

ARCHAEOLOGICAL
SERVICES
DURHAM UNIVERSITY

on behalf of
The National Trust

Seaton Delaval Hall
Seaton Sluice
Whitley Bay
Northumberland

geophysical surveys

report 2899
May 2012

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1. Summary

The project

- 1.1 This report presents the results of geophysical surveys conducted at Seaton Delaval Hall, Northumberland, as part of ongoing research and development of the National Trust property. The works comprised detailed geomagnetic and earth electrical resistance survey of three areas of garden to the south-west of the Hall.
- 1.2 The works were commissioned by The National Trust and conducted by Archaeological Services Durham University.

Results

- 1.3 Former garden features such as paths and tracks have been identified in Area 1, as shown on early Ordnance Survey maps. Some features identified in Area 2 might also relate to earlier garden designs.
- 1.4 Probable soil-filled ditches or gullies have been identified in Areas 1 and 2. These may reflect former garden features or earlier phases of activity at Seaton Delaval.
- 1.5 Possible structural remains have been identified in Areas 1 and 3. A probable brick wall-footing in the east of Area 1 corresponds to a boundary shown on early OS maps, however, other possible structures would be more likely to reflect earlier activity at the site. Broader areas of stone or rubble, which may be related to former structures or gardening practices, have been detected in each area.
- 1.6 Probable services have been detected in Areas 1 and 3.

2. Project background

Location (Figure 1)

- 2.1 The survey areas were located to the south and south-west of Seaton Delaval Hall, Seaton Sluice, near Whitley Bay, Northumberland (NGR centre: NZ 3225 7650). Both geomagnetic and earth resistance surveys were conducted over three areas: Area 1, the south-west gardens between the parterre and the church; Area 2, the lawn around the weeping ash tree; and Area 3, the lawn to the south of the South Portico.



Aerial view of the hall and survey areas from the east (© Mark Houshold)

Project background and objectives

- 2.2 Seaton Delaval Hall was acquired by the National Trust in 2009 and is currently undergoing a major conservation and renovation project. Part of these works will include the laying of a new electricity supply cable.
- 2.3 The principal aim of the surveys was to assess the nature and extent of any sub-surface features of potential archaeological significance which may be impacted upon by the new cable route, specifically features relating to: a) the deserted medieval village; b) the supposed castle shown by the Ordnance Survey (OS); c) the pre-1700 mansion complex. A secondary aim was to provide training as part of Continuing Professional Development for National Trust staff.

Methods statement

- 2.4 The surveys have been undertaken in accordance with a brief provided by the National Trust Archaeological Consultant (Appendix) and to national standards and guidance (below, para. 5.1).
- 2.5 Due to access restrictions concerning the western area shown in the Project Brief, this area was not surveyed. Two smaller areas to the south of the rose garden and the Hall's central block were substituted at the verbal instruction of the National Trust Archaeological Consultant whilst on site.

Dates

- 2.6 Fieldwork was undertaken on 18th and 19th April 2012. This report was prepared for 10th May 2012.

Personnel

- 2.7 Fieldwork was conducted by Duncan Hale and Richie Villis with training provided to Kate Phillips of The National Trust. The geophysical data were processed by Richie Villis. This report was prepared by Richie Villis and Duncan Hale with illustrations by David Graham. The Project Manager was Duncan Hale.

Archive/OASIS

- 2.8 The site code is **WSD12**, for **Whitley Bay Seaton Delaval 2012**. The survey archive will be supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **Online AccesS** to the **Index of archaeological investigationS** project (**OASIS**). The OASIS ID number for this project is **archaeol3-124068**.

3. Historical and archaeological background

Previous works

- 3.1 Archaeological Services Durham University conducted a programme of geophysical and topographic survey in 2011 (Archaeological Services 2011a & 2011b). The surveys around the central block concluded the following:
- 3.2 The earth resistance technique almost certainly detected the partial remains of the stone wall foundations for the former east wing, as shown on early OS maps. No such features were detected on the west side. Further areas of stone and rubble were detected in other parts of the surveys.
- 3.3 The remains of smaller rectilinear structures may also have been detected in the northern part of the eastern surveys, though on a different alignment to the existing buildings.
- 3.4 The remains of two tracks and a possible associated wall were identified in the eastern surveys. These correspond to features shown on early OS editions.
- 3.5 Two possible narrow ditches have been detected in the western surveys.
- 3.6 Other geophysical anomalies almost certainly reflect items of building and gardening debris and three possible services.
- 3.7 Archaeological Services Durham University also conducted an archaeological survey of approximately 162ha of the estate (Archaeological Services 2011c) as part of the preparation of a Parkland and Landscape Plan for Seaton Delaval Hall. The survey comprised a search of pertinent records, the compilation of a gazetteer of over 90 archaeological and historic features, an assessment of the condition of individual features and recommendations for their future management.
- 3.8 A building survey of the mausoleum and ha-ha was carried out by the RCHME in 1994 (Northumberland Historic Environment Record reference 13469).

General background

- 3.9 The Hall itself is a Grade I listed country house built between 1718 and 1728, and is a great English baroque villa designed by Sir John Vanbrugh for Admiral George Delaval. Much of the following background is from National Trust and Wikipedia internet resources. Additional background material is provided in our archaeological survey report (Archaeological Services 2011c).
- 3.10 The Delaval family had owned the estate since the time of the Norman Conquest. Coming from Le Mans in France, the De La Vals were loyal supporters of William the Conqueror and were gifted land in Northumberland in the 1080s as a reward for helping him at the Battle of Hastings.
- 3.11 The Church of Our Lady, which stands just to the south of Area 1, was built in the early 12th century. The medieval village of Seaton Delaval may have stood around this chapel. Ridge and furrow earthworks are evident elsewhere on the estate. A single medieval reference also mentions a castle at Seaton Delaval, the possible site of which is shown from 1860 by the OS. This castle may have evolved into the first hall, which was extensively improved in 1628.
- 3.12 Admiral George Delaval, having made his fortune from bounty while in the navy, purchased the estate from an impoverished kinsman. Calling on the services of architect John Vanbrugh in 1718, the Admiral had originally wanted to modernise and enhance the existing mansion, but upon viewing the site Vanbrugh felt he could do nothing and advised complete demolition of all except the ancient chapel near to the mansion, which is now the parish church of Our Lady. The works were completed in 1728, two years after the death of the Admiral, with the resulting new mansion the last country house Vanbrugh designed; it is regarded as his finest work.
- 3.13 On completion, the Admiral's nephew Francis had inherited the property, and moved in immediately. However, in 1822 the central block was gutted by fire, said to have been caused by jackdaws nesting in the chimneys of the section of the east wing closest to the main house. This wing was subsequently demolished and various openings can still be identified to show where it joined the central block. Ruins of this wing are shown on OS maps published from the 1850s until 1881.
- 3.14 The house was partially restored in 1862–63, when the central block was re-roofed, although it remained a shell internally. The effects of the fire are still clearly visible in the great hall, originally 30 feet (9.1 m) high but still open to the roof, with blackened walls and muse statues. Further restoration was undertaken by Lord and Lady Hastings in 1959 and the early 1960s, including replacement of windows in the central block, restoration of the upstairs gallery in the main hall and paving of the floors on the piano nobile. However, the house was to remain unoccupied until the 1980s. The National Trust bought the property in December 2009.
- 3.15 The gardens were designed in 1947 by James Russell and were enhanced by the late Lady Hastings. Also in the 162ha estate park is a stone mausoleum, about half a mile east of the hall, with a majestic dome and a portico resting on huge monoliths. It was erected by Lord Delaval to his only son, John, who died in 1775 aged 20, “as a result of having been kicked in a vital organ by a laundry maid to whom he was paying his addresses”. The mausoleum is now ruinous and its lead roof has gone. Also to the east in the park is an orangery crowned by cherubs and leaden statuary groups; one of these shows a slight figure of David, with empty sling, lightly poised above the

