rig and furrow cultivation that is still visible on the ground. This field may be the location of the Scottish army artillery emplacements during the bombardment of Norham Castle in 1513.



Key  Geophysics anomaly

Figure 3:
Ladykirk Area A. Annotated Resistivity results

0  20 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key Geophysics anomaly

Figure 4:
Ladykirk Area A. Annotated Gradiometry results

0 20 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

Feature LK9

- 7.13 This area of magnetic disturbance and high resistance corresponds to tracks used by sheep. It is not archaeological in origin.

Feature LK10

- 7.14 This series of concentric curvilinear lines lies below the visible rig and furrow and represents earlier cultivation in this field.

Feature LK11

- 7.15 This linear feature is about 40 metres long and 2 metres wide. It appears to truncate the visible rig and furrow and, therefore, post-dates that phase of cultivation. This may be a field drain.

Feature LK12

- 7.16 A rectangular area of higher resistance was found at the eastern side of the field. This anomaly, which is about 10 metres long and about 7 metres wide, was not recorded by gradiometry, suggesting that there is no cut associated with this feature. The relatively higher resistance to the current is, therefore, most likely to have been caused by the presence of stones or a similar material.

Feature LK13 and Feature LK14

- 7.17 Two V-shaped anomalies were recorded by gradiometry at the southern part of the field. The arms of each V are about 20 metres long and about 2 metres wide, and each V has a 'wingspan' of about 30 metres. The structures apparently point towards the village of Norham, but not to Norham Castle.

Area C

- 7.18 Maps from the seventeenth century onwards indicate an agricultural use for Fair Field where the earthwork is located. Surprisingly, Roy's Military map does not depict the earthwork, although the 1st Edition OS 25" map records it as an 'intrenchment' the southern end of which runs into trees. The earthwork is visible as a small rise that, at the time of the survey, was overgrown with shrubs and other vegetation.

Feature LK15

- 7.19 The edge of the earthwork was recorded by both resistivity and gradiometry. The higher resistance suggests a fairly high concentration of stones within the subsoil. The gradiometry results are less clear-cut, with the earthwork most obvious at the south.

Feature LK16

- 7.20 This area of high resistance is located on the interior of the earthwork, at the edge of the area surveyed. It is very likely that, should the entire earthwork be surveyed, more of this anomaly would be recorded.

Feature LK17 and Feature LK18

- 7.21 These two areas of higher resistance are located at the northern and eastern limits of the survey. No topographical features that would help explain these anomalies were encountered in these areas and it is, therefore, most likely that these are archaeological remains. A small area of magnetic disturbance was recorded at Feature LK17

Feature LK19

- 7.22 This area of magnetic disturbance is in the interior of the earthwork, close to Feature LK16. The anomaly contains di-poles, which often indicates intense burning or the presence of metal.



Key  Geophysics anomaly

Figure 5:
Ladykirk Area B Resistivity results

0  40 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

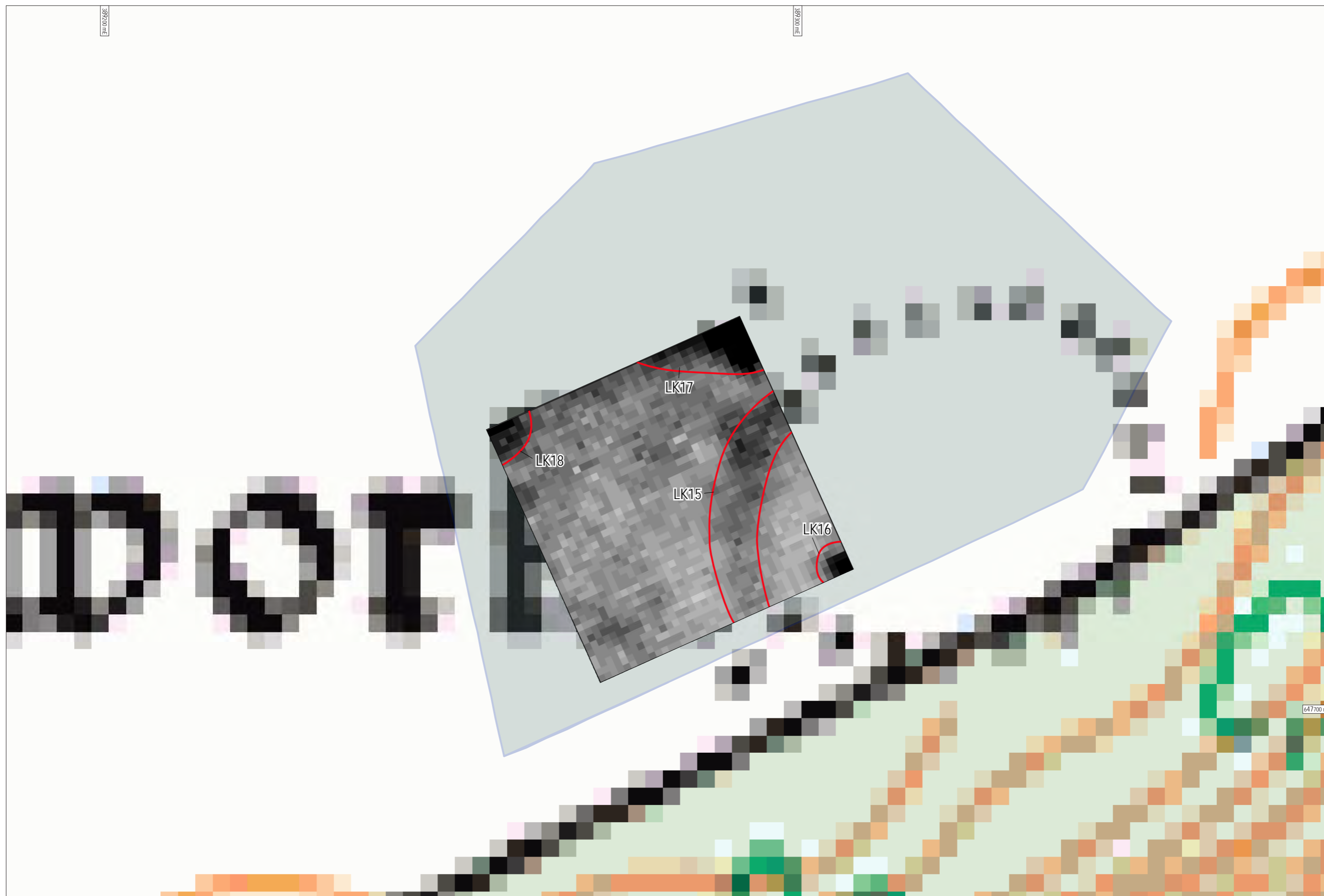


Key Geophysics anomaly

Figure 6:
Ladykirk Area B Gradiometry results



Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key Geophysics anomaly Topographical survey area

Figure 7:
Ladykirk Area C Resistivity results

0 20 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key Geophysics anomaly Topographical survey area

Figure 8:
Ladykirk Area C Gradiometry results

0  20 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

NORHAM CASTLE

7.23 The survey at Norham Castle concentrated on the visible earthworks immediately south of the modern road from Norham village (figures 9, 10 and 11). The steepness of the slopes at the west and north-west of the site prevented survey in these areas, although the slopes along the northern limit of the field were surveyed, albeit cautiously. The survey was extended to the south towards Mill Burn Valley but, due to time constraints, could not be extended any further to the east. In addition to the rig and furrow cultivation marks visible across the site, twelve features of archaeological interest were recorded. The topographical survey carried out by Trevor Pearson and Stewart Ainsworth in 2002 was used to help interpret some of the features recorded during the geophysical survey.

Feature NC1

7.24 Recorded by both resistivity and gradiometry are two linear features, the eastern and western portions of which are separated by a gap of about 9 metres. On the gradiometry plot, bands of higher resistance can be seen to either side of areas of lower resistance, suggesting that this may be a bank and ditch.

Feature NC2

7.25 Depicted on the 1st Edition OS map of 1860 as a continuous line of 'intrenchment', this was recorded as three sections of lower resistance and slight magnetic disturbance to the south of Feature NC1.

Feature NC3

7.26 This linear band of higher resistance is coupled with a similar band of lower resistance immediately north of it. The feature corresponds to a visible bank and was noted, along with Feature NC2, on the 1st Edition OS map of 1860 as an 'intrenchment'. Small pockets of slight magnetic disturbance and Feature 6 are the only indications of this bank that were recorded by gradiometry.

Feature NC4 and Feature NC5

7.27 These two areas of higher resistance and magnetic disturbance lie between Features 1 and 2, and correspond to the locations of cell-like structures depicted on the 1st Edition OS map of 1860. Pearson and Ainsworth identified these features as sixteenth century buildings (Pearson & Ainsworth 2002 32).

Feature NC6

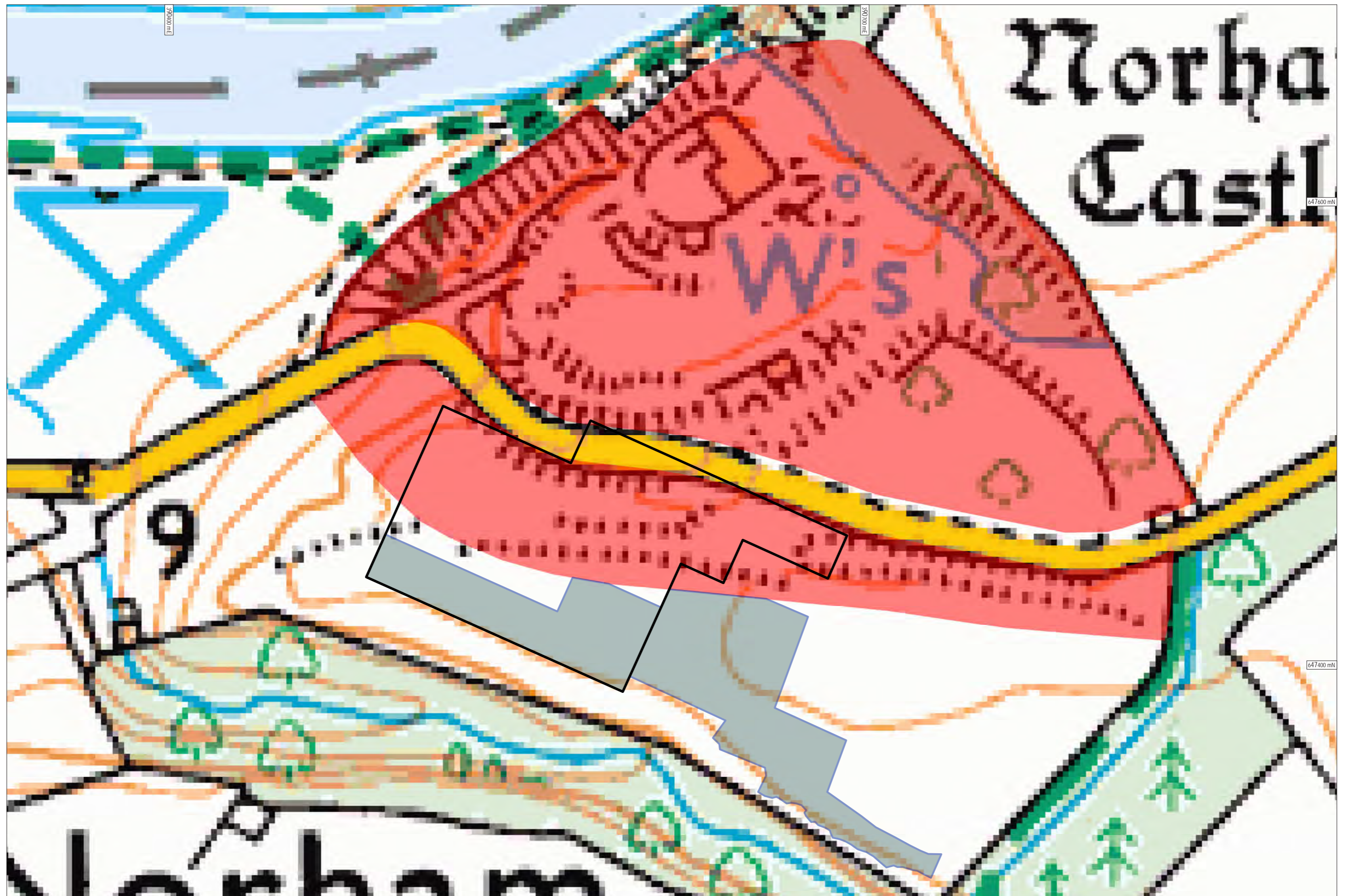
7.28 An area of magnetic disturbance, such as would indicate intense burning or the presence of metal. This is found at the eastern end of Feature 3, although it is not known if this anomaly is part of that linear bank, or a feature in its own right.

