An archaeological geophysical survey

Barnstaple Castle, Barnstaple, Devon

Centred on NGR (E/N): 255598,133305

Report: 1702BAR-R-1

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Client
Parks & Amenities
North Devon Council
Brynsworthy Environment Centre
Roundswell
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Website: substrata.co.uk

For an overview of Substrata, our archaeological geophysical surveying techniques and the results we obtain.

1 Survey description and summary

1.1 Survey

Type:	magnetometer; twin-sensor fluxgate gradiometer twin-probe resistance ground penetrating radar (GPR)
Dates:	magnetometer survey: 9 March 2017 resistance survey: 9 and 10 March 2017 GPR: 14 to 15 March
Areas:	magnetometer survey: 0.56ha resistance survey: 0.56ha GPR survey: 0.78ha
Lead surveyor:	Mark Edwards, Substrata Ltd: magnetometer and resistance Kathryn Cunningham, TIGERGEO Ltd: GPR
Author:	Ross Dean, Substrata Ltd: magnetometer, resistance and editor MJ Roseveare and ACK Roseveare, TIGERGEO Ltd: GPR

1.2 Client

Parks & Amenities, North Devon Council, Brynsworthy Environment Centre, Roundswell Barnstaple, Devon EX31 3NP.

1.3 Site information

Site:	Barnstaple Castle
Civil Parish and Town:	Barnstaple
District:	North Devon
County:	Devon
NGR:	SS 55598 33305 (point)
NGR E/N:	255598,133305 (point)
Post code:	EX31 3NP
Scheduled Monument:	List entry number 1020922, Barnstaple Castle

1.4 Archive

OASIS number:	substrat1-287193
Archive:	At the time of writing, the archive of this survey will be held by Substrata. Depending on local authority policy, an archive of the unprocessed data may be deposited with the Archaeological Data Service

1.5 Introduction

This report was commissioned by North Devon Council. Magnetometer, resistance and ground penetrating radar (GPR) surveys were completed to inform upon the buried remains at Barnstaple Castle (Figure 1). The outer and inner castle baileys are now mainly urban parkland and were subject to magnetometer and resistance surveys (Area 1, Figure 2). The tarmac carpark, which includes part of the former outer bailey and areas outwith the scheduled monument, was subject to a ground penetrating radar (GPR) survey (Area 3, Figure 2). The top of the motte was subject to surveys using all three techniques (Area 2, Figure 2).

The magnetometer and resistance surveys, data analysis and interpretation were completed by Substrata Limited and the GPR surveys, data analysis and interpretation by TIGERGEO Limited.

1.6 Summary

The magnetic, resistance and ground penetrating radar (GPR) responses were sufficient to be able to differentiate anomalies representing possible archaeological features.

Evidence for the location, structure and demolition of Castle House, situated in the current parkland between at least 1684 to 1976, was recorded in the magnetometer and resistance surveys. The resistance survey highlighted anomalies likely to represent wall footings and floors. Both surveys recorded anomaly groups that may reflect the archaeological excavation

that took place in this area between 1972 and 1975. The magnetometer survey recorded the likely position of a known well capped an iron or steel cover.

Farther to the south of the parkland, anomalies representing linear features were recorded in both the magnetometer and resistance surveys. The nature of these features was uncertain and they will have more than one origin, but these anomaly groups are likely to represent garden features, possibly associated with Castle House, and relatively recent service trenches. Some of the groups may be associated with earlier phases in history of the castle but only further archaeological investigations would clarify this possibility.

Twelve distinct anomalies were recorded in the magnetometer survey which, given their proximity to known Anglo-Saxon burials, may represent graves from the same Anglo-Saxon cemetery. These anomalies were not reflected in the resistance survey. It is possible some or all may reflect relatively recent ground disturbance and/or natural deposits. Further archaeological investigations would be required to clarify the origins of these anomalies.

The grass covered Motte top was the subject of magnetometer, resistance and ground GPR surveys. The GPR survey data implied a relatively deeply buried sub-circular structure. Given the depth, the structure may be part of the former inner circular tower (known as a donjon or shell keep). Other radar reflections and resistance anomalies possibly representing several phases of building were recorded on the keep top. The complexity of the data sets meant that it was difficult to ascertain whether they related to 19th century landscaping or to defensive structures such as the donjon and both are very likely represented.

The tarmac carpark was formerly part of the outer bailey and was subjected to a GPR survey. The deposits beneath the tarmac were found to be highly disturbed by services, and by the construction and demolition of market buildings and earlier structures. Services and surface materials dominated the data to the north. On the eastern side, the data implied that a significant component of made-up ground was present, which may possibly be partly historic in origin. Here too, patched surfaces and services dominated the data. To the south several small structural elements such as bits of masonry and spreads of rubble were represented in the data. Historic maps of the area do not record structures here but it is proposed that they are fragmented remains associated with the rear of lost burgage plots extending into the site from the south. There was much near-surface disturbance in the data collected within the south-western area of the carpark, which is likely to reflect the erection and removal of relatively recent structures such as pens and other associated infrastructure from the former sheep market.

2 Survey aims and objectives

2.1 Aims

To establish the presence or absence, extent and character of any archaeological features and deposits within the survey area.

2.2 Objectives

1. Complete magnetometer, resistance and ground penetrating radar surveys across the agreed survey areas.
2. Identify any anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the techniques and dataset, archaeologically characterise any such anomalies or patterns of anomalies.
4. Accurately record the location of the identified anomalies.
5. Produce a report based on the survey that is sufficiently detailed to inform any subsequent development on the survey area about the location and possible archaeological character of the recorded anomalies.

3 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and Historic England (2010). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service/Digital Antiquity Guides (undated).

4 Site description

4.1 Landscape and land use

Barnstaple Castle is situated on the south-western corner of the old town with the River Taw to the south and east and the River Yeo to the north (Figure 1).

The surveys were completed over three areas as shown in Figure 2. These comprised relatively flat ground with slight earthworks as follows:

- Area 1: parts of the inner and outer baileys and part of the moat, now parkland with earthworks in places;
- Area 2: the top of the motte, now grass covered with remnants of wall footings and shallow earthworks;
- Area 3: part of the outer bailey, now a tarmac carpark with apparent earthworks in parts.

4.2 Geology

The solid geology across the survey area and surrounds is of the Carboniferous and Devonian Pilton Mudstone Formation. This comprises grey mudstones and siltstones with thin- to thick-bedded, locally calcareous sandstones and beds and lenses of limestone. The sandstones are thickest and predominate in the lower half of the formation, whereas mudstones predominate in the upper half. Rich shelly neritic fauna occurs in the mudstones and limestones (British Geological Society undated).

The superficial geology across most of the survey area is Quaternary Alluvium which generically comprises soft to firm consolidated, compressible silty clay. Layers of silt, sand, peat and basal gravel can be present as can a stronger, desiccated surface zone. Quaternary Taw River Terrace Deposits occur along the eastern boundary of the survey area. The main component is stony, sandy, silty clay with traces of cassiterite (ibid).

5 Archaeological background

5.1 Historic landscape characterisation

'Historic settlements'

The core area of a historic settlement, based on the late C19th 1st edition (25inch) Ordnance Survey maps (Devon County Council, undated)

5.2 Archaeological background

This section is not designed to provide a comprehensive understanding of the historic environment of the surrounding area and should not be used as a source for further work.

The Devon County Council Historic Environment Record (DHER) was examined via the Heritage Gateway (Historic England, undated a) to gain an appreciation of historic assets pertinent to the geophysical survey data within approximately 500m of the survey area perimeter. Tables 1a to 1c provide a summary of the DHER entries for the survey area and adjacent land.

The castle is a scheduled monument (1020922) and the following is adapted from the scheduling listing (Historic England, undated b).

Barnstaple Castle is a Norman motte and bailey with a surviving motte, part of which overlies a Saxon cemetery. The area was landscaped in the 19th century. The castle stands on the east bank of the River Taw at its confluence with the River Yeo just upstream from where the Taw

broadens out on its journey to the Bristol Channel. It thus protected the lowest point at which the Taw could be forded in medieval times. The castle was sited within the western corner of an earlier Anglo-Saxon defended town or burh and was probably under construction by the time of the Domesday Book in 1086, although it is not recorded in documents until the 12th century.

The castle comprises a courtyard or bailey area originally enclosed by a bank and moat, which stood on the north west side of a motte that was equipped with its own associated set of defences, thus creating a stronghold within the castle. The bailey would have held some of the working buildings of the castle constructed either in timber or in stone.

The earth and stone-built motte, which stands about 14m high with a diameter of just over 60m, retains masonry fragments of a stone defensive wall and an inner circular tower known as a donjon or shell keep with wing walls descending the slopes of the motte. In plan it was roughly circular and comprised two concentric walls. Another wall, 1m thick, bounded the edge of the flat top of the motte. A document of 1274 indicates the presence of a hall, chamber, and kitchen on the motte. The structure is considered to be a shell keep with enclosed tower similar to contemporary Norman castle architecture at Launceston in Cornwall and Plympton in Devon.

The rampart and ditch which defended the bailey were part-excavated in 1972-75 and from these excavations it was suggested that the bailey rampart was about 10m wide and probably revetted with vertical timbers, although its height remains unknown. It was fronted by a berm 4m-5m wide and then a ditch which, because its depth has been demonstrated to be well below the high water mark, may be more correctly termed as a moat fed by channels connected to the River Yeo. The full width of the bailey moat has not yet been established although it appears to exceed 5m. A flat-bottomed trench located between the rampart and the ditch is considered to be a robber-trench of a stone wall about 1m thick which was added to the front of the rampart in the late medieval period.

As with the bailey, the motte mound was surrounded by an encircling moat found in an excavation of 1927 to be about 16m wide and 4.5m deep. The motte must have been connected to the bailey by some means, probably by a drawbridge. A moat of this size is also likely to have utilised river water by the linking of the nearby Rivers Taw and Yeo, although it was not until the 13th century that castle defences made extensive use of water-filled moats, and Barnstaple Castle appears to have been in decline by then.

Although an early Norman castle might be expected at Barnstaple, as was the case at Exeter and Totnes, there is no documentary evidence of such a castle until the early 12th century. Records suggest that by the reign of Stephen, in 1136, Barnstaple Castle was abandoned as being too weak to defend, but it was rebuilt after 1139 by Henry Tracy and his descendants. In 1228 the defences were reduced in height on the orders of Henry III and the castle was in disrepair by the end of the 13th century. The whole site is recorded as utterly ruinous by the time of John Leland's visit in 1540 during the reign of Henry VIII.

Excavations within the castle grounds in 1972-75 on the north west side of the motte in the area thought to encompass the bailey and its defences, revealed the presence of 105 graves forming part of a Saxon cemetery which was in use at the time of the Norman Conquest. All of the excavated burials were extended inhumations orientated east-west and all lacked grave goods. The cemetery was therefore deemed to be Christian and it may date to about 900, but would have ceased to be used as such when the moat and rampart of the Norman castle were constructed across the site. Further burials are expected to lie in those undisturbed areas within the castle grounds which were not subject to archaeological investigation.