crouching form of Goliath, who has his thumbs doubled inside his palms, a Northumbrian precaution against witchcraft. A large obelisk commands the fields to the south of the hall; the stub of a second can be found on the north side of the road running past the hall, next to the turning for New Hartley. This second obelisk marked the site where Admiral George Delaval was killed in a fall from his horse in 1723, before his new hall had been completed. Only the pedestal of the obelisk survives, half-hidden by trees; it is uninscribed.

4. Landuse, topography and geology

- 4.1 The survey areas comprised three lawned gardens at Seaton Deleval Hall. Area 1 comprised an informal garden of lawn, shrubs and trees, including large rhododendron bushes, a covered walkway and a summerhouse. Area 2 comprised the hemispherical lawn around the weeping ash tree to the immediate south-west of the Hall. Area 3 comprised the lawn to the immediate south of the South Portico, bounded by an iron fence to the south.
- 4.2 The survey areas were predominantly level with a mean elevation of approximately 34m OD. Area 1 contained some irregular undulating earthworks.
- 4.3 The underlying solid geology of the area comprises Carboniferous strata of the Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone), which are overlain by Devensian till.

5. Geophysical survey Standards

- 5.1 The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) *Standard and Guidance for archaeological geophysical survey* (2011); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Guide to Good Practice: Geophysical Data in Archaeology* (Schmidt & Ernenwein 2011).

Technique selection

- 5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.
- 5.3 In this instance, based on Ordnance Survey and documentary evidence, it was considered likely that cut features such as ditches and pits might be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) might also be present.

- 5.4 Given the anticipated depth of likely targets, and the non-igneous geological environment of the study area, both a geomagnetic technique (fluxgate gradiometry) and an electrical resistance technique were considered appropriate for detecting the types of feature mentioned above.
- 5.5 Fluxgate gradiometry involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.
- 5.6 Earth electrical resistance survey can be particularly useful for mapping stone and brick features. When a small electrical current is injected through the earth it encounters resistance which can be measured. Since resistance is linked to moisture content and porosity, stone and brick features will give relatively high resistance values while soil-filled features, which typically retain more moisture, will provide relatively low resistance values.

Field methods

- 5.7 A 20m grid was established across each survey area and related to known, mapped Ordnance Survey points using a Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.
- 5.8 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 20m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval was 0.125m and the traverse interval was 1m, thus providing 3,200 sample measurements per 20m grid unit.
- 5.9 Measurements of earth electrical resistance were determined using Geoscan RM15D resistance meters and MPX15 multiplexers with a mobile twin probe separation of 0.5m. A zig-zag traverse scheme was employed and data were logged in 20m grid units. The instrument sensitivity was 0.5ohm, the sample interval was 0.5m and the traverse interval was 1m, thus providing 800 sample measurements per 20m grid unit.
- 5.10 Data were downloaded on site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

- 5.11 Geoplot v.3 software was used to process the geophysical data and to produce both continuous tone greyscale images and trace plots of the raw (minimally processed) data. The greyscale images and interpretations are presented in Figures 3-5; the trace plots are provided in Figure 6. In the greyscale images, positive magnetic and high resistance anomalies are displayed as dark grey while negative magnetic and low resistance anomalies are shown as light grey. Palette bars relate the greyscale intensities to anomaly values in nanoTesla/ohm, as appropriate.

5.12 The following basic processing functions have been applied to the geomagnetic data:

<i>clip</i>	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
<i>zero mean traverse</i>	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
<i>destagger</i>	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
<i>interpolate</i>	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.125m x 0.25m intervals

5.13 The following basic processing functions have been applied to the resistance data:

<i>add</i>	adds or subtracts a positive or negative constant value to defined blocks of data; used to reduce discontinuity at grid edges
<i>despike</i>	locates and suppresses spikes in data due to poor contact resistance
<i>interpolate</i>	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

Interpretation: anomaly types

5.14 Colour-coded geophysical interpretations are provided. Three types of geomagnetic anomaly have been distinguished in the data:

<i>positive magnetic</i>	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
<i>dipolar magnetic</i>	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

5.15 Two types of resistance anomaly have been distinguished in the data:

<i>high resistance</i>	regions of anomalously high resistance, which may reflect foundations, tracks, paths and other concentrations of stone or brick rubble
<i>low resistance</i>	regions of anomalously low resistance, which may be associated with soil-filled features such as pits and ditches