Feature NC7

7.29 This linear band of magnetic disturbance does not conform to the alignment of any other features recorded on the site. Given the extreme disturbance recorded here, it is most likely that the anomaly has been caused by modern groundworks, possibly the insertion of services or drainage.

Feature NC8

7.30 This area of magnetic disturbance is about 9 metres by 9 metres in dimension and, as no corresponding anomaly was recorded by resistivity, it does not appear to be a negative-cut feature.

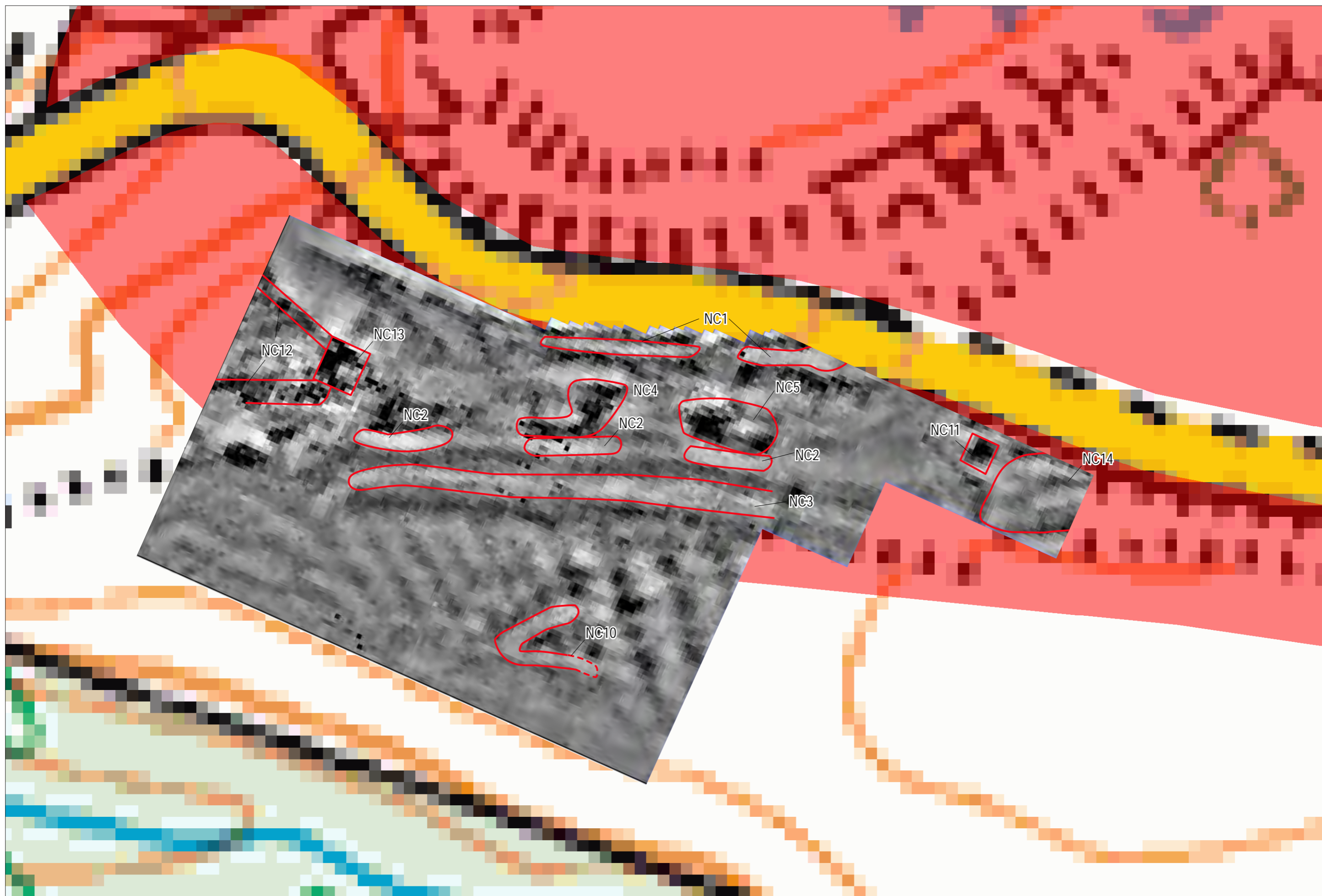


Key Geophysics area Topographical survey area Scheduled Ancient Monument

Figure 9:
Norham Castle Survey locations

0 100 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key Geophysics anomaly Scheduled Ancient Monument

Figure 10:
Norham Castle annotated Resistivity results

0 50 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key Geophysics anomaly Scheduled Ancient Monument

Figure 11:
Norham Castle annotated Gradiometry results

0 50 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

Feature NC9

7.31 This is similar to Feature NC8 in that the area of magnetic disturbance has no corresponding resistivity anomaly. The anomaly is about 20 metres long and about 17 metres wide and does not appear to be a negative-cut feature.

Feature NC10

7.32 A V-shaped anomaly of lower resistance was recorded close to Features NC8 and 9. The arms of the V are 20 metres long, and the point of the V is aligned to the south-west (ie towards Norham village). The lower resistance recorded indicates that this is a negative-cut feature.

Feature NC11

7.33 This small area of higher resistance is about 5 metres square and is located to the west of a large ditch. The regularity of this anomaly suggests that it may be a small structure.

Feature NC12

7.34 This irregularly shaped feature is truncated by the western limit of the geophysical survey, and was recorded by both survey instruments. Its location corresponds to an earthwork bastion identified by Pearson and Ainsworth (Pearson & Ainsworth 2002 30). The resistivity plot shows a band of higher resistance on the north side of the feature, although the southern side is less well-defined. On the gradiometry plot, the feature is indicated by slight disturbance on the north and south sides of the earthwork.

Feature NC13

7.35 Immediately east of Feature NC12 is a small anomaly that was recorded as an area of higher resistance surrounded by magnetic disturbance. Pearson and Ainsworth identified this as one of three sixteenth century buildings (Pearson & Ainsworth 2002 32).

Feature NC14

7.36 This very visible ditch is part of the outer bailey of the castle and was recorded as feature 18 for the 2002 topographic survey. Its later use as a pond is attested by standing water at the eastern end of the feature (Pearson & Ainsworth 2002 25). Only the westernmost part of this feature was surveyed geophysically due to time constraints.

ELLEMFORD HAUGH

7.37 A desk-based assessment (DBA) of Ellemford Haugh was carried out by Warren Bailie of GUARD Archaeology. The results of that assessment can be found at Appendix A. In addition to the information in the DBA, the tenant farmer informed the survey team that two of the three fields included in the geophysical survey (Areas B and C) were used for the annual agricultural show and that, despite flood prevention measures, the River Whiteadder sometimes broke its banks, causing flooding in the three fields that form the survey area.

7.38 The three areas targeted at Ellemford Haugh were:-

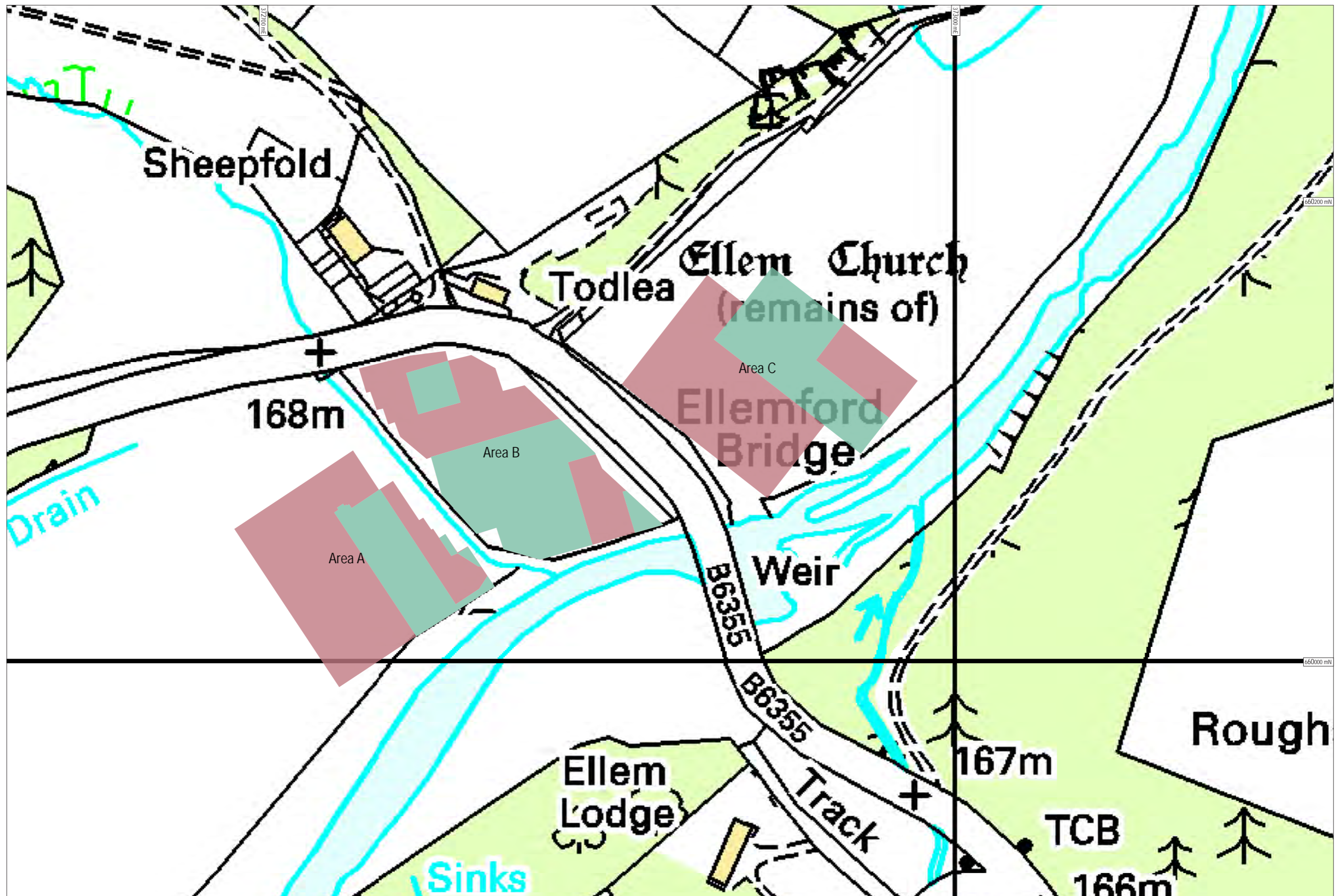
Area A – westernmost field (figures 12 and 13)