A mansion, known as Castle House, was built on the area of the bailey in the 19th century and the surrounding area, including the motte, was landscaped and planted with trees. A spiral path up the mound was also created in this period. The mansion was demolished in 1976.

Although it was landscaped in the 19th century, Barnstaple Castle still retains the basic features of a medieval motte and bailey castle and its motte in particular survives in excellent condition as a well known and dominant feature in the western part of the town. The monument will retain archaeological information about the Saxon population of the town from unexcavated burials. The monument will also be instructive about Norman fortification techniques, in particular with regard to moat construction. The location of the castle on a Saxon burial site indicates something of the relationship between the Norman rulers and the population of the Saxon burh which preceded it. Artefacts and organic remains lying within the moat, some of which may survive well due to waterlogging, will shed light on the lives of the inhabitants of the castle, and their surrounding contemporary landscape. The extant motte provides a visual reminder of the steps which were necessary to establish Norman rule in England by the construction of impressive and strongly defended motte and bailey castles, in this case not only within the recognised boundaries of the Anglo-Saxon town itself, but overlying the earlier Saxon cemetery.

6 Methodology, results, discussion and conclusions

6.1 Scope and definitions

The three surveys were designed to record magnetic anomalies, resistance anomalies and radar reflection patterns. The analysis of the data sets was designed to highlight anomalies and reflection patterns judged indicative of archaeological deposits, structures, features or past human activity.

The terms ‘archaeological deposit’, ‘structure’ and ‘feature’ refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity, excluding recent land maintenance and farming.

The reader is referred to section 7.

6.1.1 Magnetometer survey

A magnetic anomaly is a local variation in the Earth's magnetic field. Such variations can result from differences in the chemistry or magnetism of underlying solid geology, superficial geology and other near-surface deposits including those altered and created by past human activities. Near-surface artefacts can also create magnetic anomalies.

6.1.2 Resistance survey

A resistance anomaly is a local variation in the electrical resistance of a soil and is related to its porosity, permeability, saturation, and chemical nature of entrapped fluids (Heimmer and De Vore, 1995:30), all of which can be altered by past human activities. Higher concentrations of ions allow electrical current to pass more easily through the soil, creating a lower electrical resistance.

6.1.3 Ground penetrating radar survey

The strength of a reflection is proportional to the dielectric permittivity contrast between the materials the electromagnetic wave passes through. This property is governed by the electrical and magnetic properties of the material at high frequencies; these are often different from what would be measured by low frequency or passive techniques like electrical resistance or magnetic surveying. The highest contrasts are generally between air and other materials.

Each recorded reflection is the result of an interaction between the wavelength of the wave and the physical dimensions of the object; for both the top and bottom of a layer to be detected this must be thicker than half the wavelength. Each interface must be thinner than half the wavelength. A deposit or material that continually varies internally will continue to produce reflections whereas a uniform material will produce reflections only at its edges. Like light, the high radio frequencies used for radar mean that the beam can be multiply reflected and refracted. For these reasons, a profile of radar data is never a direct model of the distribution of materials in the ground.

Ground that is electrically conductive, so clay-rich or wet, will allow the electrical part of the wave induced in the ground to ebb away, preventing regeneration of the wave and hence its penetration into the ground. Dry ground (including dried-out clay) is therefore much more likely to produce useful results.

Radio waves cannot penetrate metal and any metal structure in the ground will cast a shadow over deeper deposits. In addition, a reverberation is likely to occur between the object, the ground surface and any interfaces in between and these echoes then appear as multiples below (i.e. later in time) the original object. Within voids wave propagation velocity increases to near the speed of light, i.e. significantly faster than within the surrounding ground. This can lead to distortion of the GPR profile, with deeper reflectors below the void appearing much closer to the surface than in reality. Voids also tend to create strong internal reflections due to reverberation at the interface between air and the containing structure.

6.2 Methodology

The methodology adopted for each of the surveys is summarised in Table 4.

6.3 Results

The interpretation of the magnetometer (gradiometer) survey is presented in Figure 3. The resistance survey interpretation is presented in Figure 4 and the GPR survey interpretation in Figure 5. Each figure includes the anomaly groups identified as possibly relating to archaeological and other deposits along with their identifying numbers. Tables 2 and 3 are extracts of the detailed analysis of the magnetometer and resistance survey data sourced from the attribute tables of the GIS project provided in the project archive. The GPR survey data was relatively sparse so far as identified potential archaeological deposits or features was concerned an is discussed below (Section 6.3.4).

Figures 3 to 5along with Table 2 and Table 3 comprise the analysis of the survey data.

Various plots of the processed data as specified in Tables 5 to 7 are provided in Figures 6 to 10.

Figures 12 and 13 are plots of the unprocessed magnetometer data and the unprocessed resistance data respectively. A comprehensive set of data plots for the GPR survey are provided in the site GIS archive.

6.3 Discussion

6.3.1 General points

Discussion scope

Not all magnetic and resistance anomaly groups or radar reflection patterns identified in Figures 3 to 5 and Tables 2 and 3 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project held the survey archive.

Data collection

Data collection during the magnetometer survey was restricted as shown in the figures due to the presence of magnetic materials along boundaries and within the park. Strong magnetic responses are likely to relate to these materials except where otherwise indicated in Figure 3.

Data collection during the resistance survey was restricted as shown in the figures by the presence of tarmac paths, concrete and similar hard surfaces.

Anomaly characterisation and mapping

There are a number of magnetic and resistance anomaly groups that could be interpreted as relating to large postholes or pits although most will have natural origins. Anomalies of this sort are only mapped as potential archaeology if they are clustered in groups or otherwise form recognisable patterns.

Anomalies thought to relate to natural features and recent man-made objects such as manholes, water management equipment, drains, cables and other services were only mapped where they comprised significant magnetic responses across the dataset that needed clarification.

Numerous dipole magnetic anomalies are scattered across the magnetometer data set. These are likely to represent recent ferrous objects. They are only mapped if they could influence the analysis of anomaly groups thought to have an archaeological origin.

6.3.2 Magnetometer survey (Figure 3, Table 2)

Area 1

Magnetic anomaly group **m1** represents a ferrous object and coincides with a know well cover (Devon Historic Environment Record (DHER) MDV14596).

Anomaly groups **m2** and **m3** are most likely to represent remains of Castle House which stood at the site of these two anomalies from at least 1684 to 1976 (DHER MDV853, Scheduled monument listing 1020922).

Groups **m4 to m9** certainly represent sub-surface deposits or disruption but their characterisation is otherwise difficult to determine. Each may represent archaeological deposits, former garden features associated with Castle House or recent service trenches.

Groups **m10 to m21** are relatively clear in the magnetometer data set. Whilst each anomaly may represent relatively recent ground disturbance or natural deposits, the location of the anomalies close to a known Anglo-Saxon cemetery (DHER MDV14597) within the castle grounds requires that they be highlighted as potential graves.

Groups **m301**, **m303** and **m309 to m311** are most likely to represent relatively recent ground disturbance and rubble associated with the demolishing of Castle House in 1976. Groups **302** and **304 to 30**8 may represent disturbance from the demolition or be associated with the archaeological excavations carried out in the area between 1972 and 1975 (DHER MDV14597, Scheduled monument listing 1020922).

Area 2

Anomaly group **m22** on the motte (Area 2) is most likely to represent a stony deposit or wall footing which may be associated with 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD (DHER MDV853 and Historic England scheduled listing 1020922).

6.3.3 Resistance survey (Figure 4, Table 3)

Area 1

Resistance anomaly groups r1 to r14 are most likely to represent ground disturbance and features associated with Castle House which was situated in this area of the site between at least 1684 until its demolition in 1976 (DHER MDV853 and Historic England scheduled listing 1020922). Anomaly groups **r1**, **r3 to r9**, **r13** and **r14** may represent robber trenches for the removal of stone or wall foundation trenches, groups **r10** and **r1**1 are most likely to represent wall footings while groups **r2** and **r12** may represent a stony deposit or hard floor surface.

Anomaly groups **r15** and **r16** are most likely to represent linear earthen deposits such as filled archaeological ditches or recent ground disturbance.

Groups **r19 to r24** represent sub-surface deposits or disruption but their characterisation is otherwise difficult to determine. Each may represent archaeological deposits, former garden features associated with Castle House or recent service trenches. Group r18 may relate to a sub-rectangular feature.

Group **r25** may represent part of the former motte moat (scheduled listing 1020922) but is more likely to represent recent deposits created during park landscaping.

The most likely relatively recent anomalies **r301 to r305** may be associated with an archaeological excavation undertaken across the area between 1972 and 1975 (DHER MDV14597, Scheduled monument listing 1020922).

Area 2

Resistance anomaly groups **r27**, **r28**, **r30**, **r32**, **r34** and **r35** are likely to represent stone wall footings or stony deposits on the top of the motte. **r26**, **r29**, **r31** and **r33** are relatively low-resistance anomaly groups that frequently represent filled ditches or earthen deposits. It is likely that these anomaly groups together represent one or more phases of structure on the motte. Whether they relate to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD (DHER MDV853 and Historic England scheduled listing 1020922) can only be solved by further archaeological investigations.

6.3.4 GPR survey (Figure 5)

Area 2

g1: several phases of landscaping are visible in the data set along with a deeply buried, near circular structure in the middle of the survey which may correspond with resistance anomaly group r34. No obvious walls are visible but the reflection patterns suggest that there could be rubble spread across the area. The shape of top of mound is modern but conceals likely Georgian / Victorian annular garden features.

Area 3

g2: the data in this area suggests that the area is empty of archaeological deposits with likely services and surface materials dominating.

g3: a myriad of patched surfaces and service cuts dominate the data with little sign of anything else at depth. The profile data, however, suggests that the whole area is fill. It is possible that the ground has been raised for better drainage at some point in the past. Another possibility is that this area was a refuse dump in medieval or early post-medieval times.

g4: The data in this area represents what appears to be a number of small structural elements such as bits of masonry and spreads of rubble. Historic maps of the area do not record structures in this area but a focus of activity is obvious. It is tempting to suggest these are bits and pieces towards the rear of lost burgage plots extending into the site from the south.

g5: There is much near surface disturbance in this area, probably related to the erection and removal of relatively recent structures such as pens and other associated infrastructure from the former sheep market.

6.4 Conclusions

The magnetic, resistance and ground penetrating radar (GPR) responses were sufficient to be able to differentiate anomalies representing possible archaeological features.

The parkland, formerly parts of the inner and outer baileys and part of the moat, was the subject of magnetometer and resistance surveys (Figures 3 and 4). Evidence for the location, structure and demolition of Castle House, situated in this area between at least 1684 to 1976, was recorded in both surveys. The resistance survey highlighted anomalies likely to represent wall footings and floors. Both surveys recorded anomaly groups that may reflect the archaeological excavation that took place in this area between 1972 and 1975. The magnetometer survey recorded the likely position of a known well capped an iron or steel cover.