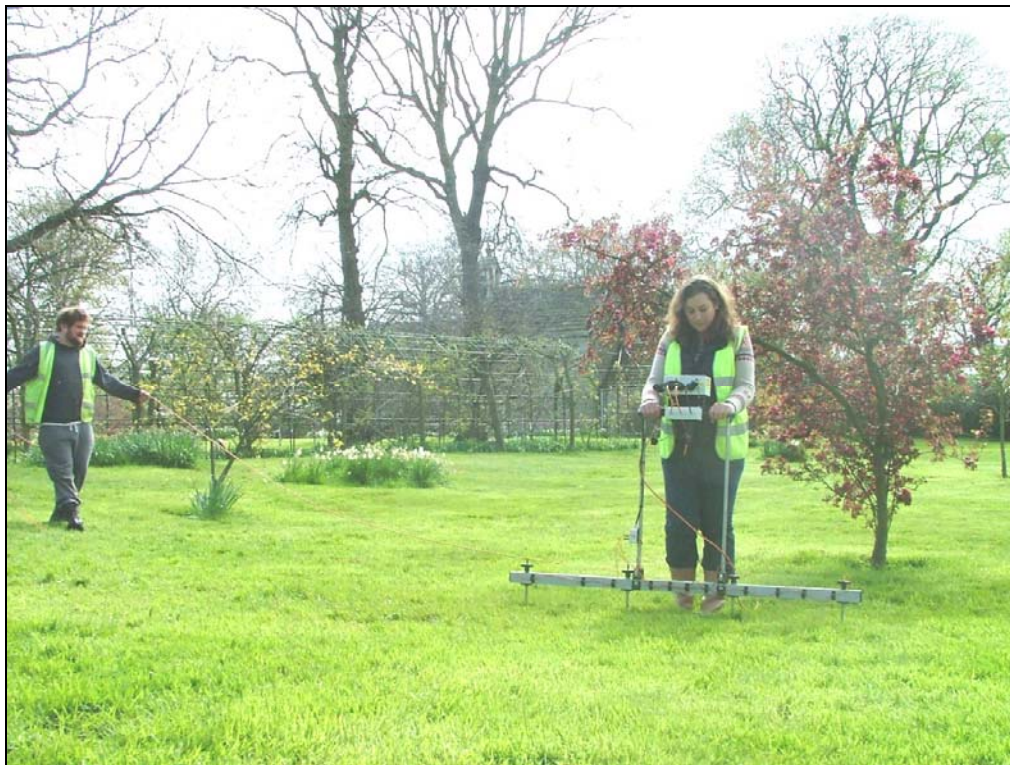
Interpretation: features

General comments

- 5.16 A colour-coded archaeological interpretation plan is provided.

Area 1

- 5.17 A number of linear positive and dipolar magnetic anomalies have been detected across the central part of the survey area, aligned broadly east-west, which broadly correspond to areas of high and low earth electrical resistance. These almost certainly reflect the remains of former tracks or paths through the garden as shown on OS maps from 1897 to 1941. Similar anomalies were detected in the previous surveys conducted to the east of the hall (Archaeological Services 2011a & 2011b).
- 5.18 A broadly north-west/south-east aligned high resistance anomaly, corresponding to a chain of dipolar magnetic anomalies, has been detected in the east of the survey area. These anomalies probably reflect the location of a brick-built wall footing; a boundary feature is shown here by the OS until as late as 1941.
- 5.19 A north-south aligned positive magnetic anomaly has been detected in the west of the area. This almost certainly reflects a soil-filled ditch feature, which may be related to previous garden features or earlier activity at the site.
- 5.20 Large areas of anomalously high electrical resistance have been detected across this area, particularly in the west. These may reflect the presence of stone or rubble. A roughly rectilinear, particularly high, electrical resistance anomaly has been detected. This could reflect structural remains, such as wall footings. A slight negative magnetic anomaly corresponds to one of the possible wall-footings. A similar but smaller and weaker resistance anomaly was also detected immediately west of the larger possible structure.



Earth electrical resistance survey in Area 1, looking south-east

- 5.21 Other high resistance anomalies which may reflect further structural remains have been detected in the north-eastern corner of this area, including what appears to be one end of a well-defined rectangular feature. The anomaly probably reflects stone rather than fired brick, due to the general absence of corresponding geomagnetic anomalies. This resistance anomaly could possibly reflect a floor or yard surface.
- 5.22 A chain of dipolar magnetic anomalies has been detected aligned broadly north-east/south-west, parallel to the hedge along the northern edge of the area. This broadly corresponds to a linear low resistance anomaly and almost certainly reflects a service, probably either a cable associated with the summerhouse or a narrow pipe associated with the adjacent water feature.
- 5.23 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, which in most cases have little or no archaeological significance. A sample of these is shown on the geophysical interpretation plan, however, they have been omitted from the archaeological interpretation plan. Several intense dipolar magnetic anomalies surround the summerhouse. The two intense linear magnetic anomalies with dummy values in between reflect an existing north-south aligned pergola in the central part of this garden. A cluster of particularly strong dipolar magnetic anomalies just west of the pergola corresponds to a few small low resistance anomalies and is likely to reflect the location of ferrous waste.

Area 2

- 5.24 A north-south aligned positive magnetic and low resistance anomaly has been detected across the centre of this area, immediately west of the weeping ash tree. This may reflect a soil-filled ditch feature.



Earth electrical resistance survey in Area 2, looking west

5.25 A broadly rectilinear positive magnetic anomaly has been detected in this area. This may reflect a series of soil-filled ditches or gullies, possibly relating to a former garden layout.

5.26 Large areas of high resistance anomalies have been detected. These may reflect areas of stone or rubble.

Area 3

5.27 As in Areas 1 and 2, areas of high resistance anomalies have been detected which are likely to reflect the presence of stone or rubble. A relatively well-defined, narrow high resistance anomaly has been detected at the eastern end of the area, which may reflect structural remains.

5.28 A broadly north-east/south-west aligned low resistance anomaly, which corresponds to an intense dipolar magnetic anomaly, has been detected in the west of the area. This probably reflects a service.

5.29 The large and strong dipolar magnetic anomaly along the southern edge of the survey reflects an adjacent iron fence. High concentrations of dipolar magnetic anomalies have been detected here, which are likely to reflect concentrations of ferrous and/or fired waste.



Geomagnetic survey outside the South Portico in Area 3, looking north

6. Conclusions

- 6.1 Two complementary geophysical survey techniques, fluxgate gradiometry and earth electrical resistance, have been undertaken in the gardens to the south-west of Seaton Delaval Hall in Northumberland.
- 6.2 Former garden features such as paths and tracks have been identified in Area 1, as shown on early OS maps. Some features identified in Area 2 might also relate to earlier garden designs.
- 6.3 Probable soil-filled ditches or gullies have been identified in Areas 1 and 2. These may reflect former garden features or earlier phases of activity at Seaton Delaval.
- 6.4 Possible structural remains have been identified in Areas 1 and 3. A probable brick wall-footing in the east of Area 1 corresponds to a boundary shown on early OS maps, however, other possible structures would be more likely to reflect earlier activity at the site. Broader areas of stone or rubble, which may be related to former structures or gardening practices, have been detected in each area.
- 6.5 Probable services have been detected in Areas 1 and 3.

7. Sources

- Archaeological Services 2011a *Seaton Delaval Hall pleasure grounds, Seaton Sluice, Whitley Bay, Northumberland: geophysical and topographic surveys*. Unpublished report **2662**, Archaeological Services Durham University
- Archaeological Services 2011a *Seaton Delaval Hall central block, Seaton Sluice, Whitley Bay, Northumberland: geophysical surveys*. Unpublished report **2663**, Archaeological Services Durham University
- Archaeological Services 2011c *Seaton Delaval Hall, Northumberland: archaeological survey*. Unpublished report **2760**, Archaeological Services Durham University
- David, A, Linford, N, & Linford, P, 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage
- Gaffney, C, Gater, J, & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*. Technical Paper **6**, Institute of Field Archaeologists
- IfA 2011 *Standard and Guidance for archaeological geophysical survey*. Institute for Archaeologists
- Schmidt, A, & Ernenwein, E, 2011 *Guide to Good Practice: Geophysical Data in Archaeology*. Archaeology Data Service

Appendix: Project brief

RCSILT

NT Consultancy: Archaeology

Yorkshire and the North-East

Archaeological Project Brief

Project name

Geophysical Survey, south-west gardens and adjoining field

Non-technical summary

To undertake geophysical surveys to determine whether identifiable archaeological remains of a) the deserted medieval village, b) the supposed castle (site marked by OS) or the pre-1700 mansion complex exist in this area. This information will be used to assess the least damaging route for a new electricity supply cable.