Area B – field on west side of Ellem Bridge (figures 12 and 14)

Area C – field on east side of Ellem Bridge (figures 12 and 15)

Area A

7.39 This is the possible location of the ford after which the settlement is named. The western extent of this field was delineated by a modern bank along the edge of the burn that divides this field

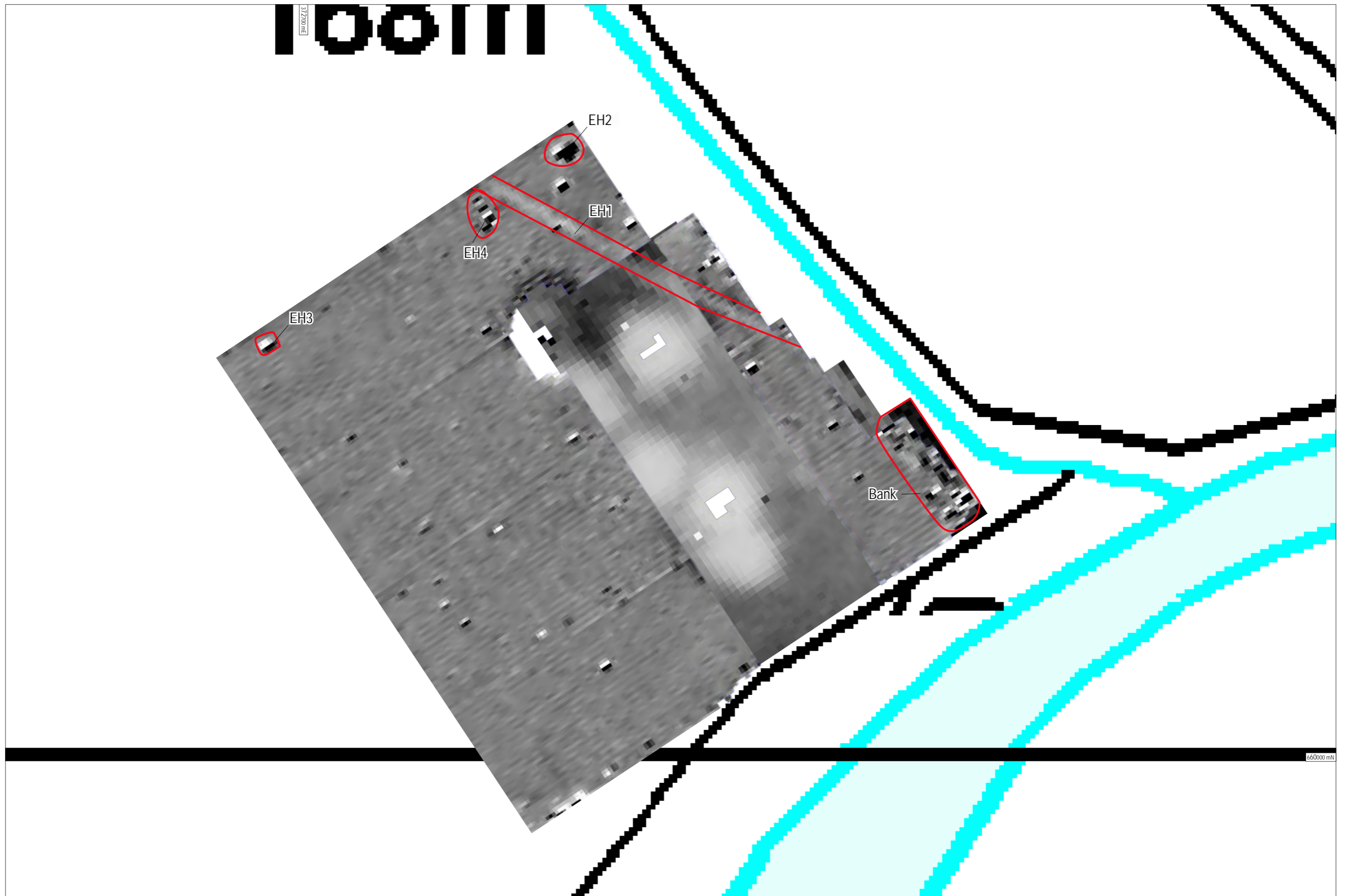


Key
■ G gradiometer survey area
■ Resistivity survey area

Figure 12:
Location of survey grids at Ellemford.



Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key  Geophysics anomaly

Figure 13:
Ellemford Area A annotated results.

0  25 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

from Area B. The field is fairly flat with standing water immediately west of the area surveyed, and a small water channel at the north-west of the area surveyed. The bank of the burn caused disturbance on both surveys, and metal cattle feeders and fences caused magnetic disturbance during the gradiometry survey.

Feature EH1

7.40 A linear band of lower resistance and altered magnetism runs for about 40 metres from north-west to south-east at the eastern side of the field. This may have been a water channel, as it appears to feed into the burn.

Features EH2, EH3 and EH4

7.41 These three anomalies are di-poles that often indicate the presence of metal, or the location of intense burning.

Area B

7.42 A raised bank at the southern edge of the field is of modern construction, and was erected as a flood prevention measure. This bank caused magnetic disturbance during the gradiometry survey and, to prevent further disturbance, the gradiometry survey was ended several metres away from the metal fences that enclose the field. Sheep-dog trials are held in this field during the Ellemford Agricultural Show.

Feature EH5

7.43 This curvilinear band of magnetic disturbance is between four and five metres wide and about 28 metres long, although some of the disturbance at its western end may be caused by proximity to the metal fence. The single resistivity grid among the gradiometry grids shows slightly higher resistance starting at about the point where this feature would enter the grid, with the anomaly curving round to the north-west.

Feature EH6

7.44 This small area of magnetic disturbance may be the same anomaly as Feature EH5.

Feature EH7

7.45 This linear band of magnetic disturbance is about two metres wide and 11 metres long. It is located at the entrance to the field and is probably due to the topsoil being churned-up by animals and farm machinery. Some of the disturbance at its eastern end may be caused by proximity to the metal fence.

Area C

7.46 Artificial banks at the west side of this field are associated with the construction of Ellem Bridge. A wire fence at the southern side of the field stops immediately adjacent to the bridge to allow fishing access to the river. This field is the location of the annual Ellemford Agricultural Show.

Feature EH8

7.47 An L-shaped area of higher resistance recorded during the survey is about 20 metres long and 11 metres wide. The morphology of this feature suggests that it may be structural.

Feature EH9 and Feature EH10

7.48 These areas of magnetic disturbance may indicate intense burning or the presence of metal within the topsoil or subsoil.

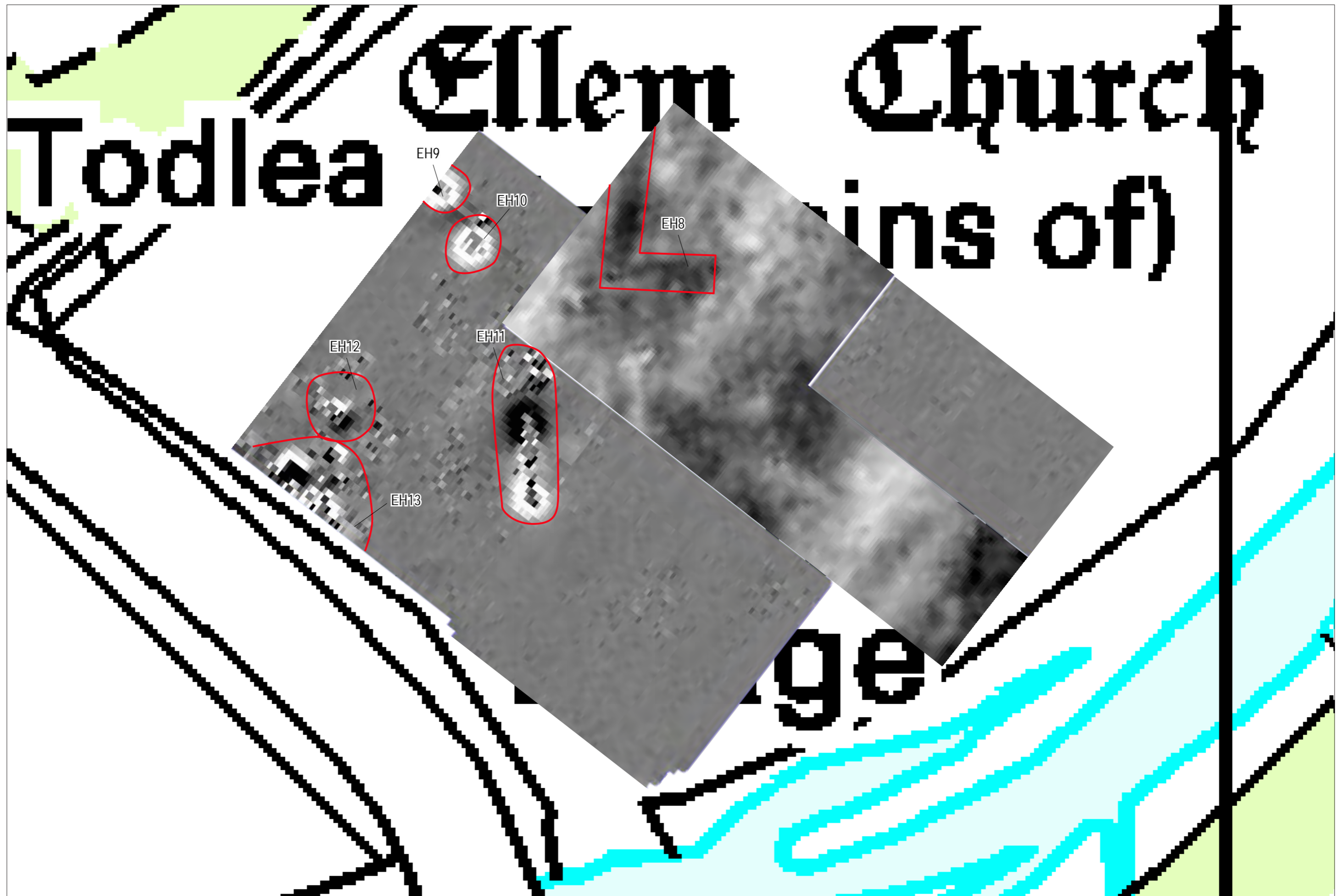


Key  Geophysics anomaly

Figure 14:
Ellemford Area B annotated results.

0  25 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.



Key  Geophysics anomaly

Figure 15:
Ellemford Area C annotated results.

0  25 m

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

Feature EH11

- 7.49 The intensity of the magnetic signal over this anomaly is so strong that it is almost certainly caused by metal in the topsoil or subsoil. The linear nature of this anomaly suggests that it is not archaeological in nature.

Feature EH12 and Feature EH13

- 7.50 These areas of magnetic disturbance may indicate intense burning or the presence of metal within the topsoil or subsoil.

Discussion

- 8.1 The geophysical surveys carried out for this phase of the Flodden 500 project successfully located anomalies in every area surveyed. Some of these features were already known from maps and earlier archaeological work, while others were unrecorded prior to this survey work. All of the features recorded during the surveys have the potential to add to our understanding of the historical background to the Battle of Flodden and to current knowledge of the archaeology within the three locations of Ladykirk, Norham Castle and Ellemford Haugh.