Farther to the south of the parkland, anomalies representing linear features were recorded in both the magnetometer and resistance surveys. The nature of these features was uncertain and they will have more than one origin, but these anomaly groups are likely to represent garden features, possibly associated with Castle House, and relatively recent service trenches. Some of the groups may be associated with earlier phases in history of the castle but only further archaeological investigations would clarify this possibility.

Twelve distinct anomalies were recorded in the magnetometer survey which, given their proximity to known Anglo-Saxon burials, may represent graves from the same Anglo-Saxon cemetery. These anomalies were not reflected in the resistance survey. It is possible some or all may reflect relatively recent ground disturbance and/or natural deposits. Further archaeological investigations would be required to clarify the origins of these anomalies.

The grass covered Motte top was the subject of magnetometer, resistance and ground GPR surveys (Figures 3, 4 and 5). The GPR survey data implied a relatively deeply buried sub-circular structure. Given the depth, the structure may be part of the former inner circular tower (known as a donjon or shell keep). Other radar reflections and resistance anomalies

possibly representing several phases of building were recorded on the keep top. The complexity of the data sets meant that it was difficult to ascertain whether they related to 19th century landscaping or to defensive structures such as the donjon and both are very likely represented.

The tarmac carpark was formerly part of the outer bailey and was subjected to a GPR survey (Figure 5). The deposits beneath the tarmac were found to be highly disturbed by services, and by the construction and demolition of market buildings and earlier structures. Services and surface materials dominated the data to the north. On the eastern side, the data implied that a significant component of made-up ground was present, which may possibly be partly historic in origin. Here too, patched surfaces and services dominated the data. To the south several small structural elements such as bits of masonry and spreads of rubble were represented in the data. Historic maps of the area do not record structures here but it is proposed that they are fragmented remains associated with the rear of lost burgage plots extending into the site from the south. There was much near-surface disturbance in the data collected within the south-western area of the carpark, which is likely to reflect the erection and removal of relatively recent structures such as pens and other associated infrastructure from the former sheep market.

7 Disclaimer and copyright

The description and discussion of the results presented in this report are the authors, based on his interpretation of the survey data. Every effort has been made to provide accurate descriptions and interpretations of the geophysical data set. The nature of archaeological geophysical surveying is such that interpretations based on geophysical data, while informative, can only be provisional. Geophysical surveys are a cost-effective early step in the multi-phase process that is archaeology. The evaluation programme of which this survey is part may also be informed by other archaeological assessment work and analysis. It must be presumed that more archaeological features will be evaluated than those specified in this report.

8 Acknowledgements

Substrata would like to thank Andrew Moulton, Parks Officer, Parks and Amenities, North Devon Council for commissioning us to undertake this survey.

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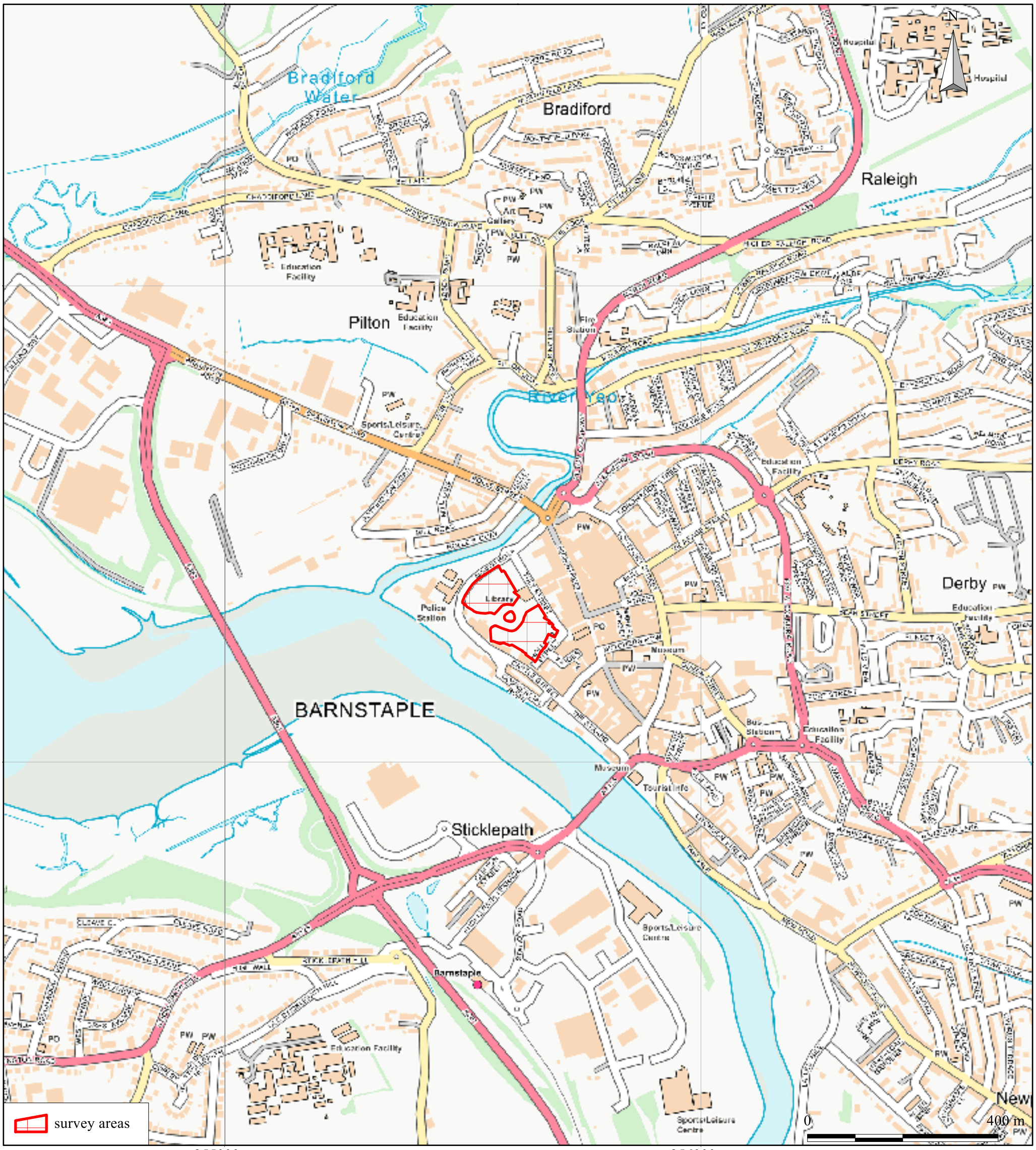
Appendix 1 Figures



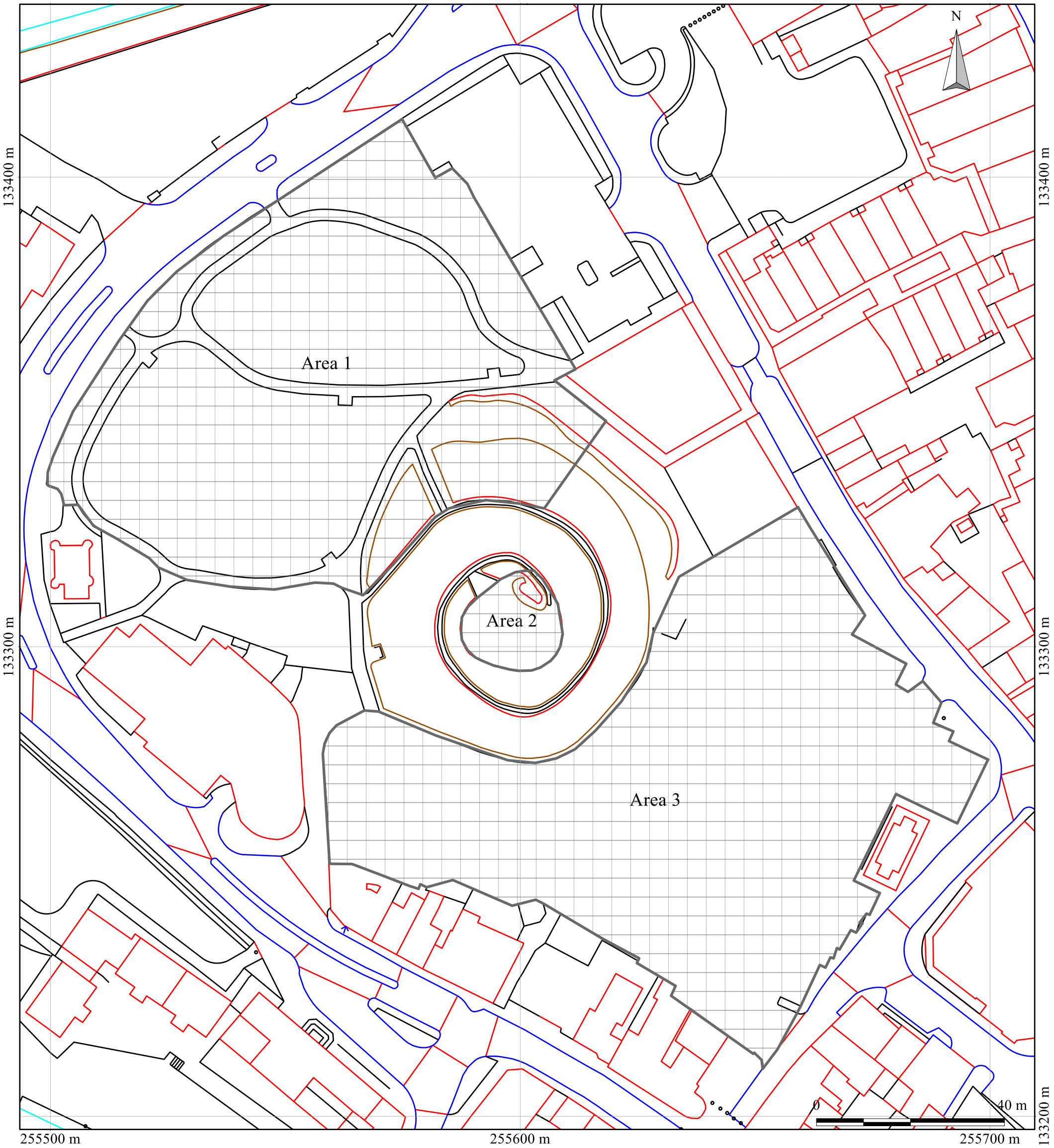
British Grid
centre X: 255615.95 m, centre Y: 133393.23 m

Scale: 1:8000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 1: survey location