The project will also provide an element of CPD for NT staff, and engagement with the public.

Site Description

Seaton Delaval Hall, Sir John Vanbrugh's most successful country house, lies between Seaton Delaval and Seaton Sluice in southern Northumberland. Acquired by the National Trust in 2009, the property is now undergoing a major conservation and renovation project, facilitating its long term enjoyment by the local and regional population.

The site to be examined lies to the south-west of the mansion. The larger of the two areas (c. 5250 square metres) lies within the bastioned enclosure designed by Vanbrugh around the mansion. This area is now largely an informal garden, mainly laid down to lawn, specimen trees, paths, shrubbery and one more formal feature. The smaller adjoining area (c.2000 square metres) is a pasture lying just to the west, outside the ha-ha. The southern limit of the site is the boundary with the area occupied by the church of Our Lady, its access and graveyard.

Archaeological and planning background :

Relatively little is known, though much suspected, about the archaeology of this area. There was a medieval village at Seaton Delaval, attested in documentation and, presumably, by surviving blocks of ridge and furrow cultivation elsewhere on the estate (especially to the east and south of the present site). The supposition that it was sited in this area is not unreasonable, given the early date of the church, and the not unreasonable assumption that it started out life as a parish church located within the environs of the village.

A single medieval reference mentions a castle at Seaton Delaval, of which we know nothing else, other than the fact that from 1860 the Ordnance Survey mark "castle, site of", adjacent to the church (originally to the WSW and later to the NW), on its coverage.

It is certainly possible that the principal residence of the village was made defensible, and that it was this that became the first Seaton Delaval Hall. Of that structure a little more is known, including a description (from 1628) of the extensive improvements (including building works) to the house and its gardens carried out in the previous generation. This too may involve the area under study, but there is no conclusive evidence to this effect.

There are notable, but largely asystematic, undulations across this area that have been considered, potentially, to relate to the archaeology described above. There is nothing on the (limited) extant map coverage to provide an alternative explanation for their origin.

The smaller area, to the west, may provide evidence relating to the medieval village or the early manorial complex. It has another layer of activity to consider too; the earliest map coverage (the estate plan of 1808), shows an east-west alignment of cottages running along the northern edge of this area, with now vanished enclosures and buildings to the south. These are reflected, in various forms, on OS coverage up until the 1:2500 edition of 1960-61.



Estate plan of 1808

Outline of required methodology:

The project requires the collation of geophysical survey data optimally likely to identify remains relating to the archaeological potential described above, recorded with a geographical accuracy such that anomalies can be identified on the ground within 10cm. The choice of geophysical techniques will be advised by the contractor, marrying our current understanding of the site with optimising results and cost-effectiveness.

The contractor will also be asked to provide 1 day of hands-on experience of geophysical survey for an NT employee, and – potentially – to provide a 30-minute talk on geophysics to the estate team.

The contractor, working in collaboration with NT staff may also be asked to contribute to the development of interpretation materials for site display and/or media briefings.

The Archaeological Contractor will -

- a) Produce a detailed project design responding to the outline above, consistent with standards outlined in IFA guidance.
- b) Familiarise with existing data, and develop the programme of works in consultation with NT staff. Form a project team with NT staff.
- c) Contribute to the design of pre-event publicity and interpretation materials
- d) Carry out the works survey works on site to an agreed timetable
- e) Deliver agreed public engagement elements.
- f) Report findings. *Reporting is required to i) provide identification of the precise location and assumed nature of significant anomalies; ii) provide a permanent record of the archaeological survey undertaken, and iii) provide source material from which the impacts of future management of this area may be determined.*

Survey practices will be of a high professional standard, consistent with published IFA Standards and Guidance, and National Trust archaeological policies.

Outline of managerial parameters:

The archaeological project will be directly managed by the National Trust's Archaeological Consultant, in a consultant role. The archaeological contractor will also be accountable to the property team at Seaton Delaval Hall.

Whilst on NT land, the contractor's staff will be expected to confirm to NT bye-laws. For the purposes of the Treasure Act, 2003 (and for no other purposes) they will be deemed to be archaeologists in the employ of the National Trust. The Contractor shall have full responsibility for the Health and Safety of their staff engaged in working on this project (at a minimum to the full legally required standard) as well as that NT staff and the general public in as far as they may be affected by the completion of this project.

The National Trust reserves copyright over any and all materials arising from the completion of this fieldwork, while recognising the right of recognition of the originators.

Access to NT land is granted for the purposes of completing the described fieldwork and for no other purpose.

Monitoring arrangements:

The Contractor and the Archaeological Consultant will meet to finalise the specification for works at the outset of the contract. The Archaeological Consultant and other NT staff may, with prior agreement of the Contractor, review progress on site at any point.

Reporting requirements:

The fieldwork will be described in an archival report at the conclusion of the project. This will fully describe all encountered anomalies, and offer an interpretation of their significance and meaning.

The Contractor should plan to produce a draft report which will then be subject to detailed review by the Archaeological Consultant, to ensure alignment with NT standards and needs.

The Contractor will supply five copies of paper reporting, four bound and one unbound, as well as three copies of all report materials in digital format supplied on CD.

The Contractor will also return all site records and artifactual material in suitable archival media.

Archive deposition:

At the conclusion of the project, the archive (including all reporting materials and original field materials) will be deposited with the National Trust. It will be stored either in central filing systems, at the York Office, or on the property. Digitised information will be stored on the NTHBSMR, and made available to the NMR and ADS through centralised processes. A copy of the final report will be deposited with Natural England and Northumberland County Council.

Health and Safety provision:

Responsibility for the Health and Safety management of the project will reside with the contractor, subject to agreeing practices with the Archaeological Consultant and other NT staff. These will extend to all of the activities undertaken by the Contractor's staff, and the safety of the public and NT staff in as far as this is influenced by the actions of the Contractor's staff. A full Risk Assessment for all aspects of the project will be completed and supplied to the NT in advance of work commencing, and will require NT agreement. The Contractor will also be expected to comply with practices outlined in the NT "General guidelines for Countryside and Garden work".