Ladykirk Area A

- 8.2 The survey at Area A located the remains of two buildings (LK 2 and 3) and what appears to be the footprint of a third building (LK5). Of these, LK2 and LK3 appear on the 1st Edition OS map, and all three may be among the buildings recorded by Roy in the field to the east of Ladykirk church. Local residents suggested that a hospital or hospice had existed in Area A, but no evidence could be found to support this assertion, although the National Monuments Record for Scotland (NMRS) records the thirteenth century St Leonard's Hospital at Horndean (NMRS NT94NW 15), some two km from Ladykirk.
- 8.3 Three tracks appear to be associated with these buildings (LK 1,6a and 6b), none of which are depicted on maps of the site. Tracks LK6a and LK6b seem to be associated with buildings LK 3 and LK5 respectively, with the tracks leading towards the church. The larger track at the edge of the field (LK1) may be a road that pre-dates the OS maps and that was superseded by the present road between Ladykirk and Horndean.
- 8.4 Feature LK4 corresponds to a rise in the ground and is most likely to be a natural feature. The magnetic disturbance at LK8 is probably caused by an episode of intense burning in this area, or by a metal object(s) in the topsoil or subsoil.
- 8.5 The morphology of a possible circular enclosure (LK7) that was recorded by gradiometry is reminiscent of prehistoric roundhouses. This very subtle anomaly is about 10 metres in diameter and is defined by what appears to be a ditch of up to 0.5 meters wide, the north-eastern segment of which has been truncated by later activity.

Ladykirk Area B

- 8.6 Of the six anomalies recorded in this area, three (LK9, LK10 and LK11) are almost certainly not archaeological in nature. LK9 corresponds to visible tracks used by sheep in order to gain access to the pasture on the slope at the south of the area. LK10 is a series of concentric bands that were recorded by resistivity, and that are most likely to be rig and furrow cultivation on a different alignment to that which is now visible in the field. That LK10 is truncated by the later rig and furrow cultivation allows for the relative dating of these two features. The linearity and alignment of LK11 is markedly different to the cultivation remains already discussed, and this linear anomaly is more akin to modern service ducts than to archaeological remains.
- 8.7 Three anomalies in Area B that may be associated with the Battle of Flodden are two V-shaped areas recorded by gradiometry (LK13 and Lk14) and a stony patch recorded by resistivity (LK12).

The V-shaped features are quite subtle anomalies, each comprising two linear ‘arms’ that meet to form a point. The ‘arms’ are about 20 metres long and about 2 metres wide, with the V pointing in the direction of Norham village. These features were not located by resistivity, probably due to their being largely obliterated by later ploughing activity. Given their location on elevated ground overlooking the River Tweed and their morphology, it is reasonable to suggest that these may be the remains of earthwork batteries, designed to surround and protect the Scottish army artillery positions. The stony patch recorded by resistivity (LK12) may also be an artillery position, the stones being used to prevent the heavy artillery sinking into the ground.

Ladykirk Area C

- 8.8 The earthwork in Area C is, somewhat surprisingly, not depicted by Roy in his Military Survey of Scotland, although it was undoubtedly visible in the mid-eighteenth century. Local volunteers who assisted in the geophysical survey suggested that the earthwork was constructed (or at least utilised) as an artillery position for Mons Meg during the 1496 siege of Norham Castle, and the farmer is said to have uncovered large deposits of charcoal when the earthwork was ploughed (H Lough pers. com.). The edge of earthwork LK15 seems to be delineated by stonier ground, and compacted stones found in the interior (LK16) may have been placed in order to provide a stable base for firing artillery and to prevent the heavy guns sinking. The magnetic disturbance (LK19) within the earthwork may be evidence that this was an artillery position, although not necessarily one used during the 1613 siege of Norham Castle. This magnetic disturbance may have been caused by burning material ejected during the firing of cannon. Stony areas (LK17 and LK18) may also be associated with this presumed artillery position, although so little of these was surveyed that it is difficult to ascribe any particular function to them.

Norham Castle

- 8.9 The results of the survey at Norham Castle correlate very well with the 2002 topographical survey carried out by Trevor Pearson and Stewart Ainsworth. All of the principal topographic features within the geophysical survey area were detected by one or both survey techniques and several previously unknown features were recorded.
- 8.10 Six of the features recorded during the geophysical survey (NC2 to NC5, NC12 and NC13) had previously been surveyed by Pearson and Ainsworth in their 2002 topographic survey of the castle and its environs. Of these, NC3 corresponds to earthwork bank 21 which Pearson and Ainsworth describe as ‘a significant boundary feature which emphatically divided the castle from the rest of the promontory to the south’ (Pearson & Ainsworth 2002 26). NC4, NC5 and NC13 are the remains of three sixteenth century buildings surveyed by Pearson as features 36, 37 and 35 respectively. The heavy compaction recorded by resistivity on the interior of these structures suggests that some floor deposits remain in-situ.
- 8.11 Linear bank NC2 lies to the south of structures NC4 and NC5, and marks the southern extent of yards or pens related to the structures. This feature appears as a solid line on the 1st Edition OS map and, in conjunction with NC3, is noted as ‘intrenchment’.
- 8.12 The banks recorded at NC12 correspond to Pearson and Ainsworth’s earthwork bastion that overlooks the western approach to Norham Castle from Norham village (Pearson and Ainsworth 2002 29). This feature is at the western limit of the geophysical survey, and was not fully recorded due to the steepness of the incline at this side of the area.
- 8.13 A probable earthwork not ascribed a number in the 2002 survey is NC1, two linear banks that effectively create an entrance from the north to enclosed the partially structures NC4 and NC5. It is not known if this earthwork dates from the same period as the buildings.
- 8.14 A possible structure (NC11) was recorded at the west exterior of the outer bailey (NC14). This was only detected by resistivity, suggesting that there is no associated cut, and the anomaly appears to comprise stone or similar compacted material.
- 8.15 A probable artillery position was recorded by resistivity at NC10, where a V-shaped feature

points towards the route from Norham village to Norham Castle. The similarity between this feature and features LK13 and LK14 at Ladykirk is striking, and the three are almost certainly earthworks associated with heavy artillery, albeit on different sides of the battle.

- 8.16 Three areas of magnetic disturbance, NC6, NC8 and NC9, have no corresponding resistivity anomaly, and may be evidence of military activity. The magnetic disturbance at NC8, which is in fairly close proximity to artillery position NC10, may have been caused by the spread of burning material ejected from cannon on firing. NC9 may have a similar origin, with the associated artillery position being beyond the limit of the geophysical survey. The cause of the much smaller anomaly at NC6 is not known. While this could be due to material ejected from cannon, its location at the eastern end of bank NC3 may indicate that it is part of that larger earthwork.

Ellemford Haugh

- 8.17 The results of the survey at Ellemford Haugh are less clear-cut than those at Ladykirk and Norham Castle in that very few readily identifiable archaeological features were recorded. The anomalies consisted almost exclusively of di-poles, indicating the presence of metal or of an area of burning. It should be noted that there is no way of assessing the date of di-polar anomalies without employing some form of excavation, and that di-poles recorded at Ellemford Haugh are as likely to be related to the annual agricultural show or general agricultural activity as they are to the Battle of Flodden. No remains of the ford or of the paths depicted on the 1st Edition OS map were recorded.
- 8.18 In Area A, linear cut EH1 is probably an in-filled water channel that probably pre-dates the construction of the raised banks of the burn that separates this field from Area B. The three di-poles are quite small, and may indicate localised burning, or the presence of buried metal objects. Other recorded magnetic disturbances are caused by a metal animal feeder and the material used to construct the burn banks.
- 8.19 Curvilinear feature EH5/EH6 in Area B was recorded by resistivity, but is far more evident in the grids surveyed by gradiometry. The lower resistivity readings indicate that this is a negative-cut feature, which suggests that it may be archaeological. However, its morphology is rather enigmatic, being about 6 metres wide at the south-west, petering away to about 1.5 metres at the north-west, and an overall length of about 30 metres. Although the anomaly is almost circular and it is located close to a water source, the width of the cut is far too great to be a prehistoric roundhouse. No obvious archaeological parallels to this could be found and, without further investigation, it is not possible to ascribe a function to it.
- 8.20 Other magnetic anomalies in Area B are due to the raised bank on the north side of the Whiteadder River, metal fences and disturbance of the ground at the entrance to the field. These do not require further investigation.
- 8.21 The location of feature EH8 in Area C does not correspond to any paths or buildings depicted on the 1st to 3rd Edition OS maps, although the higher resistance recorded at EH8 is indicative of the presence of stone or a similar poorly conducting material. The regular shape of this L-shaped feature suggests that it may be structural, albeit only two sides have been recorded, and that it may be related to pastoral or arable farming.

Recommendations

- 9.1 The surveys undertaken at these three locations associated with the Battle of Flodden has potentially increased current knowledge of the locations of artillery to a fairly significant degree. Further archaeological work, including excavation, would lead to a fuller understanding of the ways in which some of the features recorded relate to the battle, and would further enhance understanding of the Scottish bombardment of Norham Castle from Ladykirk.
- 9.2 Some of the features recorded may not relate directly to the Battle of Flodden, but investigation of these would, nonetheless, add to the local archaeological landscape.

Ladykirk

- 9.3 Further investigation of the buildings recorded in Area A is recommended in order to reveal something of the date and function of these structures. Although NMRS records feature LK3 as an animal byre, this description may merely reflect its most recent usage and not its original function. The tracks associated with the three buildings, and that represented by LK1 would also benefit from further archaeological assessment that may help to assign dates to these features and provide evidence of their relationship with the buildings. All of these could be investigated via small trenches cut through the features in order to record the exposed sections of their fills. Appropriate environmental samples should be taken for post-excavation analysis, with the aim of retrieving any botanical and artefactual remains that could be used to more closely date these features.
- 9.4 The possible circular enclosure (LK7) is not likely to be associated with the Battle of Flodden, but investigation of this anomaly may reveal something of the earlier history or prehistory of the site. This could be achieved by excavating one or more sondages through the width of the feature, initially in order to establish if it is archaeological. The exposed sections should be fully recorded and environmental samples taken from the fill for the post-excavation retrieval of botanical remains for radiocarbon dating.
- 9.5 The cause of the magnetic disturbance at LK8 could be investigated by test-pit. After the removal of turf, the topsoil would be removed and could be sieved on-site in order to retrieve any small metal objects that may account for the magnetic disturbance. Any scorching in the topsoil and/or subsoil could indicate that the feature is archaeological, and environmental samples would be taken for post-excavation extraction of datable botanical remains.
- 9.6 The likely artillery positions in Area B should be investigated via test-pit in order to ascertain their nature, function and any association with the bombardment of Norham and the subsequent seizure of Norham Castle.
- 9.7 The earthwork in Area C should be investigated in order to ascertain if this is an artillery position. This could be achieved by excavating one or more small trenches through the edge of the earthwork, or by test-pitting over the mound. Excavation of test pits at the area of probable burning (LK19) could establish the presence of heavy artillery and post-excavation analysis of environmental samples has the potential to produce charcoal for the purpose of radiocarbon dating.

Norham Castle

- 9.8 Much of the area surveyed is within the Scheduled Ancient Monument of Norham Castle, and further investigation, particularly intrusive works, would require Scheduled Monument Consent (SMC).
- 9.9 The results of the resistivity survey indicate that floor deposits of the sixteenth century buildings (NC4, NC5 and NC13) are *in-situ*. Test pits located within these structures would aim to retrieve environmental samples that could more closely date the structures and may provide evidence for the use of the buildings, the living conditions and diet of those who lived or worked there, and any association the structures may have with the 1513 siege of the castle.
- 9.10 The banks of earthwork bastion NC12 appear to be intact, although there does not appear to be an interior stone layer to accommodate artillery. Test pits in this structure may help establish the presence or absence of artillery, and botanical remains retrieved from environmental samples could be used to accurately date the bastion and ascertain if the bastion was used in 1513.
- 9.11 The nature and function of the possible structure at NC11 and any association with structures NC4, NC5 and NC12 could be determined by test pitting. This would aim to establish if the resistivity anomaly is caused by a stone base/floor and to retrieve botanical samples that could be used to date this feature.