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk



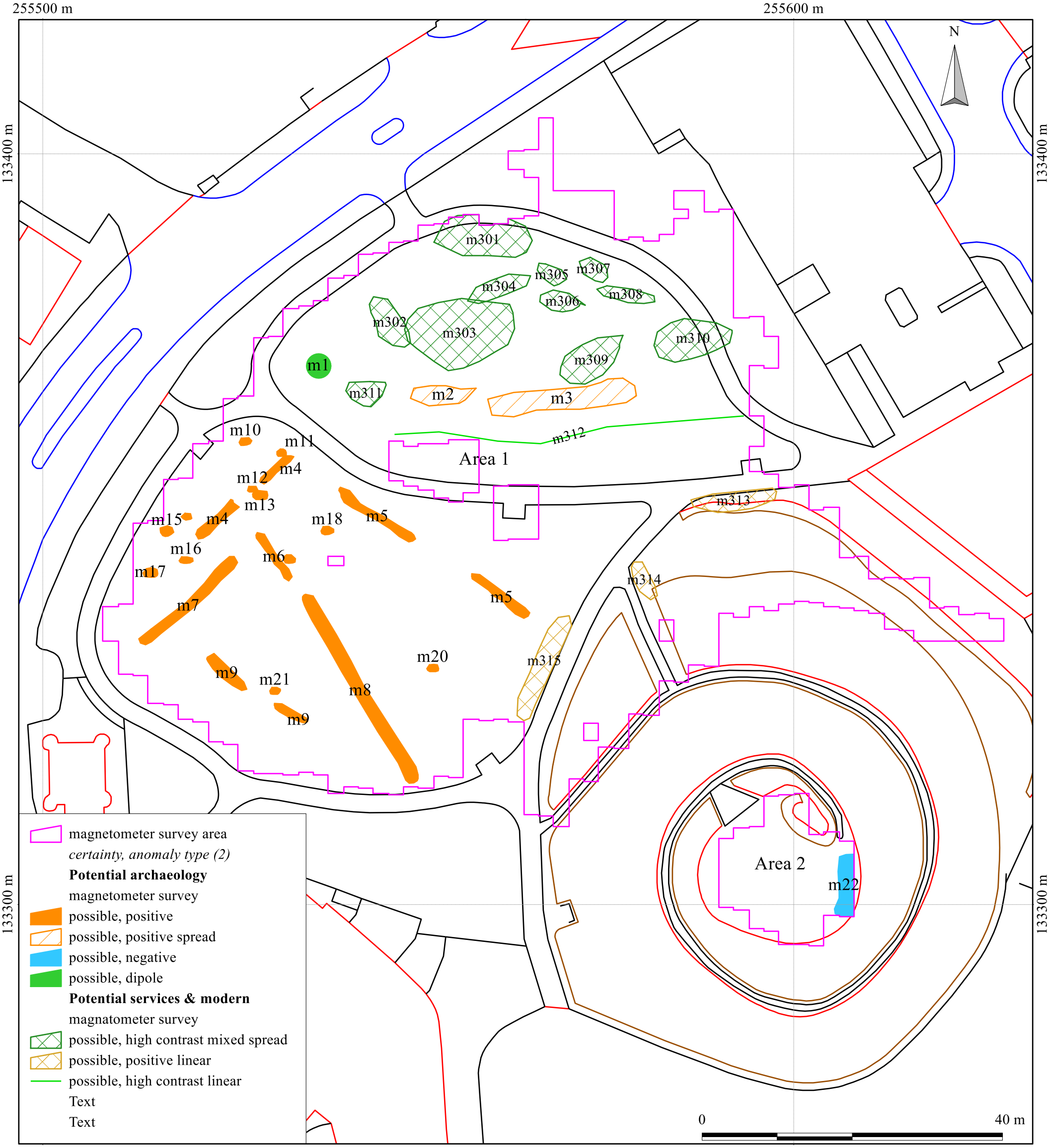
British Grid
centre X: 255601.49 m, centre Y: 133317.01 m

Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 2: survey areas

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk



British Grid
centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 3: magnetometer survey interpretation

Substrata Limited
Langstrath, Goodleigh
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Web: substrata.co.uk

255500 m

255600 m

133400 m

133300 m

N

Area 1

Area 2

r1 r2 r3 r4 r5 r6 r7 r9 r10 r11 r12 r13 r14 r15 r16 r17 r18 r19 r20 r21 r22 r23 r24 r25 r26 r27 r28 r29 r30 r31 r32 r33 r34 r35

r301 r302 r303 r304 r305 r306 r307 r308 r309

certainty, anomaly type (2)

Potential archaeology

resistance survey

possible, high

possible, low

Potential services and modern

resistance survey

possible, linear low

possible, linear trends

0 40 m

British Grid
centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 4: resistance survey interpretation

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

255600 m

255700 m

133300 m

133300 m

N

g1

g2

g3

g4

g5

time slice outline
surface materials
spreads, Motte
spreads
structure
drains
services

0

40 m

255600 m

255700 m

British Grid
centre X: 255629.45 m, centre Y: 133273.22 m

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Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 5: GPR survey interpretation

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
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Email: geophysics@substrata.co.uk
Web: substrata.co.uk

255500 m

255600 m

133400 m

133300 m

N

magnetometer survey area

Processed magnetometer data (nT)

15

-15

0

40 m

British Grid
centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 6: shade plot of processed magnetometer data

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

255500 m

255600 m

N

133400 m

133400 m

133300 m

133300 m

magnetometer survey area

Processed magnetometer data (nT)

< -32.00

-32.00 - -16.00

-16.00 - -8.00

-8.00 - -4.00

-4.00 - 4.00

4.00 - 8.00

8.00 - 16.00

16.00 - 32.00

> 32.00

0

40 m

255500 m

255600 m

British Grid

centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 7: contour plot of processed magnetometer data

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

255500 m

255600 m

133400 m

133300 m

N

Processed resistance data
high pass filtered
1
-1

0
40 m

British Grid
centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 8: shade plot of processed resistance data

Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

255500 m

255600 m

133400 m

133400 m

133300 m

133300 m

N

resistance survey area

Processed resistance data high pass filtered data

> 4

4.00 - 2.00

2.00 - 1.00

1.00 -0.50

0.50 - 0.25

0.25 - - 0.25

-0.25 - -0.50

-0.50 - -1.00

-1.00 - -2.00

-2.00 - -4.00

< 4.00

0

40 m

255500 m

255600 m

British Grid

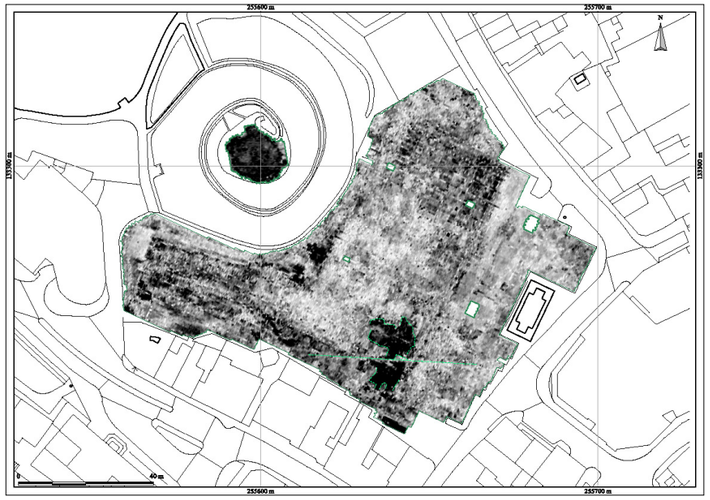
centre X: 255564.31 m, centre Y: 133343.00 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

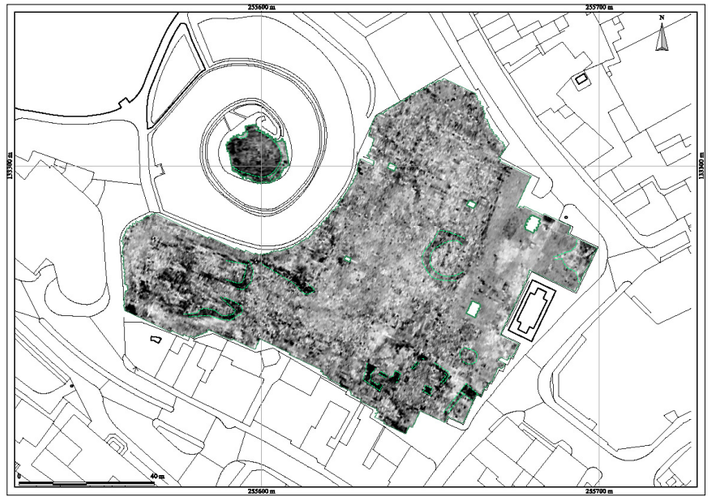
An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 9: contour plot of processed resuistance data

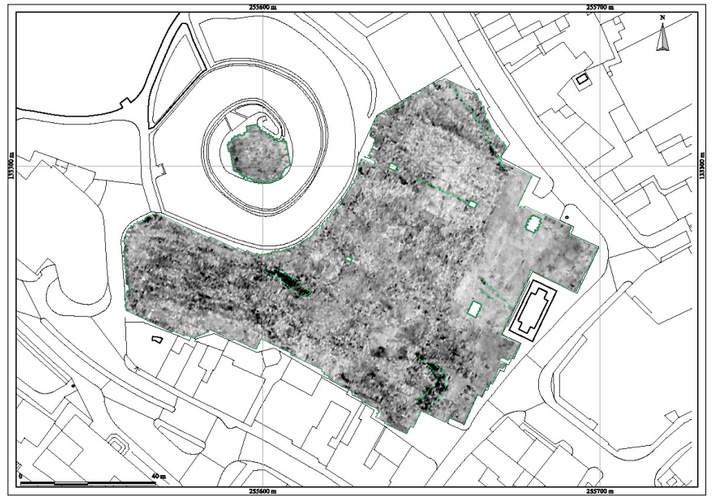
Substrata Limited
Langstrath, Goodleigh
Barnstaple, Devon EX32 7LZ
Tel: 01271 342721
Email: geophysics@substrata.co.uk
Web: substrata.co.uk