Insurance coverage:

The Contractor will be expected to carry Public Liability Insurance to a value of not less than £2,000,000, and to provide proof of insurance to the Archaeological Consultant prior to the commencement of works.

Compliance with guidance/standards:

In the execution of all aspects of the described fieldwork, the Contractor will be expected to comply with the professional standards published by the Institute of Field Archaeologists, and guidelines produced by the National Trust.

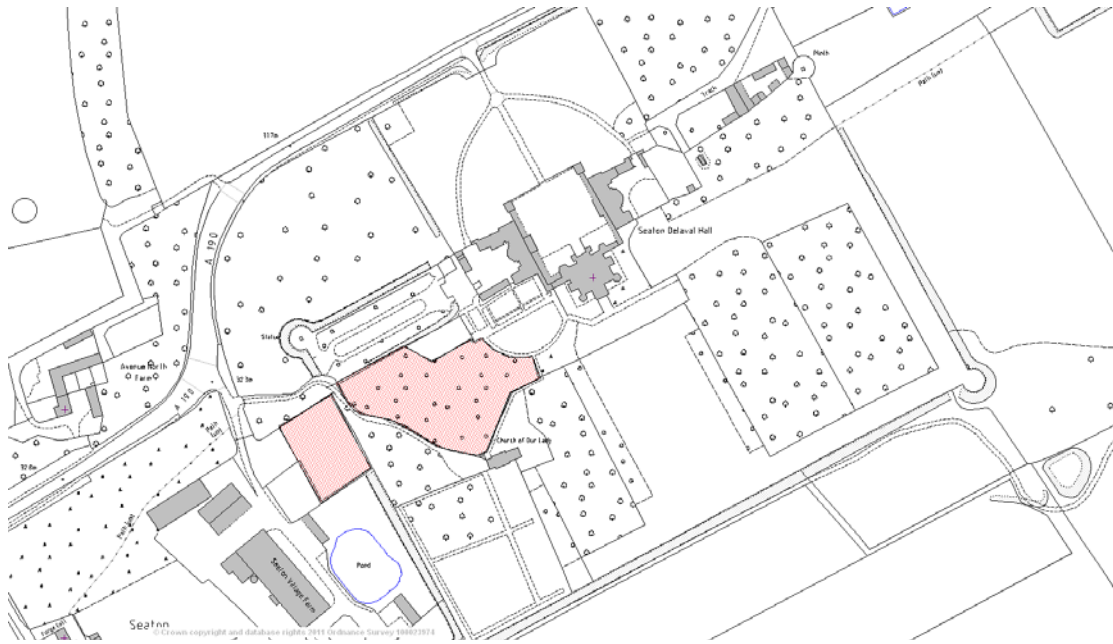
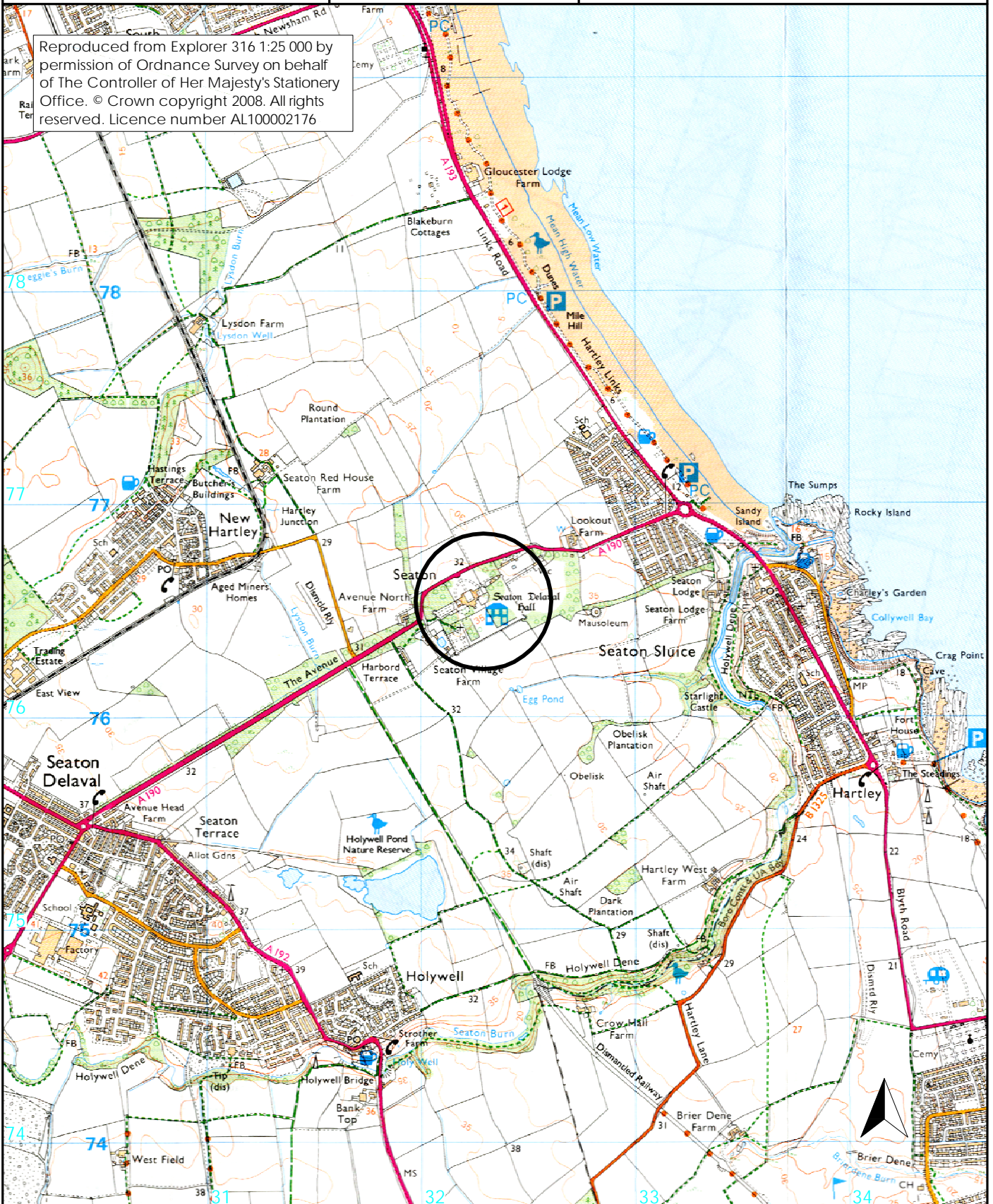



Fig 1 Location of survey areas.