- 9.12 The function and date of probable artillery position NC10 could be achieved through excavating a small trench through one of the ‘arms’ of the V, and retrieving environmental samples for post-excitation processing. Similarly, test-pit excavation and analysis of environmental samples from the probable spreads of burnt material at NC8 and NC9 may establish if these anomalies are related to a siege of Norham Castle. These three features are out-with the Scheduled area.

Ellemford Haugh

- 9.13 In order to establish the cause of di-polar anomalies recorded at Ellemford Haugh, it is recommended that test-pits are excavated at the locations of some or all of these features. After the removal of turf, the topsoil would be removed and could be sieved on-site in order to retrieve any small metal objects that may account for the magnetic disturbance. Any scorching in the topsoil and/or subsoil could indicate that the feature is archaeological, and environmental samples would be taken for post-excitation extraction of datable botanical remains. This strategy could be applied to features EH2 to EH4 and EH9 to EH13.
- 9.14 In order to establish the nature of linear cut EH1 in Area A, a sondage should be excavated through the feature. Recording of the exposed sections of the sondage should help determine if this is a water channel and may indicate in the in-filling was deliberate or natural. Environmental samples taken from the fill(s) of the cut could provide material suitable for radiocarbon dating.
- 9.15 The curvilinear feature in Area B (EH5/EH6) should be investigated via small trenches in order to establish its nature, function, probable date and any association to the muster of the Scottish army.
- 9.16 Possible structure EH8 could be investigated via test-pits through the each of the two linear components. The stone (or other fill material) would be removed to expose the sides and base of the presumed cut, and the sections would be fully recorded. Environmental samples taken for post-excitation retrieval of botanical remains could help determine the function and date of this structure.

Acknowledgements

- 10.1 GUARD Archaeology would like to thank The Flodden 500 Heritage Steering Group, in particular Chris Bowles, Chris Burgess and Kenrda Turnbull, for their assistance. We would also like to thank the volunteers - Dougie Allan, Chris Jackson, Catherine Kent, Joan Lawson, Heather Lough, Jack Pennie, Mike Rennard, Nigel Sumerling and Mark Woolston-Houshold - who helped to make this such an enjoyable experience. Particular thanks are extended to Mark Woolston-Houshold for allowing GUARD Archaeology to use his aerial views of the Norham Castle survey. Technical and administrative support was provided by Jen Cochrane, Aileen Maule and John Kiely. The illustrations were produced by Fiona Jackson and the report was desk top published by Gillian McSwan. The project was managed for GUARD Archaeology by John Atkinson, and the director was assisted in the field by Beth Spence, Rowena Thompson and Scott Wilson.

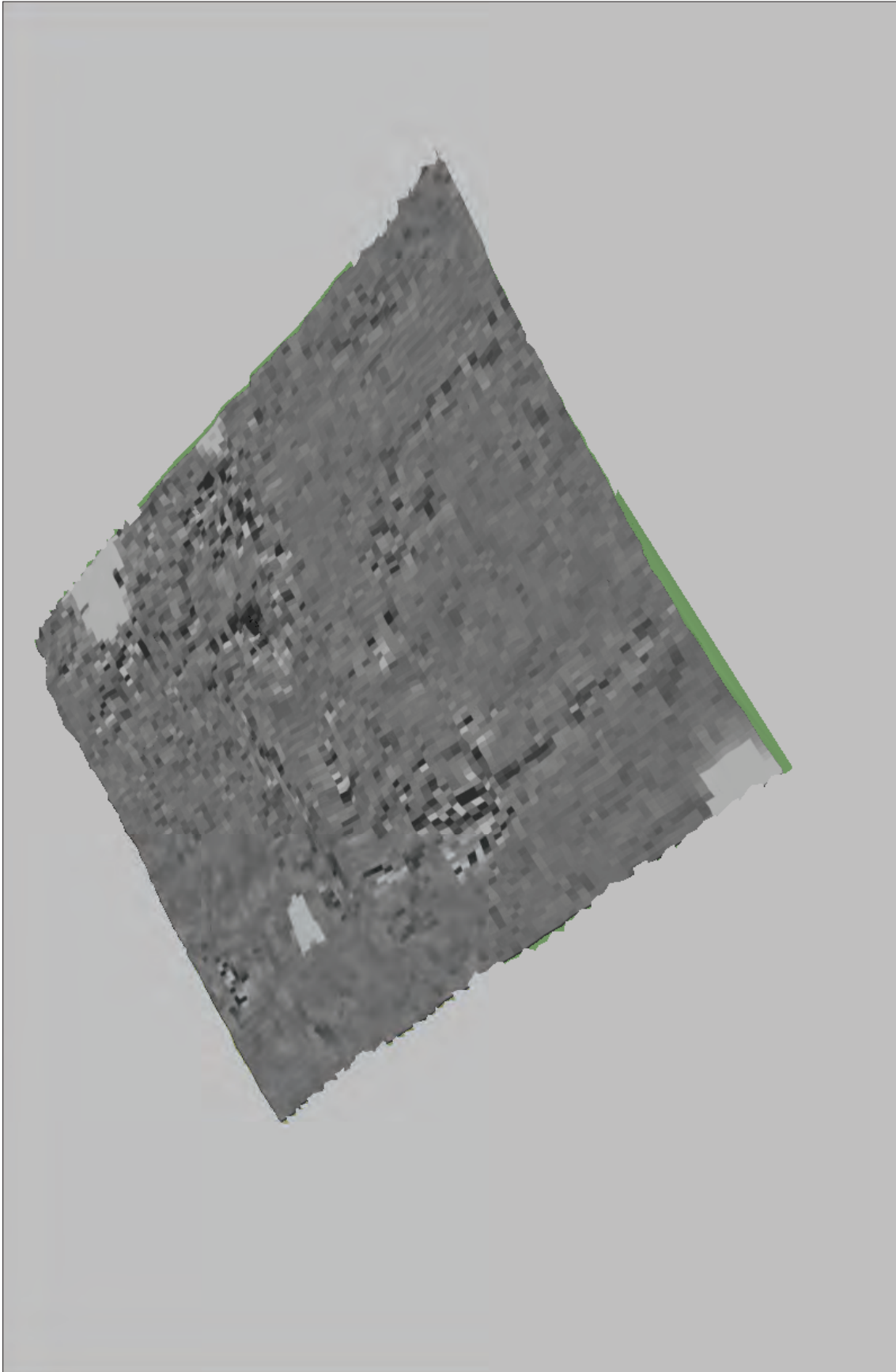


Figure 16: Digital terrain model of Ladykirk Area A looking South East with Gradiometer overlay.

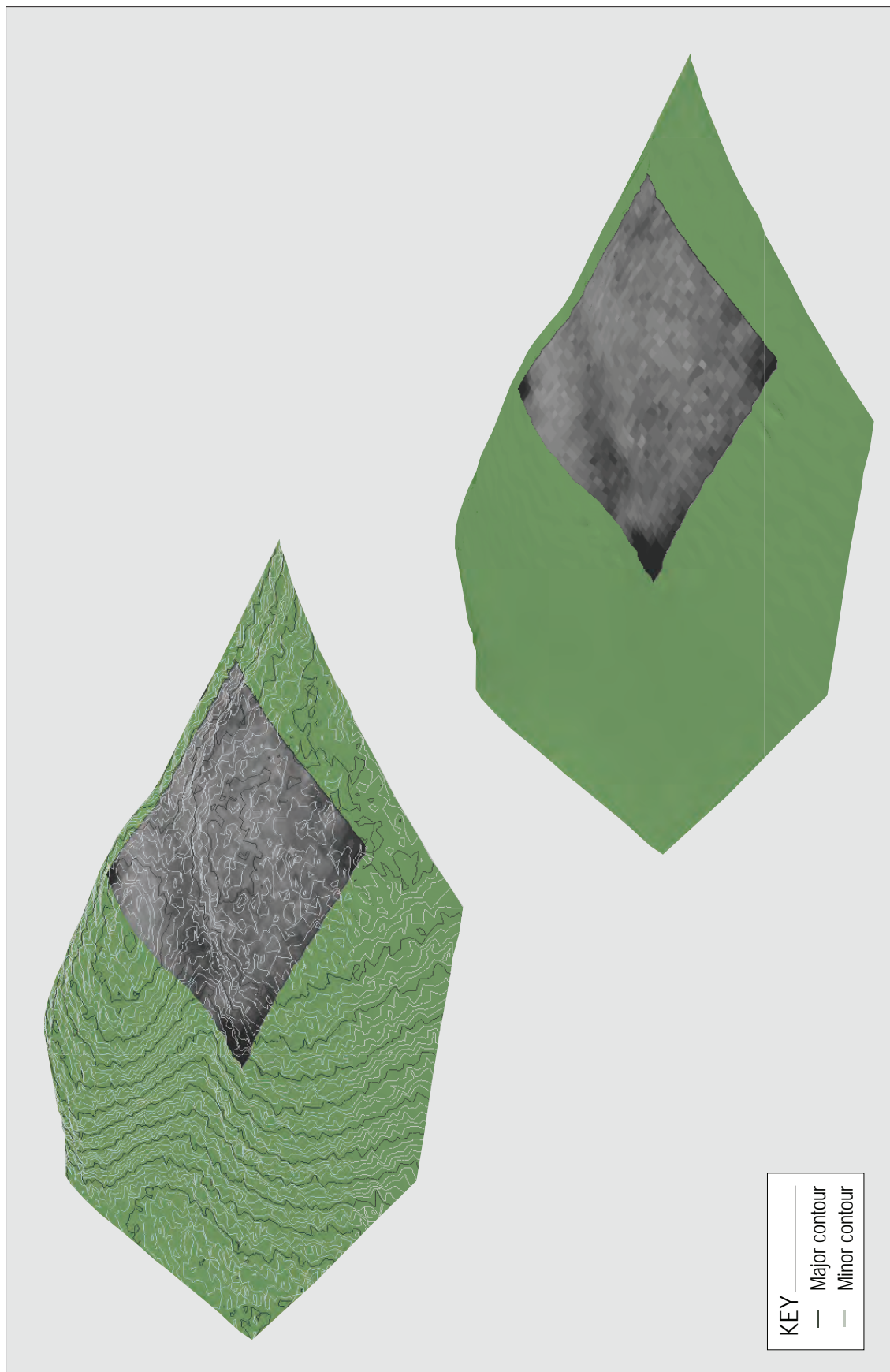


Figure 17: Digital terrain model of Ladykirk Area C looking South East with Resistivity overlay.