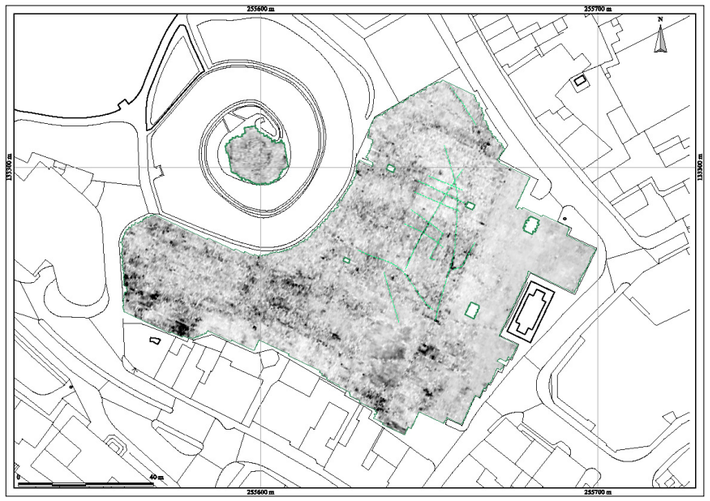
2 timeslice_0_30m



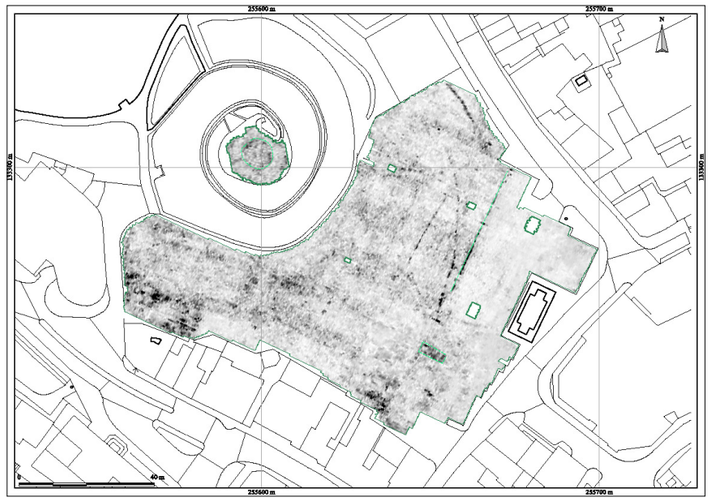
3 timeslice_0_39m



4 timeslice_0_51m

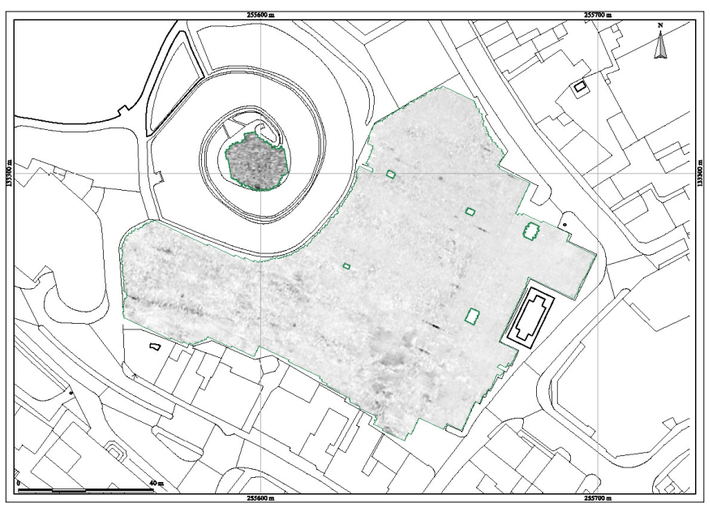


9 timeslice_1_02m



10 timeslice_1_11m

14 timeslice_1_50m



19 timeslice_2_01m

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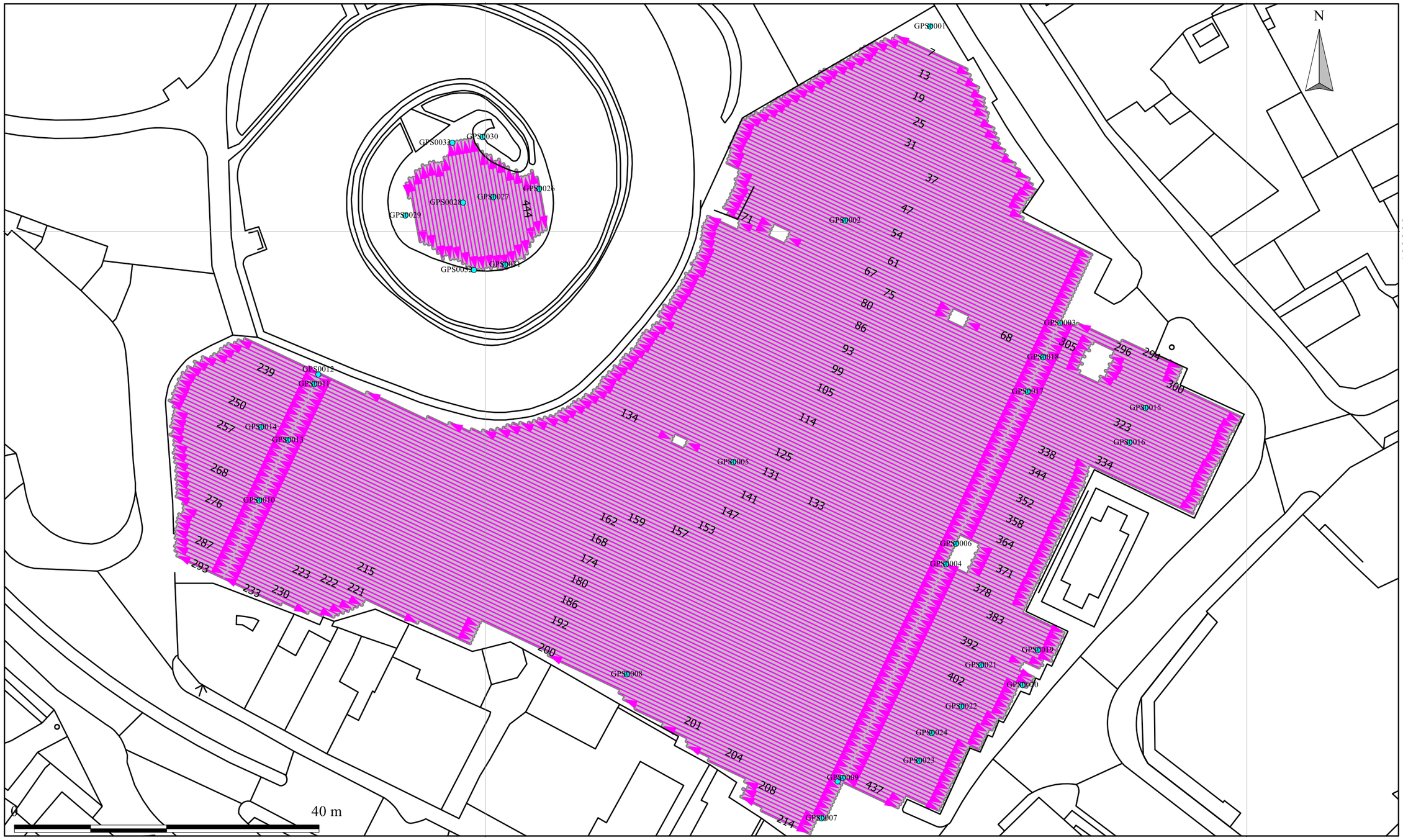
Figure 10: GPR survey selected timeslices



British Grid
centre X: 255628.39 m, centre Y: 133275.26 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

Figure 11: GPR profile layout map and RTK set out points

Substrata Limited
Langstrath, Goodleigh
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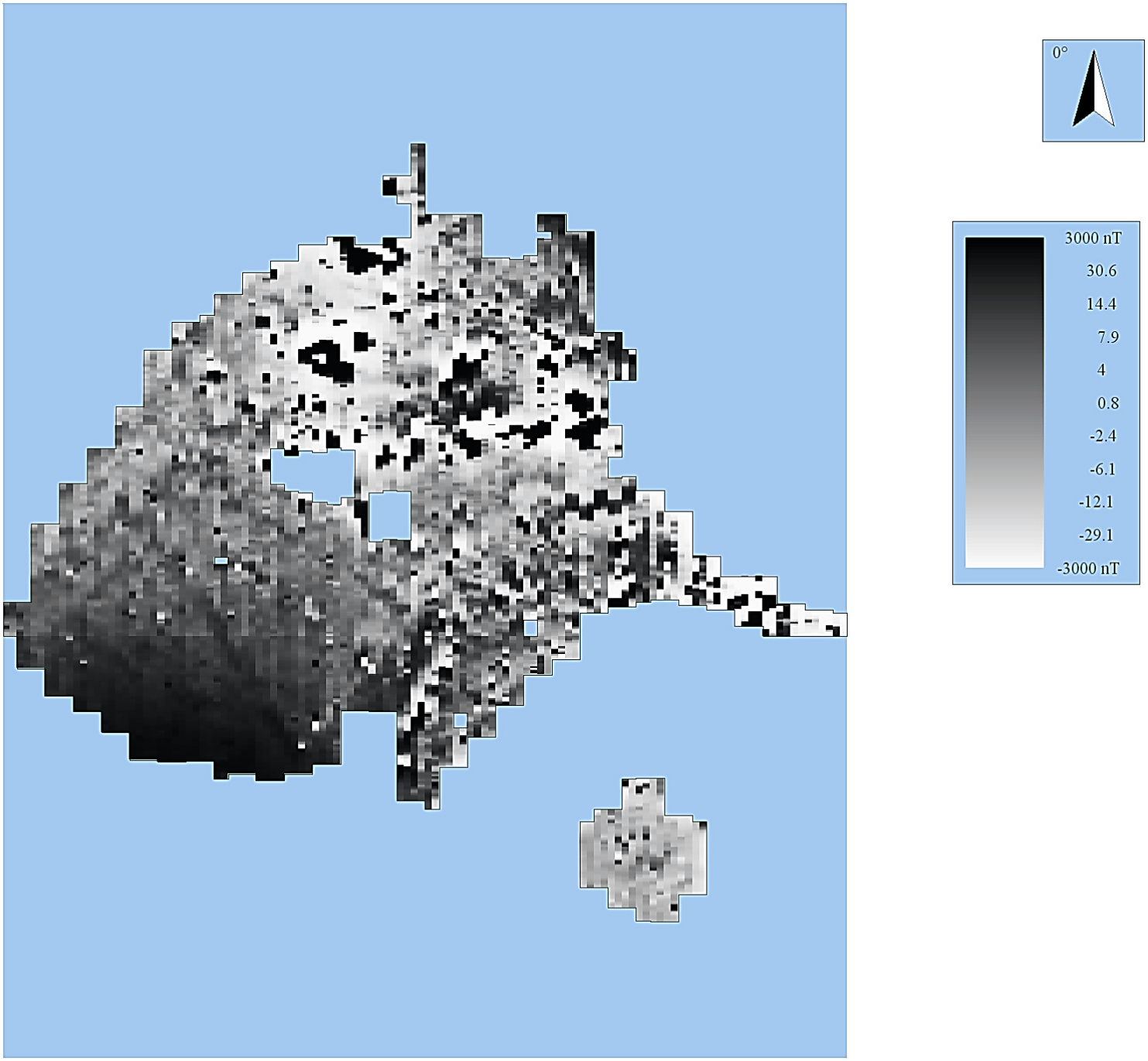
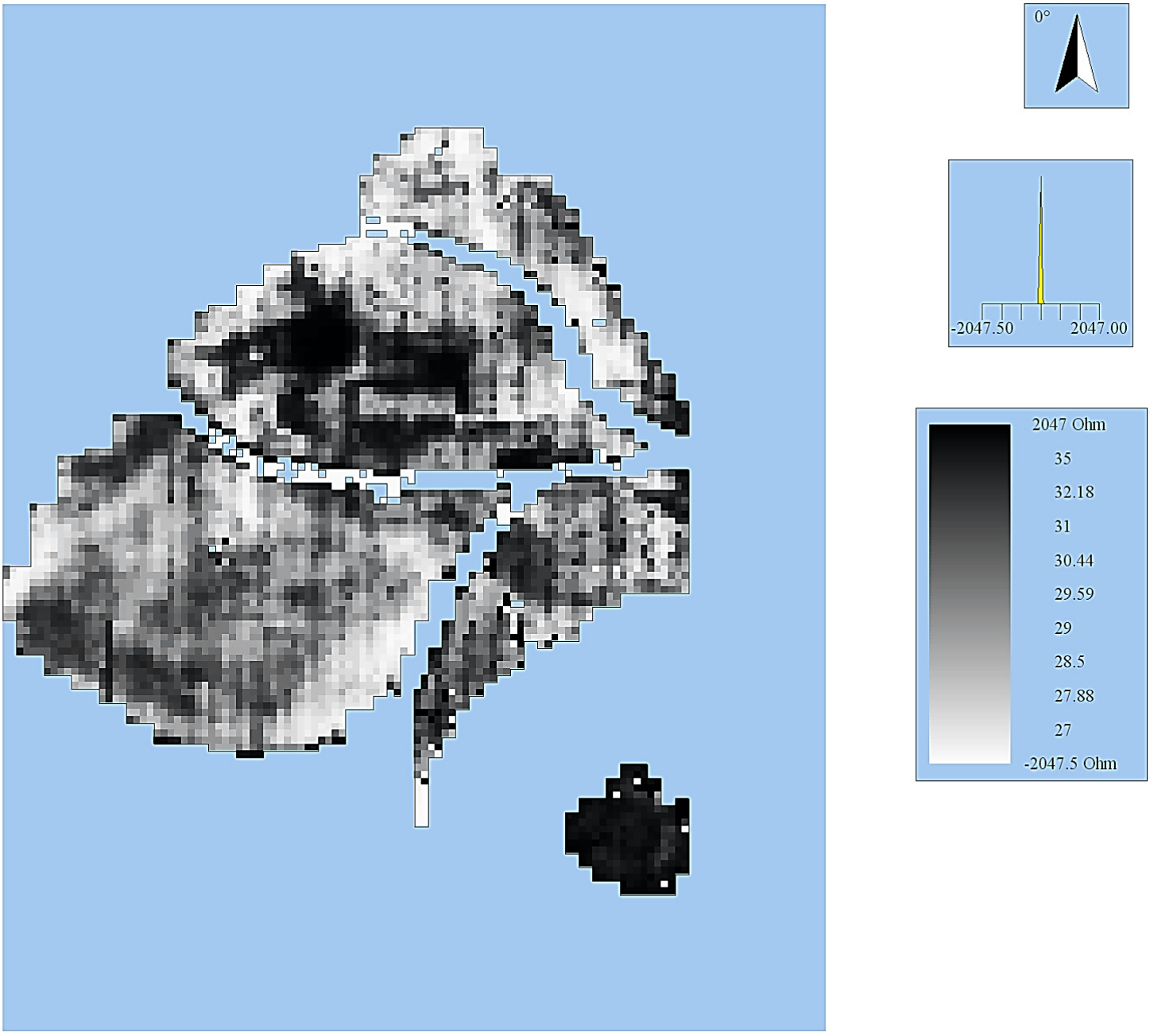
Web: substrata.co.uk