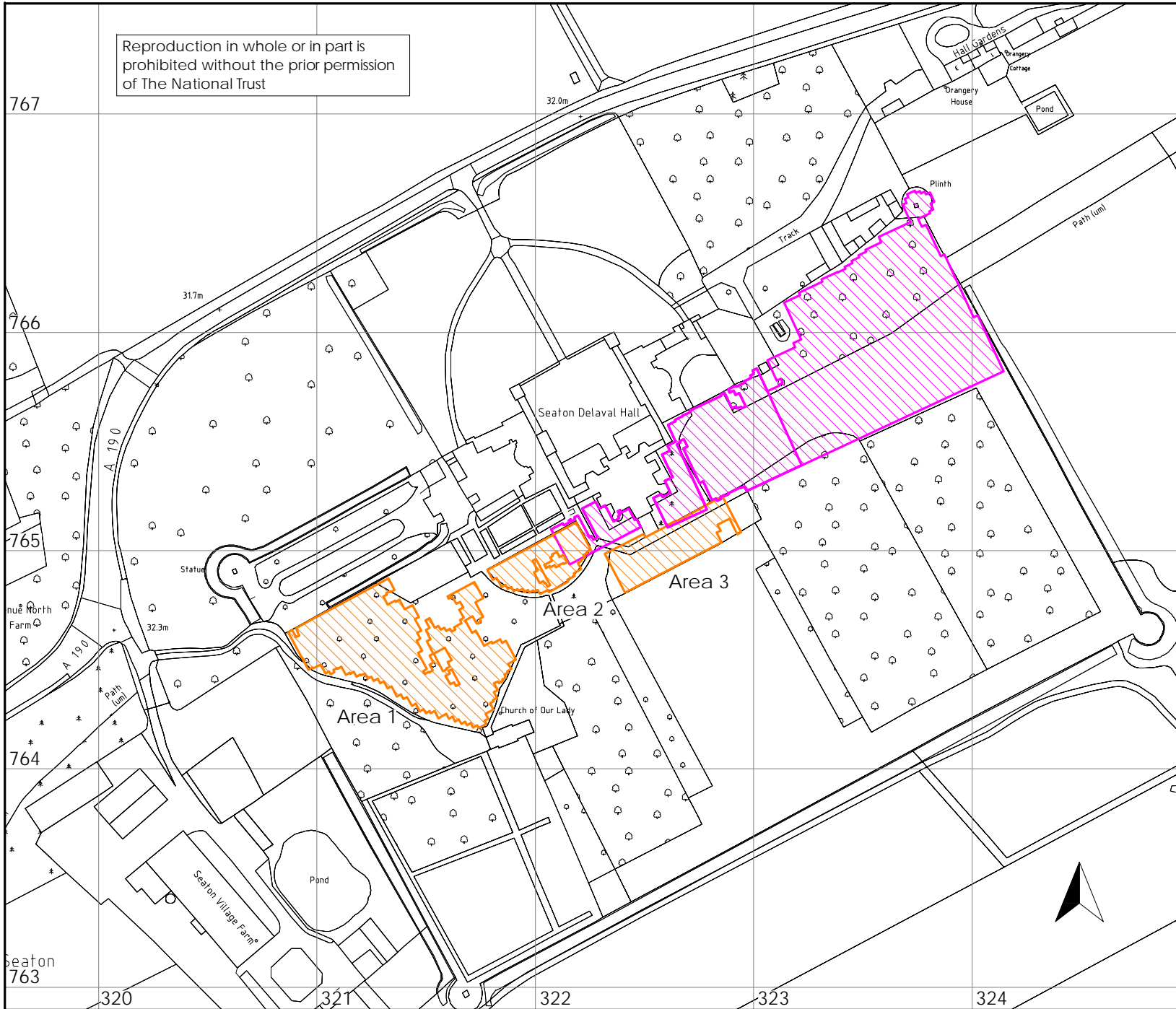
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 site location