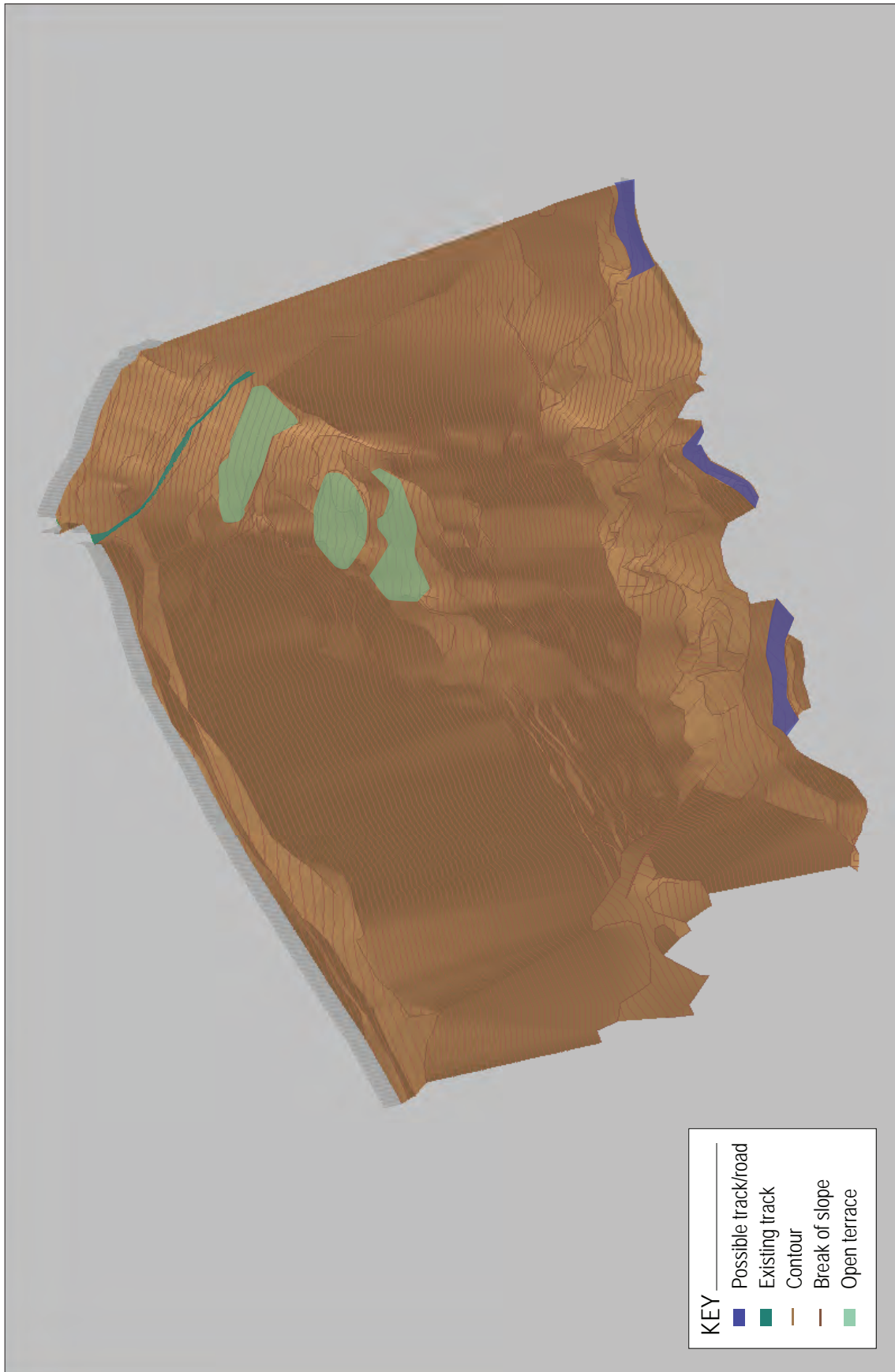


Figure 18: Digital terrain model of slope south of Ladykirk Area B.

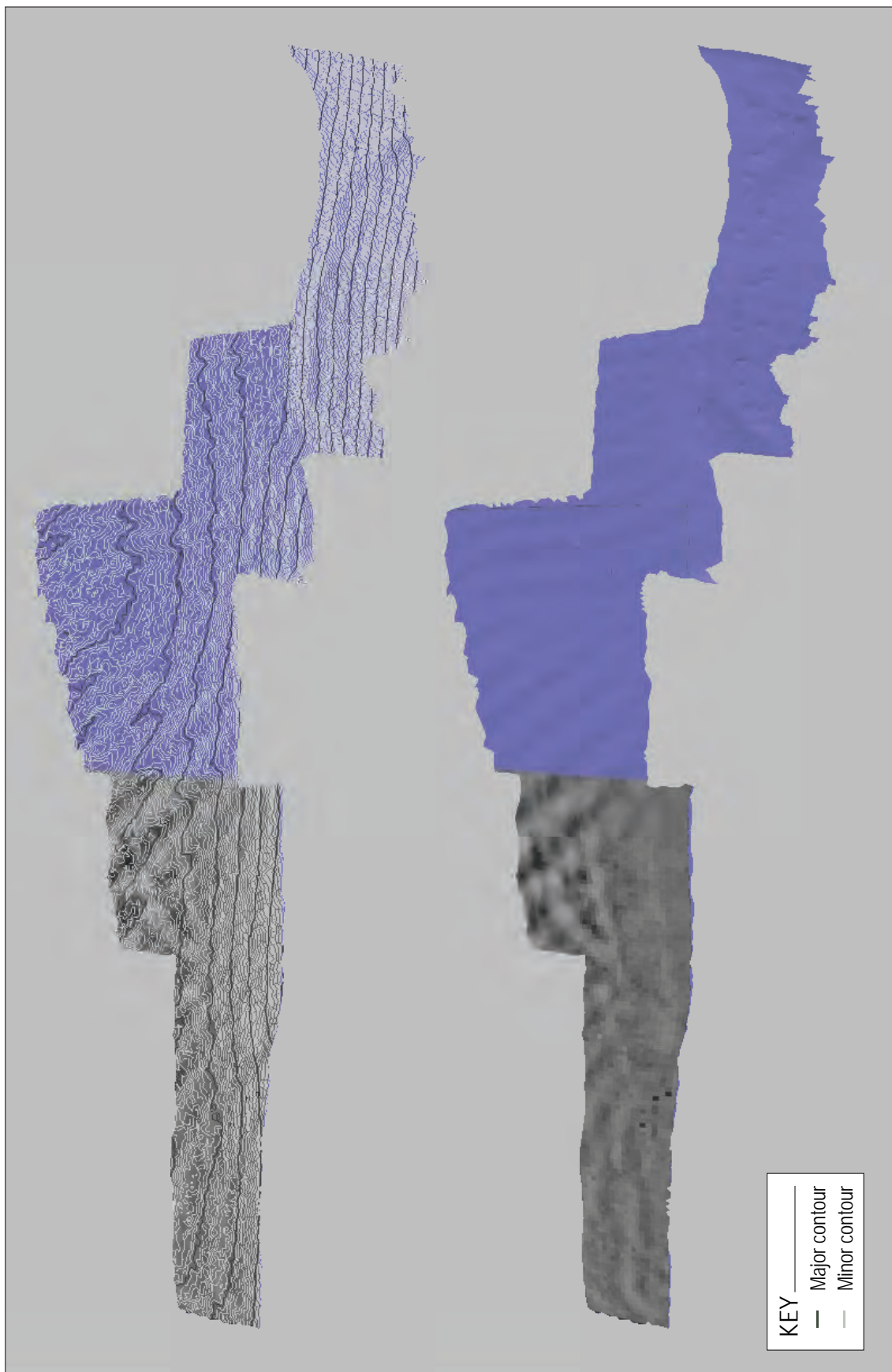


Figure 19: Digital terrain model of Norham Caetle looking North East with Resistivity overlay.

**Flodden 500 Geophysical Survey
Data Structure Report**

Section 2: Appendices



www.guard-archaeology.co.uk

Appendices

Appendix A: Desk-based Assessment of Ellemford Haugh

Executive Summary

- 1.1 GUARD Archaeology Limited was commissioned by Flodden 1513 Ecomuseum Limited, to undertake an archaeological desk-based assessment for Ellemford Haugh ahead of a geophysical survey as part of the Flodden 500 project.
- 1.2 This assessment indicates that the area around Ellemford is particularly rich in archaeological and historical sites. There is a potential for sub-surface remains to survive on the north and south bank of the former ford position depicted in 1862 and in the area of the former stepping stones on either side of the Whiteadder Water.

Introduction

- 2.1 In April 2012, Flodden 1513 Ecomuseum Limited, commissioned GUARD Archaeology Limited to undertake a desk-based assessment of Ellemford, The Scottish Borders (centred at NGR: NS 701 685). The area assessed is centred around a former ford and site of stepping stones which are shown on the OS first edition map (1862), with 'Elemford' also noted on Roy's map of lowland Scotland (1752-55). James IV's entire military force and artillery is said to have mustered at Ellem Kirk on 21st August 1513 having left Edinburgh on 17th August (Barr 2001). The ultimate destination was Lady Kirk and the target Norham Castle which lay either side of the Scottish border and the Tweed River. James IV was to take Norham Castle before going on to take further Castles and plunder several villages on his advance to begin the Battle at Flodden on 9th September 1513.

Legislative Background

- 3.1 ***The assessment has been carried out within the context of:***
 - The Historic Buildings and Ancient Monuments Act 1953, the Ancient Monuments and Archaeological Areas Act 1979, the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, the Town and Country Planning (Scotland) Act 1997 and the Planning etc (Scotland) Act 2006, and the Historic Environment (Amendment) (Scotland) Act 2011;
 - National cultural heritage policy, primarily as outlined in Scottish Planning Policy (SPP) Paragraphs 110-124: Historic Environment, the Scottish Historic Environment Policy (SHEP) 2009, Planning Advice Note 2/2011: Planning and Archaeology, and Historic Scotland's Managing Change in the Historic Environment guidance note series;
- 3.2 *Cultural heritage resources include sites with statutory and non-statutory designations, as defined in SPP. Sites with statutory designations include:*
 1. Scheduled Ancient Monuments;
 2. Listed Buildings;
 3. Conservation Areas; and
 4. Designated Wreck Sites.
- 3.3 *Sites with non-statutory designations include:*
 - World Heritage Sites;
 - Historic Gardens and Designed Landscapes;
 - Historic Battlefields; and
 - Other Historic Environment Interests.

Aims and Objectives

- 4.1 The aim of this study was to provide a broad understanding of the historical development of the area around the former Ellemford ford and stepping stones. More specifically this study aims to highlight the potential for as yet unidentified archaeological remains within that area, especially remains that may be associated with the mustering of military forces associated with advance of the Scottish army south to ultimately take part in the Battle of Flodden.
- 4.2 The specific objectives of the assessment were:
 - to identify any previously known archaeological monuments present within the proposed development area through a search of the National Monuments Record of Scotland and the local Sites and Monuments Records;
 - to identify any previously unknown archaeological sites through the examination of documentary and cartographic evidence and the undertaking of a walkover survey; and
 - to suggest specific areas of interest for geophysical survey and or further investigation.