Instrument Type: Bartington Grad 601
Units: nT
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 0.00 m spacing.
Dummy Value: 32702
Dimensions
Grid Size: 30 m x 30 m
X Interval: 0.125 m
Y Interval: 1 m
Stats
Max: 3000.00
Min: -3000.00
Std Dev: 662.15
Mean: -8.33
Median: 0.70
Surveyed Area: 0.5587 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.31.0

Processes: 1
1 Base Layer

Figure 12: shade plot of unprocessed magnetometer data



Instrument Type: GeoScan (Resistance)
Units: Ohm
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 1
Dummy Value: 32702
Dimensions
Grid Size: 30 m x 30 m
X Interval: 1 m
Y Interval: 1 m
Stats
Max: 2047.00
Min: -2047.50
Std Dev: 262.65
Mean: 2.51
Median: 29.64
Surveyed Area: 0.5635 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.31.0

Processes: 1
1 Base Layer

Figure 13: shade plot of unprocessed resistance data

Appendix 2 Tables

County: Devon
District: North Devon
Parish: Barnstaple
Source: Heritage Gateway
Site centre: 255598,133305

Area	HER number	grid reference	designations	type	period	description	distance (m) from site centre	bearing (GN) from site centre
Barnstaple	MDV106447	SS 556 332		SETTLEMENT	Established, Saxon - 701 AD to 1065 AD (Between)	Barnstaple is the oldest town in North Devon. It is first documented in the 10th century and was probably one of the four Saxon burhs founded by King Alfred in Devon in the late 9th century. Following the Norman Conquest, the Domesday Book of 1086 records that there were over 50 burgesses within the borough and 9 outside. Barnstaple remained the property of the king until the reign of Henry II when it had its first Lord of the Manor. A market and annual fair were in operation by 1274. Its development in the medieval period was mainly due to the growth of trade in wool and woollen materials; overseas trade was particularly important. The Great and Little Quays were constructed in the 16th and 17th centuries to service this trade which continued to expand to accommodate the export of wool and pottery and the importation of tobacco, wine and spices. The scale of overseas trade dropped in the late 18th century and Barnstaple became dependent upon a more local economy; its importance as a regional agricultural and marketing centre did not diminish.	105	179
	MDV14995	SS 555 333		BURH	Saxon - 701 AD to 1065 AD (Between)	Documentary evidence implies that settlement at Barnstaple originated in the late Saxon period, with Beardastapol referenced in association with Pilturn (Pilton) as one of the four defended 'burhs' in the Burghal Hidage of AD 913. The strategic placement of the town, at the lowest bridging point of the navigable River Taw, provided links via the Bristol Channel with Wales, Bristol and Ireland, enabling its development as a significant trading centre. A mint was established in the town in the 10th century. The importance of the town in the late and early medieval periods is further attested in the Domesday.	98	267
Castle	MDV14592	SS 555 333	Note 1	CASTLE	XI to XII - 1066 AD to 1200 AD (Between)	Barnstaple Castle comprised a Norman motte with shell keep and two baileys. The record of demolished houses in Domesday Book is usually taken as evidence for the presence of a castle by 1086 but there is no firm documentary evidence until the early 12th century. It is suggested that there may have been two phases of castle construction, with Judhael responsible for the first stone structure. The castle was said to be in ruins by 1274 and by the mid 16th century had fallen into permanent decay, marking the beginning of a long period of industrial use on the site. Part of the site overlies a Saxon cemetery within which more than 50 graves have been found.	98	267
	MDV14593	SS 556 333	Note 1	MOAT	XI - 1100 AD to 1100 AD (Between)	The moat at Barnstaple Castle is probably contemporary with the 11th century motte. Excavation has shown that the moat was timber piled and filled with water from the river. A wet moat is considered to be an unusual feature for so early a castle. There is still a ditch around the north-east side of the motte.	5	158
	MDV14594	SS 555 333	Note 1	BAILEY	VIII to Late Medieval - 701 AD to 1539 AD (Between)	The inner bailey lies on the north-western side of the motte and was originally enclosed by a bank and moat. Part of it overlies a Christian Saxon cemetery. Trial trenches adjacent to 'The Castle', an 18th/19th century house, revealed extensive features and traces of buildings overlain by a long-established cemetery. Many burials were sealed by a clay and rubble bank, apparently the Norman bailey rampart. A sherd of Norman pottery underlay Phase I of the bank but was above the graves. A large structure, stone-robbed in the 17th century, may have been a castle building.	98	267
	MDV14595	SS 555 333	Notes 1 to 4	BAILEY	XI to Late Medieval - 1001 AD to 1539 AD (Between)	Outer bailey. The castle had two baileys, the outer one being bounded by Tuly Street and Holland Street a fragment of wall with mooring posts called Quay Wall' aligned on this bailey, was found when building the police station to the south of Barnstaple Castle.	98	267
	MDV14596	SS 555 333	Note 1	WELL	Medieval - 1066 AD to 1539 AD (Between)	Barnstaple Castle Medieval well. The covered well was first recorded in the grounds of 'Castle House' which lies within the castle's inner bailey, which was laid to lawn in 1953.	98	267
	MDV14597	SS 555 333	Note 1	CEMETERY	Saxon - 701 AD to 1065 AD (Between)	Excavations in the 1970s in the vicinity of 'The Castle', an 18th/19th century house in the former bailey of the castle, revealed 105 graves belonging to a Saxon cemetery. The general nature of the burials, which were extended inhumations, orientated broadly east-west and the lack of grave goods, suggests that the cemetery was Christian in character. Graves were of both adults and children and were frequently intercut. Some had iron coffin fittings; an infant burial was also packed in charcoal. A number of burials contained 'coffin furniture' in the form of a stone(s) placed with the body, a practice that has been noticed elsewhere in Britain. Over 80 burials were sealed by a clay and rubble bank, apparently the Norman bailey rampart. No dateable finds were obtained but the graves were aligned east to west.	98	267

Table 1a: Historical Environment Entries thought relevant to geophysical survey

Notes
1. Scheduled Monument, List entry Number: 1020922, Barnstaple Castle
2. Listed Building, List entry Number: 1385247, CASTLE LODGE INCLUDING SUNDIAL
3. Listed building, List entry Number: 1385248, ENTRANCE GATES AND GATE PIERS AND ADJACENT WALLS TO PARK AT CASTLE MOUND
4. Listed building, List entry Number: 1385087, 17, CASTLE STREET
5. Listed Building (II) 1385163: 74, HIGH STREET
6. Listed Building (II) 1385169: 85, HIGH STREET
7. Listed Building (II) 1385110: 3, CROSS STREET
8. Listed Building (II) 1385111: 4, CROSS STREET
9. Listed Building (II) 1385164: 75, HIGH STREET
10. Listed Building (II) 1385166: 81 AND 82, HIGH STREET
11. Listed Building (II) 1385167: 83, HIGH STREET
12. Listed Building (II) 1385168: 84, HIGH STREET

County: Devon
District: North Devon
Parish: Barnstaple
Source: Heritage Gateway
Site centre: 255598,133305