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scale 1:25 000 for A4 plot

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ARCHAEOLOGICAL SERVICES

DURHAM UNIVERSITY

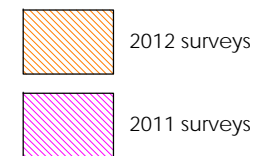
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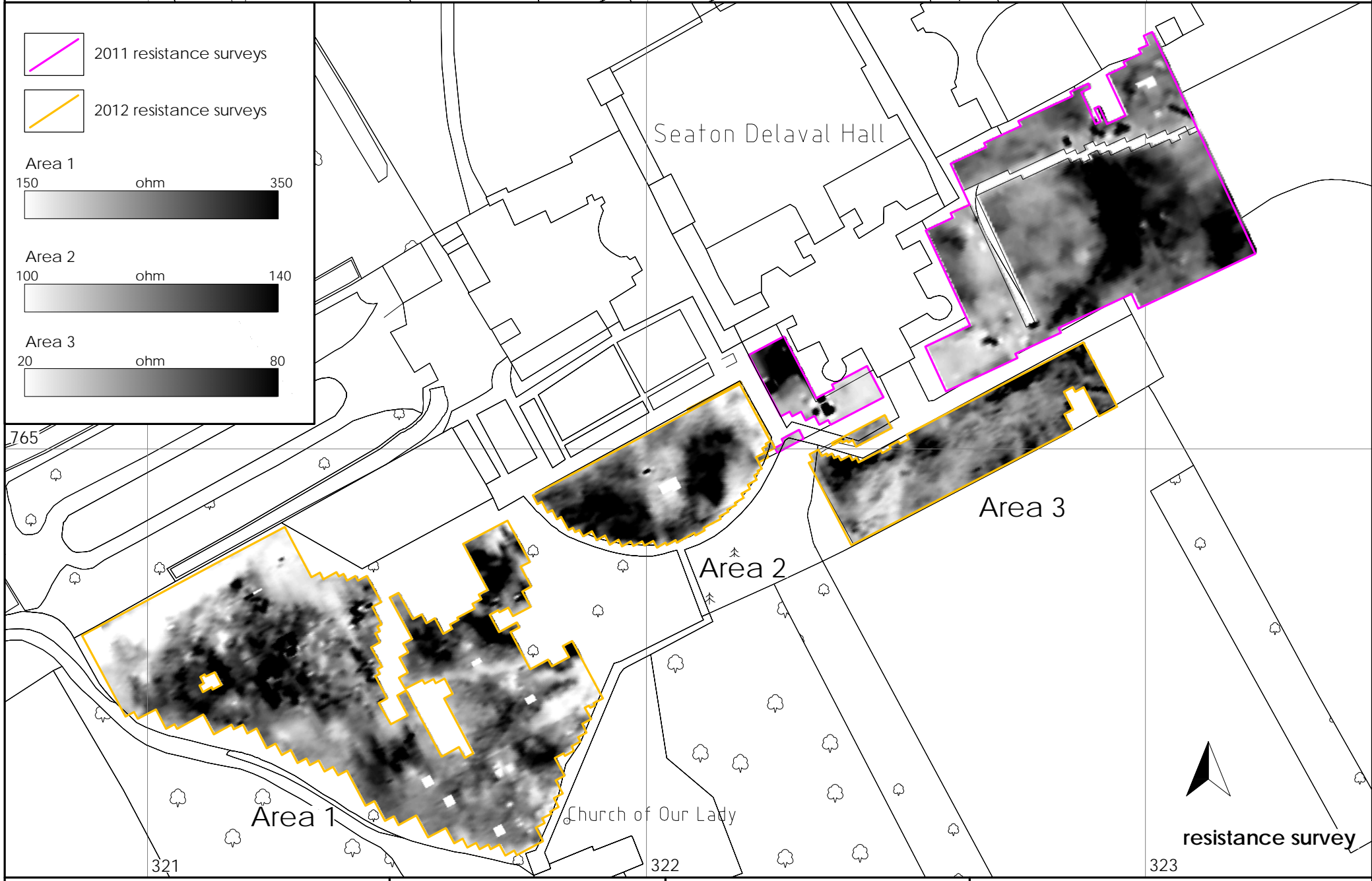
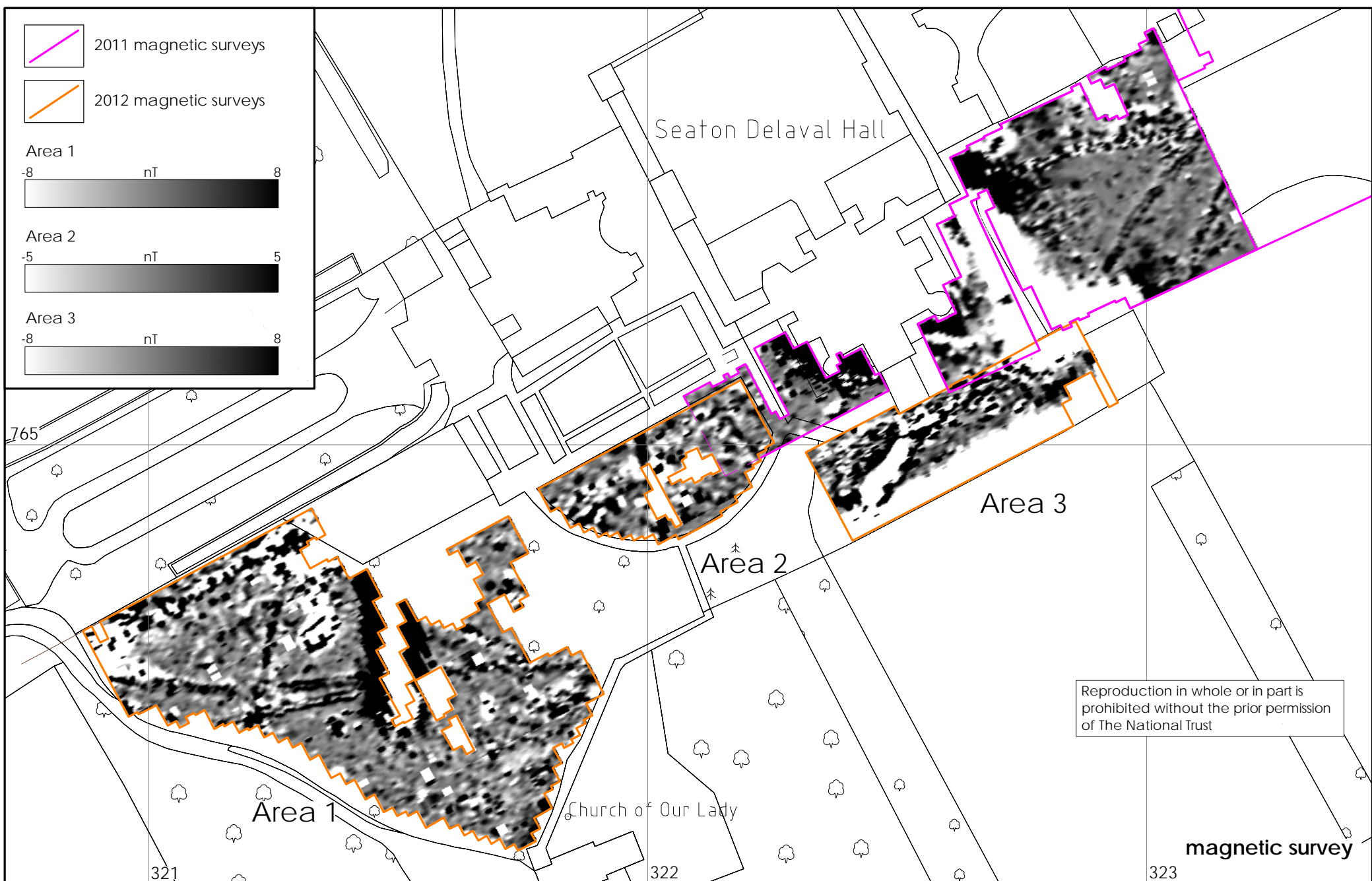
The National Trust

Seaton Delaval Hall
Seaton Sluice
Whitley Bay
Northumberland

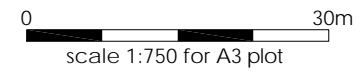
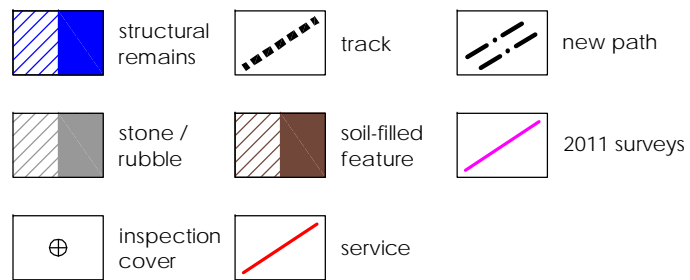
geophysical surveys
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Figure 2: Survey areas