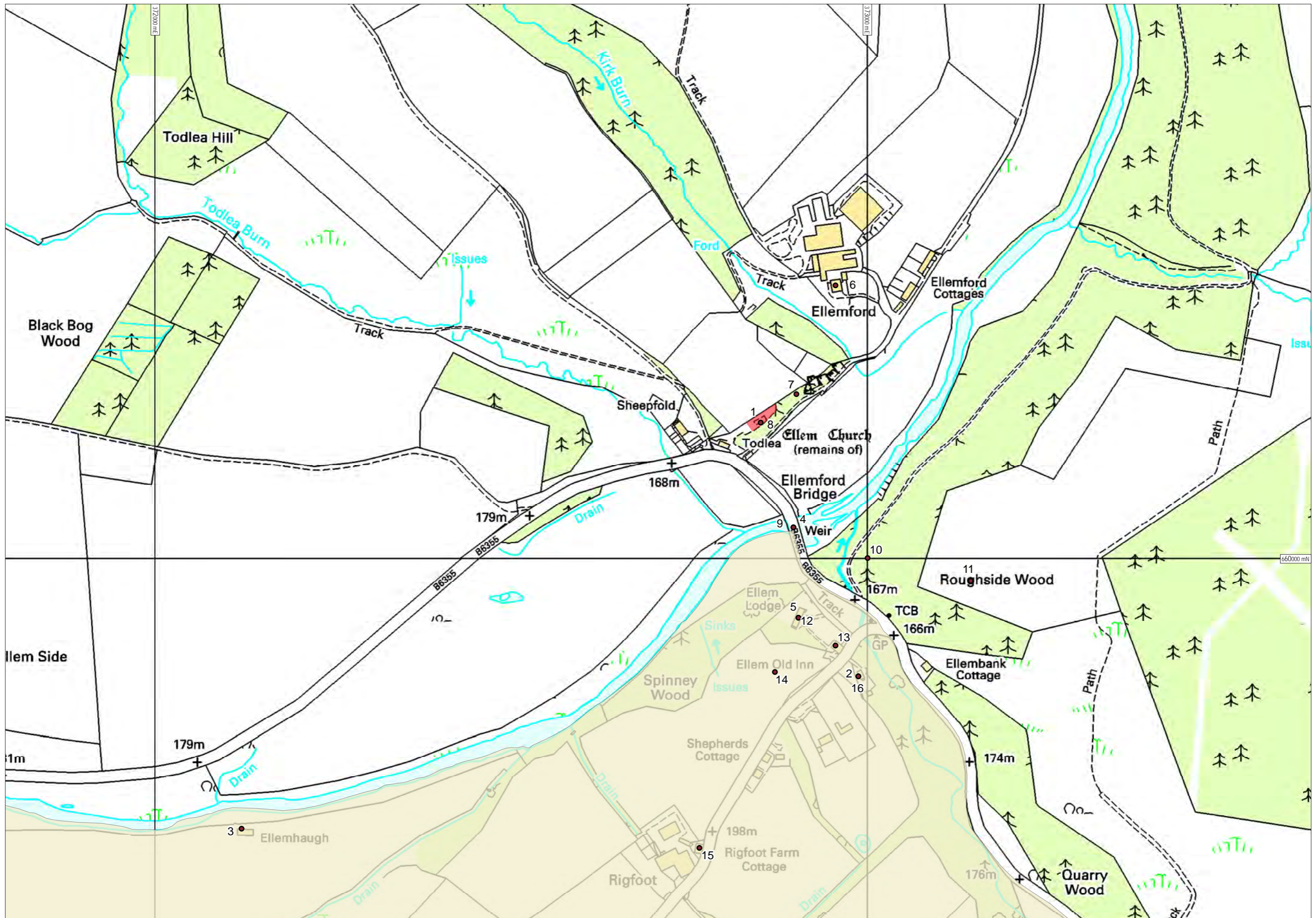
Methodology

- 5.1 The desk-based assessment covered the proposed development area and a radius of approximately 1km around the position of the former fording point (1862). This wider study area was deemed necessary in order to establish the local archaeological and historical context, and to provide a broader understanding of the historical development of the area proposed for survey and the potential for as-yet-unidentified archaeological remains within those areas.
- 5.2 The desk-based assessment of the study area employed the following methodology:
 - Information on Scheduled Ancient Monuments and Listed Buildings was obtained from PASTMAP (a map-enabled query system for Scottish National and Regional Archaeological and Architectural Datasets, maintained by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS));
 - The National Monuments Record of Scotland (NMRS), maintained by RCAHMS, was consulted through PASTMAP.
 - The local Sites and Monuments Record (SMR), maintained by The Scottish Borders Council, was consulted;
 - Pre-Ordnance Survey maps of the proposed development area, held by the National Library of Scotland (NLS), were identified and consulted on-line. Relevant maps range in date from the 16th to the 20th century.
 - First, second and subsequent editions of the Ordnance Survey maps of the area of interest, were identified and examined online via NLS website;
 - Readily accessible primary and secondary historical sources were consulted for information relating to the area's historical past, including details relating to earlier land-use;
 - Vertical aerial photographs, ranging from 1946 to 1988, held by the RCAHMS, were consulted;
 - A walkover survey of the proposed development area was carried out during the geophysical survey.

Baseline Assessment

Archaeological Background

- 6.1 A search of all online sources revealed that there are seventeen cultural heritage sites, which include four listed buildings, eleven NMR sites, one scheduled monument and one designed landscape within 1km of the former ford and stepping stones location in Ellemford. The details of these can be found in the gazetteer in Appendix B.
- 6.2 The scheduled monument of Ellem Church and burial ground, Index No. 12471 is situated approximately 130m north-north-west of the current Ellem bridge, which is in fact a Category



Key

- Archaeological sites
- Site 17 Designed landscape
- Site 1 Scheduled Ancient Monument

Figure 1:
Ellemford Survey locations



Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. All rights reserved. Licence number 100050699.

B listed building (HB NUM 205) dating to 1886. The site of Ellem Church survives as the largely turf-covered footprint and lower courses of a ruined building with associated burials and burial markers. The church sits on the edge of a hill at 175m OD overlooking the Whiteadder Water. The church lies in a naturally defensive position with a near vertical drop to the south and a steep ascent from the west (Brooke 2000).

- 6.3 The remaining sites were noted as probable 19-20th Century date, this included farm buildings and field enclosures. The exception to this was a Bronze Age short cist (NT75NW 2) containing a few fragments of decayed bone; this was discovered in the 'Cottage Knowe' field at Rigfoot farm in 1933 at the NGR of NT 7287 5984.

Cartographic and documentary sources

- 6.4 Ellemford was used previously by James IV in September 1496 as a muster point for his guns and troops ahead of raids in England; an attack was also made on Norham Castle during this campaign (Barr 2001). James IV and his army camped at Ellemford in 1496 and he met with his military commander in the church (Binnie 1995). While James IV's army camped he stayed in a local house paying the occupants £5 (MacDougall 1997). James IV and his army would have therefore been familiar with the route and muster point and also would have been practised in moving the large cannons over this route. This route is also part of a greater ancient road network between Haddington, Dunbar and Longformacus (Graham 1960).
- 6.5 The site of the ford at Ellemford offers a wide flat ellem 'haugh' (low-lying riverside meadow) to the south-west of the fording point stretching for 750m along the north bank with a further 350m extending north-east from the crossing. This would have given ample space for the mustering of thousands of personnel on the river banks. It is not certain how long the army may have spent at this location but considering that James IV's entire military force and artillery is said to have mustered at Ellem Kirk on 21st August 1513 having left Edinburgh on 17th August (Barr 2001), covering a straight line distance of 48 miles over undulating terrain, they were by no means taking their time.
- 6.6 The settlement and church was named as 'Alem' or 'Allem' is depicted from the sixteenth century on Gordon's maps of 1580-1661. A note on the National Archives of Scotland notes a 'Precept of warning by John, Earl of Mar, against pretended tenants and occupiers to remove themselves from his lands of Wester Skarhill, Ellemfurde [Ellemford] on 14th April 1617 (NAS), confirming there was settlement here at that time. The settlement was later called 'Alam' on Bleau's map of 1654. No fording point is noted on the Whiteadder Water at this time but an 'Alam furd' is noted just to the north of the church on Bleau's map.
- 6.7 On Roy's map of lowland Scotland (1752-55) 'Ellemford' is noted with a collection of three buildings and a small rectangular enclosure. From Taylor and Skinner's 'The Road from Haddington to North Berwick (1776) the crossing of the Whiteadder Water is shown with no note of a settlement or church. The position of the crossing of the river is consistent with the ford point shown on the first edition map of 1862 (Berwick Sheet IX. 12. Longformacus 1862). By Thomson's map of Berwickshire (1832) there is a small settlement noted at 'Elmford' but no church noted. As the church site went out of use in 1712 when the parishes of Ellem and Longformacus united it is not unusual that the church is neglected in Thomson's map.
- 6.8 The ford point shown on the OS first edition map of 1862 (Berwick Sheet IX. 12. Longformacus 1862) is in a position to the west of the existing bridge across the Whiteadder Water. There are three tracks shown radiating one to the north-west and two to the north-east from the stepping stones position across the river. The most westerly path shown is close to the position of the current bridge and appears to have led directly towards the stepping stones. The ford point shown on the first edition map of 1862 is approximately 85m to the south-west of the existing Ellemford Bridge (HB No. 205) and the most westerly path shown on the same first edition map (Berwick Sheet IX. 12. Longformacus 1862) would have been approximately 22m south-west from the position of the current bridge as are the stepping stones shown on the same edition.
- 6.9 By the time of the second edition OS map of the area (1899) the Ellemford Bridge is shown and the former fording point, stepping stones and the radiating tracks are all no longer shown. Ellemford remains relatively unchanged to the present day with no major developments or changes to the layout of the roads or river crossing.

Aerial Photography

- 6.10 A series of aerial photographs (APs) from 1946 to 1988 were consulted to determine if there were any features or crop-marks previously unknown in the area of the Ellem ford. Particular attention was paid to the area of the former crossing points of the ford and stepping stones as well the wider haugh area on the north bank. There was no evidence of any crop-marks that would suggest major sub-surface features or deposits. There was no evidence of the stepping stones that once crossed the Whiteadder Water, they were not visible on any APs, but this may be down to the resolution of the photographs.

Walkover Survey

- 6.11 No previously unrecorded archaeological remains were found. Fuller descriptions of the areas surveyed are included in the results section of the geophysical survey report.

Conclusions

- 7.1 This assessment indicates that due to limited disturbance in the area throughout the historic period there is a high potential for buried archaeological remains to survive within the geophysical survey area. The current crossing on the Ellemford Bridge did not impact upon the earlier ford point depicted in 1862 and appears to avoid the area of the stepping stones which lay to the east of the ford. It is likely then that there may be surviving archaeological remains in the ford crossing and stepping stones areas on either side of the Whiteadder Water in each location. Due to the volumes of military personnel that mustered here in August 1513 the evidence is likely to take the form of discarded or accidentally dropped refuse and munitions at the crossing. If the army had stayed for any length of time there may also be the remains of camp-fires and evidence of temporary structures present in the haugh area.

Appendix B: DBA References

Documentary Sources Consulted

Barr, N. 2001 *Flodden 1513- The Scottish Invasion of Henry VIII's England* (p. 64, 66), Tempus publishing, Gloucestershire

Binnie, G. A. C. 1995 *The Churches and Graveyards of Berwickshire*, Berwick Upon Tweed

Brooke, C. J. 2000 *Safe sanctuaries: security and defence in Angle-Scottish border churches 1290-1690*, Edinburgh

Cowan, I. B. 1967 *The parishes of medieval Scotland*, Scot. Rec. Soc., vol. 93, Edinburgh

Graham, A. 1960 *More Old Roads in the Lammermuirs* PSAS, Vol. 93 (1959-60), pps 217-35

MacDougall, N. 1997 *James IV- Stewart Dynasty in Scotland*, Tuckwell Press, Edinburgh

Cartographic Sources Consulted

Gordon, R. 1580-1661 A description of the province of the Merche

Blaeu J 1654 *Glottiana Praefectura Inferior*

Moll, H 1745 *Shire of Berwick*.

Roy, W 1747-55 *Military Survey of Scotland*.

Taylor, G. and Skinner, A. Survey and Maps of the roads of North Britain or Scotland (1776), 'The Road from Haddington to North Berwick'.

John Thomson's Atlas of Scotland 1832, Berwickshire.

Ordnance Survey 1862 *Six-Inch 1st edition maps of Scotland, Berwickshire Sheet IX*.

Ordnance Survey 1862 *Twenty five Inch 1st edition maps of Scotland, Berwick Sheet IX.8 Longformacus*.