Area	HER number	grid reference	designations	type	period	description	distance (m) from site centre	bearing (GN) from site centre
Castle	MDV70642	SS 555 333	Note 1	ARTEFACT SCATTER	Prehistoric - 698000 BC to 42 AD (Between)	A total of 174 prehistoric worked flints were recovered during an excavation to the north of 'The Castle'. Flints were found in the fills of several of the saxon graves that were uncovered on the site, some quite close to the bones. These were initially interpreted as grave goods but could simply have been part of the grave fill.	98	267
	MDV70644	SS 556 333	Note 1	CAUSEWAY	Unknown date	A causeway mentioned during excavations in the castle motte ditch by North Devon District Council. Castle Lane, shown on early maps, may have been	5	158
	MDV70647	SS 555 333		PIT	Medieval - 1066 AD to 1539 AD (Between)	A medieval pit containing bone, charcoal and four sherds of 13th to 15th century pottery, was exposed during a watching brief on Castle Green.	98	267
	MDV50027	SS 556 333		WAREHOUSE	Post Medieval to XIX - 1540 AD to 1900 AD (Between)	Site of a post medieval stone-walled building constructed over the edge of the Barnstaple Castle ditch. The floor was of pottery waste with a layer of clay and grit over which it turn was superseded by cobble floors bedded on sand.	5	158
	MDV853	SS 555 333	Note 1	MANSION HOUSE	Early Medieval to XXI - 1066 AD to 2009 AD (Between)	Site of Castle House and gardens that formerly stood to the north of Barnstaple Castle. Castle house marked on 1855-1895 1:500 town map to the north of Barnstaple Castle and set within wooded gardens. A large irregular but broadly rectangular building with an attached range of buildings off the western end of the north elevation. There is another range opposite flanking an entrance. To the south-east of the house is a large greenhouse. The present Castle House has many features of an early 17th century mansion, mainly the roof and chimneys. The buildings footings were breaking the surface of the ornamental garden in 2003. 'Castle House' is referred to in leases from 1684 and may originally have been the site of the C15 chapel of St Sabinus. When the house was extended in 1790, a skeleton was excavated under the building. C19 sales notices mention various garden features, stables and a coach house.	98	267
	MDV104133	SS 556 333		POTTERY KILN	Medieval XIII	The remains of a pottery kiln dated to the 13th century.	5	158
	MDV70645	SS 555 333	Note 2	LODGE	XIX to XXI - 1830 AD to 2009 AD (Between)	Lodge at entrance to park in front of Castle Mound, and sundial. Probably mid 19th century.	98	267
	MDV70643	SS 555 333		LIME KILN	XVIII to XXI - 1701 AD to 2009 AD (Between)	Site of a limekiln on Castle Green shown on the 1772 Bridge Trust Plan of Barnstaple.	98	267
	MDV38774	SS 556 333		POTTERY WORKS	XVI to XIX - 1600 AD to 1900 AD (Between)	Site of a post medieval pottery industry located between Castle Green and Tuly Street. Three 17th century pottery kilns were excavated on the site of Barnstaple Library car park. A large assemblage of pottery waste was also recovered. Clay pipe fragments found on the site ranged in date from 1600-1720.	5	158
	MDV107246	SS 555 333		FINDSPOT	XVII - 1665 AD to 1685 AD (Between)	Excavations within the castle bailey found waste dumps from the North Walk pottery in the upper levels. These date from circa 1665 to 1685. The products cover a range of domestic pots enlivened by the presence of slip decorated wares including ships, flowers and chickens. Much of the pottery was exported to colonial America.	98	267
	MDV50123	SS 555 333		POTTERY KILN	XVI to XVII - 1600 AD to 1699 AD (Between)	Site of post medieval pottery kiln number 1, Tully Street, one of several excavated in the area.	98	267
	MDV58911	SS 556 334		POTTERY KILN	Post Medieval - 1540 AD to 1750 AD (Between)	Site of post medieval pottery kiln number 2, Tully Street, one of several excavated in the area.	95	1
	MDV58911	SS 556 334		POTTERY KILN	Post Medieval - 1540 AD to 1750 AD (Between)	Site of post medieval pottery kiln number 3, Tully Street, one of several excavated in the area.	95	1
	MDV866	SS 556 332	Note 1	LIVESTOCK MARKET	XIX to XX - 1848 AD to 1980 AD (Between)	Site of the cattle market which stood adjacent to Barnstaple Castle in the 19th and earlier 20th century. The Cattle Market marked on 1880s-1890s 25 inch Ordnance Survey map as a relatively open area to the southeast of the castle with a row of small 'pens' to the south running southwest. On the site of the outer bailey of Barnstaple Castle. Wood's plan of Barnstaple shows a sheep market occupying a long narrow strip running back from present Castle Street in 1843. the plan also shows that the cattle market was held in the open in the present Castle Street.	105	179
	MDV4501	SS 556 333		GATE	XVIII to XX - 1751 AD to 1967 AD (Between)	Tuly Street. Fine stone entrance in style of Gibbs demolished with the reconstruction of the northeast cattle market.	5	158

Table 1b: Historical Environment Entries thought relevant to geophysical survey (continued)

Notes

1. Scheduled Monument, List entry Number: 1020922, Barnstaple Castle
2. Listed Building, List entry Number: 1385247, CASTLE LODGE INCLUDING SUNDIAL
3. Listed building, List entry Number: 1385248, ENTRANCE GATES AND GATE PIERS AND ADJACENT WALLS TO PARK AT CASTLE MOUND
4. Listed building, List entry Number: 1385087, 17, CASTLE STREET
5. Listed Building (II) 1385163: 74, HIGH STREET
6. Listed Building (II) 1385169: 85, HIGH STREET
7. Listed Building (II) 1385110: 3, CROSS STREET
8. Listed Building (II) 1385111: 4, CROSS STREET
9. Listed Building (II) 1385164: 75, HIGH STREET
10. Listed Building (II) 1385166: 81 AND 82, HIGH STREET
11. Listed Building (II) 1385167: 83, HIGH STREET
12. Listed Building (II) 1385168: 84, HIGH STREET

County: Devon
District: North Devon
Parish: Barnstaple
Source: Heritage Gateway
Site centre: 255598,133305

Area	HER number	grid reference	designations	type	period	description	distance (m) from site centre	bearing (GN) from site centre
Adjacent areas	MDV12501	SS 557 332	Notes 5 to 12	SETTLEMENT	VII to XVI - 700 AD to 1540 AD (Between)	Site of a medieval settlement between Paiges Lane, Holland Street and Cross Street. Excavations revealed evidence for a large stone building dating to about 1350. Alongside, Paiges Lane seems to have been developed about the same time, providing access to High Street and to a row of cottages. Beneath these several phases of timber buildings were found dating back to the 11th century and earlier.	146	136
	MDV70638	SS 557 332		HEARTH	Bronze Age - 2200 BC to 701 BC (Between))	A possible Bronze Age hearth exposed during excavations in 1974 between Paiges Lane and Holland Street.		
	MDV19245	SS 555 334		QUAY	XVII to XVIII - 1601 AD to 1800 AD (Between)	Potters quay was located immediately west of the North Walk potteries area. It is known to have been in existence in the 17th century and survived until the River Yeo was embanked in 1757 and North Walk was laid out over the site.	136	314
	MDV19247	SS 556 332		QUAY	Early Medieval to XVIII - 1066 AD to 1800 AD (Between)	Building works on the corner of Holland Street and Castle Street in 1926 revealed several rough mooring posts within an old thick wall. These probably mark the location of the original Castle Quay. Stratigraphy comprised 1.5 - 2.0 metres depth of make up running back from the river, a turf line similar to the soil over the Saxon graves [at the Castle], 1.0 metres of drift deposits. Solid rock was encountered at a depth of 3.0 metres.	105	179
	MDV38715	SS 555 333		FINDSPOT	XVII - 1601 AD to 1700 AD (Between)	Quantities of 17th century pottery have been recovered from North Walk. In excess of 2.0 metres of stratigraphy and large quantities of pottery observed in a deep service trench in 1987.	98	267
	MDV58909	SS 556 333		ROAD	XIII to XVI - 1300 AD to 1600 AD (Between)	A series of clay silts interspersed with roughly laid patches of cobbling interpreted as the surface of the former Tuly Street. The lower levels produced solely 1300-1450 material, whilst the upper levels produced pot from 1450-1600. These road make-up layers formed the original line of Tuly Street until the 2 metre encroachment in the 17th century.	5	158
	MDV63405	SS 556 332		BUILDING	XVIII to XIX - 1701 AD to 1900 AD (Between))	Two 18th-19th century walls were located during groundworks in advance of the construction of an extension to the west of the Marks & Spencer store in Holland Street on the eastern side of the site. Another, undated, wall was revealed to the west of the site. All the walls, however, probably represent buildings shown on the 1843 map of Barnstaple.	105	179
	MDV70636	SS 556 334		WALL	XVIII to XXI - 1751 AD to 2009 AD (Between)	Site of a substantial stone wall excavated in a service trench in Tuly Street in 1987 which may have been a former quay wall.	95	1
	MDV70640	SS 557 332		WELL	(XIV to XVIII - 1301 AD to 1800 AD (Between)	Two wells of the 15th and 18th centuries were excavated in 1977. Many 15th, 16th and early 17th century rubbish pits were also exposed producing a large quantity of artefacts. The present plot boundaries appeared to respect those of the 15th century.	146	136
	MDV104589	SS 556 333		BOUNDARY DITCH	Early Medieval to XVI - 1066 AD to 1600 AD (Between)	Excavations in Tuly Street in 1987 revealed a number of medieval boundary ditches with 16th and 17th century backfilling and clay quarry pits.	5	158
	MDV104683	SS 554 332		FINDSPOT	Post Medieval - 1540 AD to 1750 AD	A service trench in North Walk near the old station in 1985 revealed over 1.0 metres of deposits including preserved timber and post medieval pottery.	224	242
	MDV104795	SS 555 332		QUAY	Unknown date	Line of a possible former quay revealed during a watching brief on service trenches in 1986. The derivation of the place name 'Bardanstapol' suggests that the town was an important mooring point in the 10th century. It is suggested that the earliest moorings may have been located in the sheltered waters of the Yeo, outside the north gate. The main medieval quay, however, lay along the east bank of the Taw with access to the town through the west gate. Traces of the early quay structure have been observed along Castle Street.	144	223
	MDV110240	SS 556 332		WALL	Medieval - 1066 AD to 1539 AD (Between)	A watching brief at the Old Police Station/Kingsley House in 1979 revealed deep deposits near the presumed line of the town wall.	105	179

Table 1c: Historical Environment Entries thought relevant to geophysical survey

Notes
1. Scheduled Monument, List entry Number: 1020922, Barnstaple Castle
2. Listed Building, List entry Number: 1385247, CASTLE LODGE INCLUDING SUNDIAL
3. Listed building, List entry Number: 1385248, ENTRANCE GATES AND GATE PIERS AND ADJACENT WALLS TO PARK AT CASTLE MOUND
4. Listed building, List entry Number: 1385087, 17, CASTLE STREET
5. Listed Building (II) 1385163: 74, HIGH STREET
6. Listed Building (II) 1385169: 85, HIGH STREET
7. Listed Building (II) 1385110: 3, CROSS STREET
8. Listed Building (II) 1385111: 4, CROSS STREET
9. Listed Building (II) 1385164: 75, HIGH STREET
10. Listed Building (II) 1385166: 81 AND 82, HIGH STREET
11. Listed Building (II) 1385167: 83, HIGH STREET
12. Listed Building (II) 1385168: 84, HIGH STREET