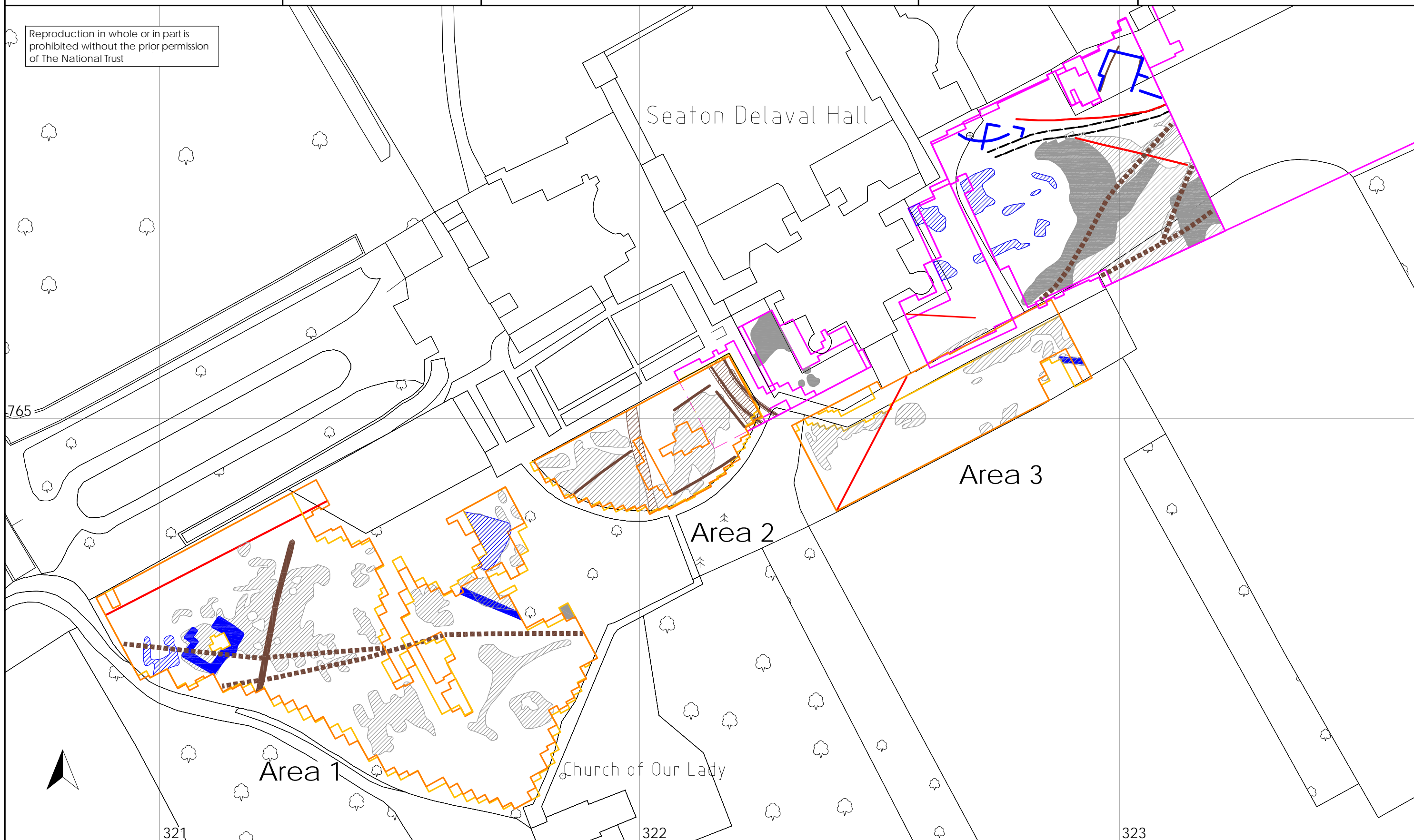








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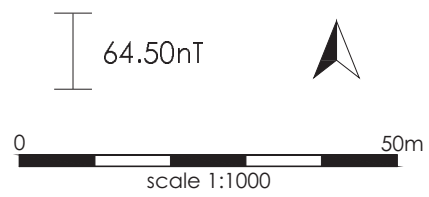


Seaton Delaval Hall
Seaton Sluice
Whitley Bay
Northumberland

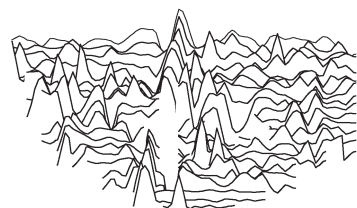
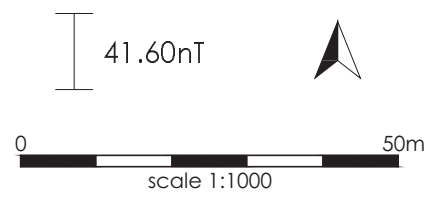
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Figure 6:
Trace plots of geophysical data

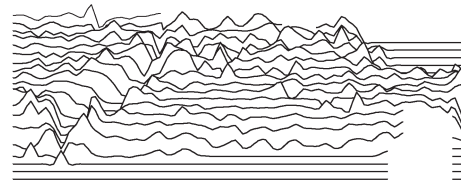
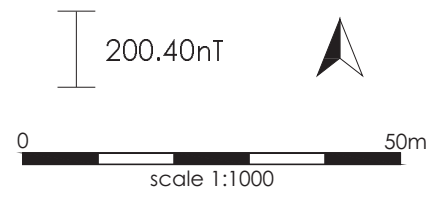
Area 1



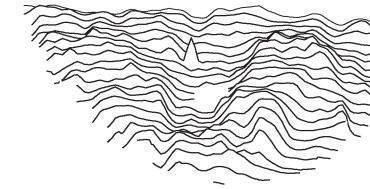
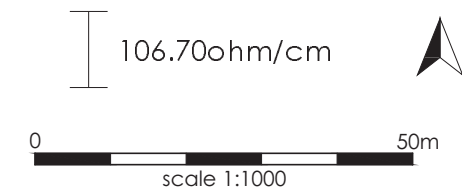
Area 2



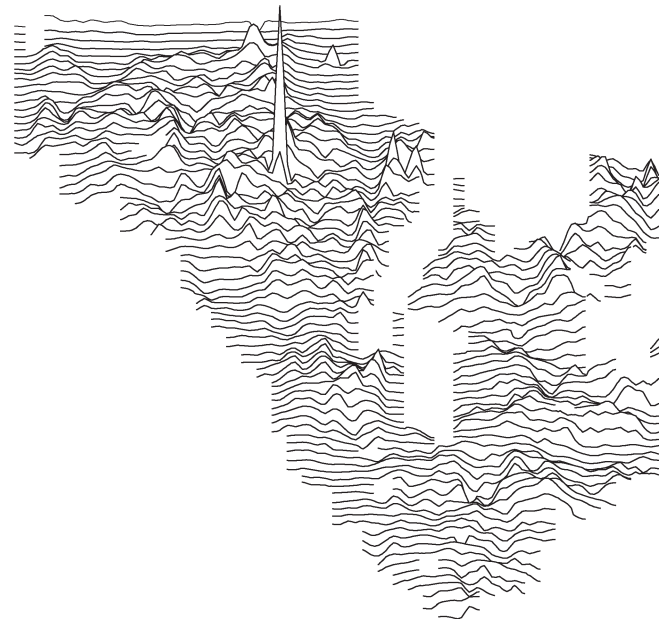
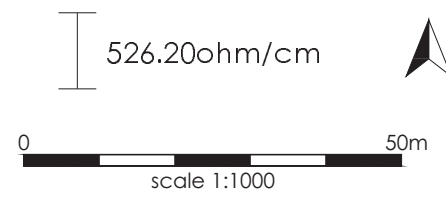
Area 3



Area 2



Area 1



Area 3