Ordnance Survey 1908 *Twenty five Inch 2nd edition maps of Scotland, Berwickshire 009.08*

Aerial Photograph Sources

Sortie	Frames	Date	Reference
106G_UK_0020	-	1946	SB_000918
58_3262	-	1959	SB_002201
106G_UK_0015	6319	1946	SB_002853
CPE_UK_0347	5010	1948	SB_002891
ASS_518_88	60, 61, 62	1988	SB_003173
OS65_100	150, 151, 152	1965	SB_003784
OS70_364	81, 82, 131, 132, 133	1970	SB_004060
OS75_066	95, 96	1975	SB_004485

Online Sources Consulted

<http://www.rcahms.gov.uk>

<http://www.nls.uk/collections/maps/index.html>

<http://edina.ac.uk/stat-acc-scot/>

<http://www.nas.gov.uk>

Appendix C: Survey Sources

Documentary Sources

Pearson, T & Ainsworth, S. 2002. Norham Castle, Northumberland. Archaeological Investigation Report Series AI/25/2002. York

Cartographic Sources

Gordon, R 1636-52. A description of the province of the Merche (manuscript)

Pont, T 1654. Merce or Sherrefdome of Berwick. Amsterdam

Moll, H 1745. The Shire of Berwick. London

Roy, W 1747-55. Military map of Scotland

Armstrong A & Armstrong, M 1771. Map of the County of Berwick. London

Taylor, G & Skinner, A 1776. The Road from Berwick to Hawick. London

Blackadder, J 1797. Berwickshire. Edinburgh

Thomson, J 1820. Berwickshire. Edinburgh

Greenwood, C & Fowler, W 1826. The County of Berwick. London

Ordnance Survey 1858. Berwickshire Sheet XXIII.7 Ladykirk 25" to the mile

Ordnance Survey 1862. Berwickshire Sheet IX.8 Longformacus 25" to the mile

Ordnance Survey 1862. Berwickshire Sheet IX.12 Longformacus 25" to the mile

Ordnance Survey 1862. Berwickshire Sheet X.5 Dunse 25" to the mile

Ordnance Survey 1862. Berwickshire Sheet X.5 Longformacus 25" to the mile

Ordnance Survey 1900. Berwickshire Sheet IX.NE 6" to the mile

Ordnance Survey 1900. Berwickshire Sheet X.N 6" to the mile

Ordnance Survey 1908. Berwickshire Sheet 023.07 Ladykirk 25" to the mile

On-line Sources

National Library of Scotland map collection: <http://geo.nls.uk/>

British Geological Survey: <http://bgs.ac.uk>

Satellite imagery was accessed via Google Earth

Appendix D: National Archives of Scotland

GD124 Papers of the Erskine Family, Earls of Mar and Kellie 1189-1957

GD124/6 Judicial, 1371-1887 1371-1887

Country code GB

Repository code 234

Repository National Archives of Scotland

Reference GD124/6/56

Title Precept of warning by John, Earl of Mar, against pretended tenants and occupiers to remove themselves from his lands of Wester Skarhill, Ellemfurde [Ellemford], and others in the barony and parish of Ellem and sheriffdom of Berwick.

Dates 14 Apr 1617

Appendix E: Gazetteer Of Cultural Heritage Sites

Scheduled Monuments

Site No. 1

Site Names: Ellem Church, Church And Burial Ground; Todlea; Ellemford

Site type: Burial Ground, Church

SAM Index No.: 12471

Canmore ID: 58787

Site Number: NT76SW 4

NGR: NT 7285 6019

Council: The Scottish Borders

Description: Scheduled as 'Ellem Church, church and burial ground... the former parish church of Ellem and an associated burial ground surrounding the structure' Information from Historic Scotland, scheduling document dated 18 January 2010.

Noted in 13th Century and situated at 175m OD overlooking the Whiteadder Water. Survives as largely turf covered footprint and lower courses of a ruined building with associated burials and burial markers. The church went out of use in 1712 when the parishes of Ellem and Longformacus united.

Listed Buildings

2. Woodside Cottage including Sundial

HB Number 10781 Item Number: 29 - Group with Items:

Map sheet: Category: C(S)

Group Category:

Date of Listing 19-AUG-1998

Description: Late 18th to early 19th century; possibly George Fortune, architect, Duns, alterations and embellishments 1894. Asymmetrical single storey, single storey with attic and 2 storey, 4-bay former estate dwelling with later lean-to addition recessed to outer left. Harled; sandstone ashlar dressings (droved in part). Crowstepped gables; rounded angles; stop-chamfered sandstone margins; flush sandstone cills.

3. Ellemhaugh Smithy including House, ancillary structure (former henhouse, byre and stable) and former Smithy

HB Number 10782

Category: C(S)

Date of Listing 19-AUG-1998

Description: Late 18th to early 19th century; possibly George Fortune, architect, Duns, raised to include attic and altered 1899. Symmetrical single storey with attic, 3-bay house with bowed stair tower centred at rear; single storey, 4-bay ancillary structure (former hen house, byre and stable) adjoined to left; single storey, 2-bay wing (former smithy) beyond. Harl-pointed rubble (predominantly sandstone) to house; some rendered pointing at upper floor; droved and stugged sandstone dressings; harled elevation to E. Rubble quoins at ground; sandstone margins; tooled long and short sandstone surrounds to stair opening; sandstone mullions to bipartites; projecting cills. Harl pointed rubble to adjoining ancillary structure and smithy.

4. Ellemford Bridge

HB Number 205

Category: B:

Date of Listing 10-DEC-1997

Description: Dated 1886 with later repairs. 3-arch bridge spanning Whiteadder Water. Heavily-pointed rubble sandstone to inner elevations; squared and snecked tooled sandstone to outer elevations; tooled and polished sandstone dressings; rendered bases to piers. Polished voussoirs to segmental-arches; coursed abutments; coursed soffits; intermediate piers with curved cutwater buttresses; paired pilasters advanced to outer ends; polished string courses marking flat deck. Sandstone plaque centred in E wall inscribed "Erected by the Berwickshire Road Trustees, John Turnbull Esq.... 1886"; round-arched coping to parapet walls (splayed at either end).

5. Ellem Lodge including boundary walls, gatepiers and gates

HB Number 8346

Category: B

Date of Listing 09-JUN-1971

Description: Late 18th to early 19th century with later additions and alterations. 2 storey circular-plan house with single storey, and single storey with basement, flanking wings set on sloping site; single storey, 3-bay wing incorporating gabled porch to front; bowed projection at rear. Whitewashed harl; some painted margins; flush cills; sandstone dressings to porch addition.

NMRS List

6. Ellemford Farmhouse

Canmore ID 95554

Site Number NT76SW 19

NGR NT 72955 60383

Council SCOTTISH BORDERS, THE

Parish CRANSHAWS

7. Ellemford Copper Mine

Canmore ID 71562

Site Number NT76SW 15

NGR NT 7290 6023

Council SCOTTISH BORDERS, THE

Parish CRANSHAWS

8. Ellem Church, Church And Burial Ground; Todlea; Ellemford

Canmore ID 58787

Site Number NT76SW 4

NGR NT 7285 6019

Council SCOTTISH BORDERS, THE

Parish CRANSHAWS

9. Ellem bridge

Canmore ID 58782

Site Number NT76SW 10

NGR NT 72896 60043

Council SCOTTISH BORDERS, THE

Parish CRANSHAWS

10. Ellem Fishing Club

Canmore ID 95550

Site Number NT76SW 26

NGR NT 73 60

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

11. Vegetation Marks

Canmore ID 58791

Site Number NT76SW 8

NGR NT 73145 59968

Council SCOTTISH BORDERS, THE

Parish DUNS

Notes: Vegetation marks recorded on oblique aerial photographs (RCAHMSAP 1983) are mushroom rings - or 'fairy rings'.

Information from RCAHMS (DCC) 17 October 2007

12. Ellemford Lodge

Canmore ID 219132

Site Number NT75NW 42

NGR NT 72903 59916

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

13. Ellem Old Inn; Ellem Lodge, Stables

Site type COTTAGE, INN

Canmore ID 277421

Site Number NT75NW 47

NGR NT 72955 59877

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

14. Bronze Age Cist, Rigfoot

Canmore ID 58621

Site Number NT75NW 2

NGR NT 7287 5984

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

Notes: In February 1933, a Bronze Age short cist containing a few fragments of decayed bone was discovered in the 'Cottage Knowe' field at Rigfoot farm. This field is the first on the left hand side of the Ellemford-Longformacus road after passing Ellem Cottage (NT 7290 5991). The cist's location was on the brow of the bank overlooking Ellem Cottage and c 25 yds from the above-mentioned road.

A Falconer 1935.

The probable site of this cist is NT 7287 5984, located by topo description above. No further information was obtained.

Visited by OS(JFC) 16 December 1954.

No change.

Visited by OS(RD) 12 August 1970

Listed.

RCAHMS 1980.

15. Ellemford Estate; Rigfoot Farm

Canmore ID 217914

Site Number NT75NW 41

NGR NT 72764 59593

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

16. Woodside Cottage With Sundial On South Corner

Site type COTTAGE, SUNDIAL

Canmore ID 58626

Site Number NT75NW 7

NGR NT 72987 59834

Council SCOTTISH BORDERS, THE

Parish LONGFORMACUS

Gardens and Designed Landscapes

17. Whitchester Walled Gardens, Greenhouses and surrounding designed landscape (344 hectares)

Parish: LONGFORMACUS

County: SCOTTISH BORDERS, THE

Grid reference: NT719589

Map reference: [EPSG:27700] 371931, 658964

Subject: GREENHOUSE; WALLED GARDEN;

Identifiers:

- [ADS] Depositor ID - NT75NW 32.1
- [ADS] Import RCN - RCAHMS06-150765

Appendix F: DES entry

LOCAL AUTHORITY:	The Scottish Borders
PROJECT TITLE/SITE NAME:	Flodden 500 Geophysical Survey
PROJECT CODE:	3508
PARISH:	Ladykirk and Cranshaws
NAME OF CONTRIBUTOR(S):	Christine Rennie
NAME OF ORGANISATION:	GUARD Archaeology Limited
TYPE(S) OF PROJECT:	Geophysical and topographic survey
NMRS NO(S):	NT84NE 54
SITE/MONUMENT TYPE(S):	Animal byre
SIGNIFICANT FINDS:	N/A
NGR (2 letters, 6 figures)	NT 89036 47682 (Ladykirk) and NT 72729 60029 (Ellemford)
START DATE (this season)	3rd May 2012
END DATE (this season)	24th May 2012
PREVIOUS WORK (incl. <i>DES</i> ref.)	None known
MAIN (NARRATIVE) DESCRIPTION: (May include information from other fields)	A geophysical survey was carried out by GUARD Archaeology Limited on behalf of Flodden 1513 Ecomuseum Limited over two locations associated with the Battle of Flodden. At Ladykirk, portions of three fields were surveyed and four possible artillery emplacements, four trackways, a possible prehistoric ring-ditch and the remains of three buildings were recorded. The survey at Ellemford Haugh recorded a possible earthwork, an old water channel, a structure and areas of burning that may be associated with the muster of the Scottish army.
PROPOSED FUTURE WORK:	To be confirmed
SPONSOR OR FUNDING BODY:	Flodden 1513 Ecomuseum/ Heritage Lottery Fund
CAPTION(S) FOR ILLUSTRS:	None
ADDRESS OF MAIN CONTRIBUTOR:	52 Elderpark Workspace, 100 Elderpark Street, Glasgow, G51 3TR
EMAIL ADDRESS:	christine.rennie@guard-archaeology.co.uk
ARCHIVE LOCATION (intended/deposited)	The archive will be deposited with NMRS.

GUARD Archaeology Limited
52 Elderpark Workspace
100 Elderpark Street
Glasgow
G51 3TR

Tel: 0141 445 8800

Fax: 0141 445 3222

email: info@guard-archaeology.co.uk



www.guard-archaeology.co.uk