Site: An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	m1		possible, dipole		Well cover	anomaly group approximately coincides with a recorded well cover	DHER MDV14596
	m2		possible, positive spread	linear	demolition debris, possibly in a wall robbing trench	likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m3	r9?	possible, positive spread	linear	demolition debris, possibly in a wall robbing trench	likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m4	r17	possible, positive	disrupted linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m5		possible, positive	disrupted linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m6		possible, positive	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m7		possible, positive	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m8		possible, positive	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m9		possible, positive	disrupted curvilinear		if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	m10		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m11		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m12		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m13		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m14		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m15		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m16		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m17		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m18		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m19		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m20		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m21		possible, positive	oval	recent deposit, natural deposit or grave	the anomaly group stands out in the data and, given the proximity of known Saxon graves, it is recorded as a potential grave although it may have a natural or recent origin	DHER MDV14597
	m301		possible, high contrast mixed spread	irregular	rubble with ferrous material	anomaly group is most likely to represent demolition and fill material associated with Castle House	DHER MDV853
	m302		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m303		possible, high contrast mixed spread	irregular	rubble with ferrous material	anomaly group is most likely to represent demolition and fill material associated with Castle House	DHER MDV853
	m304		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m305		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m306		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m307		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m308		possible, high contrast mixed spread	mixed spread	linear	anomaly group may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	m309		possible, high contrast mixed spread	irregular	rubble with ferrous material	anomaly group is most likely to represent demolition and fill material associated with Castle House	DHER MDV853
	m310		possible, high contrast mixed spread	irregular	rubble with ferrous material	anomaly group is most likely to represent demolition and fill material associated with Castle House	DHER MDV853
	m311		possible, high contrast mixed spread	irregular	rubble with ferrous material	anomaly group is most likely to represent demolition and fill material associated with Castle House	DHER MDV853
	m312		possible, high contrast linear		ferrous pipe, drain or cable		
	m313		possible, positive linear	linear	recent path construction deposits		
	m314	r308	possible, positive linear	linear	recent path construction deposits		
	m315	r307	possible, positive linear	linear	recent path construction deposits		
2	m22	r30	possible, negative	linear	stony deposit or wall footing	relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	DHER MDV853 and Historic England scheduled listing 1020922

Table 2: magnetometer survey data analysis

Site: An archaeological geophysical survey
Barnstaple Castle, Barnstaple, Devon
Centred on NGR (E/N) 255598,133305
Report: 1702BAR-R-1

area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	r1		possible, low	return	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r2		possible, high	sub-rectangular	stony deposit or floor surface	anomaly group is most likely be associated with the now demolished Castle House and to represent a floor or stony surface	DHER MDV853
	r3		possible, low	return	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r4		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r5		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r6		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r7		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r8		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r9	m3?	possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r10		possible, high	linear	stony deposit or wall footings	anomaly group is most likely be associated with the now demolished Castle House and to represent a wall footing	DHER MDV853
	r11		possible, high	linear	stony deposit or wall footings	anomaly group is most likely be associated with the now demolished Castle House and to represent a wall footing	DHER MDV853
	r12		possible, high	complex sub-rectangular	stony deposit or floor surface	anomaly group is most likely be associated with the now demolished Castle House and to represent a floor or stony surface	DHER MDV853
	r13		possible, low	return	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r14		possible, low	linear	ditch or linear earthen deposit	anomaly group is most likely be associated with the now demolished Castle House and to represent a robber trench of a former wall footing or a foundation trench	DHER MDV853
	r15		possible, low	linear	ditch or linear earthen deposit		
	r16		possible, low	linear	ditch or linear earthen deposit		
	r17	m4	possible, low	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r18		possible, low	sub-rectangular	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r19		possible, low	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r20		possible, low	disrupted linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r21		possible, low	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r22		possible, low	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r23		possible, low	linear	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r24		possible, low	oval	garden feature, other archaeological deposit or recent service trench	if the anomaly group represents a garden feature then the feature is likely to be associated with Castle House which dated from at least 1684 until its demolition in 1976	DHER MDV853 and Historic England scheduled listing 1020922
	r25		possible, low	irregular	ditch or linear earthen deposit	anomaly group may represent a earthen fill associated with landscaping and/or a part of the filled Motte moat	Historic England scheduled listing 1020922
	r308	m314	possible, linear trends	linear	modern footpath construction deposits		
	r309		possible, linear trends	linear	modern footpath construction deposits		
	r301		possible, linear low	linear	ditch or linear earthen deposit	given the relative angle of this anomaly compared to those most likely to represent the Castle House foundations, it may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	r304		possible, linear low	linear	ditch or linear earthen deposit	given the relative angle of this anomaly compared to those most likely to represent the Castle House foundations, it may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	r303		possible, linear low	linear	ditch or linear earthen deposit	given the relative angle of this anomaly compared to those most likely to represent the Castle House foundations, it may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	r302		possible, linear low	linear	ditch or linear earthen deposit	given the relative angle of this anomaly compared to those most likely to represent the Castle House foundations, it may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	r305		possible, linear low	linear	ditch or linear earthen deposit	given the relative angle of this anomaly compared to those most likely to represent the Castle House foundations, it may be associated with excavation back-filling from an excavation carried out between 1972 and 1975	DHER MDV14597 and Historic England scheduled listing 1020922
	r306		possible, linear trends	linear	modern footpath construction deposits		
	r307	m315	possible, linear trends	curvilinear	modern footpath construction deposits		
2	r26		possible, low	complex return	ditch or linear earthen deposit	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	DHER MDV853 and Historic England scheduled listing 1020922
	r27		possible, high	linear	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	
	r28		possible, high	linear	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	
	r29		possible, low	linear	ditch or linear earthen deposit	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	DHER MDV853 and Historic England scheduled listing 1020922
	r30	m22	possible, high	linear	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	
	r31		possible, low	curvilinear	ditch or linear earthen deposit	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	DHER MDV853 and Historic England scheduled listing 1020922
	r32		possible, high	linear	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	
	r33		possible, low	linear	ditch or linear earthen deposit	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	DHER MDV853 and Historic England scheduled listing 1020922
	r34		possible, high	linear	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	
	r35		possible, high	return	stony deposit or stone footings	anomaly group may represent robber ditches of former stone foundations, either relating to 19th century landscaping or to defensive structures such as the donjon keep built before 1274AD	

Table 3: resistance survey data analysis

<table>
<tr><td colspan="2">Documents
Survey method statement: Dean (2017)</td></tr>
<tr><td colspan="2">Methodology
1. The work was undertaken in accordance with the survey methodology statement. The geophysical survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service/Digital Antiquity Guides (undated).
2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system.
3. Data processing was undertaken using appropriate software, with all anomalies being digitised and geo-referenced. The final report included a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology.</td></tr>
<tr><td colspan="2">Grid
Method of Fixing: DGPS and RTK set-out using pre-planned survey grids and Ordnance Survey coordinates.
Composition: 30m by 30m grids
Recording: Geo-referenced and recorded using digital map tiles.</td></tr>
<tr><td>Magnetometer Equipment
Instrument: Bartington Instruments grad601-2
Firmware: version 6.1</td><td>Magnetometer Data Capture
Sample Interval: 0.125-metres
Traverse Interval: 1 metre
Data capture: automatic data logger
Traverse Method: zigzag
Traverse Orientation: GN</td></tr>
<tr><td>Resistance Equipment
Instrument: Geoscan Research RM15 multi-probe resistance meter
Configuration: twin probe
Mobile probe spacing: 0.5-metres</td><td>Resistance Data Capture
Sample Interval: 1 metre
Traverse Interval: 1 metre
Data capture: automatic data logger
Traverse Method: zigzag
Traverse Orientation: GN</td></tr>
<tr><td>Ground Penetrating Radar Equipment
UTSI Trivue 250 MHz, 500 MHz & 1000 MHz antennas (only 500 MHz data used for reporting)</td><td>GPR Data Capture
Along-line position measurement by integral odometer wheel calibrate for each surface material

Profiles at 0.5m centres within a local grid located by Network RTK GNSS (so within 0.02m OSGB36)

GPR profile layout and RTK set out: Figure 11</td></tr>
<tr><td colspan="2">Data Processing, Analysis and Presentation Software
QCAD Professional
DW Consulting TerraSurveyor3
Manifold System 8 GIS
Microsoft Corp. Office Excel 2013
Microsoft Corp. Office Publisher 2013
Adobe Systems Inc Adobe Acrobat 9 Pro Extended
Reflex v7.2</td></tr>
</table>

Table 4: methodology summary

SITE

Instrument Type:	Bartington Grad 601
Units:	nT
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702

PROGRAM

Name:	TerraSurveyor
Version:	3.0.31.0

Figures 6 and 7

Stats	
Max:	61.41
Min:	-54.86
Std Dev:	18.69
Mean:	3.14
Median:	1.35
Surveyed Area:	0.55ha

Processes: 11

1 Base Layer
2 Clip at 1.00 SD
3 Clip at 1.00 SD
4 Clip at 1.00 SD
5 De Stagger: Grids: All Mode: Both By: -2 intervals
6 De Stagger: Grids: a9.xgd Mode: Both By: -2 intervals
7 DeStripe Median Traverse: Grids: a2.xgd a6.xgd a9.xgd a3.xgd a5.xgd a10.xgd a11.xgd a4.xgd
8 Edge Match (Area: Top 30, Left 240, Bottom 59, Right 479) to Right edge
9 Edge Match (Area: Top 0, Left 240, Bottom 29, Right 479) to Right edge
10 Interpolate: Match X & Y Doubled.
11 Clip at 3.00 SD

Table 5: magnetometer survey - processed data metadata

SITE

Instrument Type:	Geoscan Research RM15
Units:	resistance data (ohms) normalised about a near-zero mean
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702

PROGRAM

Name:	TerraSurveyor
Version:	3.0.31.0

Figures 8 and 9

Stats	
Max:	15.36
Min:	-7.50
Std Dev:	1.41
Mean:	0.04
Median:	-0.05
Surveyed Area:	0.55ha

Processes: 9

1 Base Layer
2 Search & Replace -2047.5 With: Dummy (Area: Top 0, Left 0, Bottom 119, Right 149)
3 Despike Threshold: 1 Window size: 3x3
4 Despike Threshold: 1 Window size: 3x3
5 Despike Threshold: 1 Window size: 3x3
6 Despike Threshold: 1 Window size: 3x3
7 Clip from 20.00 to 60.00 Ohm
8 High pass Gaussian filter: Window: 10 x 10
9 Low pass Gaussian filter: Window: 3 x 3

Table 6: resistance survey - processed data metadata

SITE Instrument Type: UTSI Trivue PROGRAM Name: Reflexw Version: 7.2
Processing of 500 MHz Data 1. time zero set 2. dewow (10 ns) 3. manual gain (0ns:-25dB, 10ns:-10dB, 20ns:5dB, 60ns:30dB) 4. bandpass Butterworth 0 - 1200 MHz 5. running average (3 scans) 6. fk migration (Stolt) using velocity 0.99 m/ns
Timeslice Generation slicing parameters: interp radius X 0.6m Y 0.3m output grid X 0.5m Y 0.25m square weight 0 to 60ns, increment 3 samples

Table 7: GPR survey - processed data metadata