2020

Tyne and Wear

Archaeological
Non-intrusive
Assessment

VINDOMORA SOLUTIONS LTD



LAND SOUTHWEST OF NORTH ROAD
West Boldon, South Tyneside
Tyne and Wear
NGR 434773 561171
Archaeological Non-intrusive Assessment

Project 311-20-AAS | October 2020

on behalf of Mr A Le Blond

Vindomora Solutions Ltd
Archaeological Practice

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Archaeological Non-invasive Assessment

Land southwest of North Road

West Boldon, South Tyneside
Tyne and Wear

October 2020



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SUMMARY

Name of location:	Land south of North Road, West Boldon NE36 0QE
National Grid Reference:	NGR 434773 561171
Client:	Mr. A. Le Blond
Project Type:	Archaeological non-invasive assessment
Local Authority Conservation Team:	Tyne and Wear Archaeology Service
Local Authority Reference:	MON17088
Planning application reference:	PRE-APP
Vindomora Solutions Reference:	311-20-AAS
Report Author:	Tony Liddell
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Ordnance Survey Licence Reference:	100053142
OASIS Reference:	vindomor1-405240
Google Earth Pro:	Licensed 2015-20

CONCISE SUMMARY OF REPORT

In July 2020 Vindomora Solutions Ltd were commissioned by Ethical Partnership on behalf of their client, Mr A Le Blond, to undertake a non-invasive archaeological assessment on land at North Road, West Boldon to inform consultation on a proposed planning application for the site. The assessment comprised a combined desk-based assessment and geophysical survey. The assessment was undertaken in line with paragraphs 8, 11, 184, 185, 187, 189, 190, 197 and 199 and footnote 63 of the National Planning Policy Framework (NPPF).

The study of the known archaeological/historical sites and historic mapping of a 1km radius study area from the centre of the proposed development area (PDA) highlights that the site lies primarily within an area of Later-medieval activity, though a low level of background material belonging to earlier periods does exist within the overall area. The closest prehistoric element, two Neolithic axes, were found 770m to the south of the PDA; the closest Roman instance are architectural fragments found within the fabric of the medieval stonework of West Boldon's Church of St. Nicholas, 230m to the southeast of the PDA boundary.

As noted, the primary archaeological period of interest within the study area is the Later-medieval period, with the PDA lying directly to the northwest of the heart of the 12th century West Boldon Village. The PDA also lies within the expansive system of medieval cultivation, with the earthworks from ridge and furrow still visible within the PDA itself. According to historic mapping, the PDA appears to have been largely untouched since the Later-medieval period, while the study area as a whole sees a massive increase in development from the 17th century onwards.

The study of the aerial photography, LIDAR and geophysics suggests ridge and furrow lying in two directions, potentially with a road or track between them. This track leads to the southwest of the PDA, where the geophysical survey detected a large area of disturbance and the photography and LIDAR suggest a potential building platform, possibly part buried by what appears to be spoil heaps generated by the 19th century quarry located due south of the PDA boundary. If this is a building, it may be medieval

in date, relating to the ridge and furrow field systems, or it could be post-medieval in date relating to the quarry, though a building is not shown on the historic maps, so the latter is unlikely.

The geophysical survey report identified the ridge and furrow systems within the PDA as well several linear/curvi-linear potential sub-surface features. These could be related to natural features/variations or agricultural activity but an archaeological origin for some of them cannot be completely ruled out. The survey also detected strong magnetic disturbances within the survey area, with the survey report noting that the strength of those responses could mask anomalies from other sub-surface features in those areas, should any such features be present.

The archaeological potential, specifically for structures, artefacts and ecofacts relating to the Later-medieval period is categorised as HIGH.

As such, further investigation of the site is recommended prior to development, specifically an earthwork survey of the extant remains within the site, and an archaeological evaluation to target subsurface remains.



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Figure 1. Location of the site, regionally.

1. SCOPE OF PROJECT



Plate 1. Aerial view of the site (dataset © 2020 Google) with the Proposed Development Area highlighted in red.

1.1 Project location

1.1.1 The proposed development area lies on the southwest side of North Road, West Boldon, South Tyneside, Tyne and Wear (centred at NGR 434773,561171). The River Don marks the northwestern boundary of the site, with property boundaries on Don Gardens marking the southern boundary. *Figure 1* shows the location of the site regionally and *Figure 2* shows the location locally.

1.1.2 *Local geology*: The proposed development area is located over a change in geology within the Pennine Upper Coal Measures Formation, with sandstone to the east and interbedded sandstone, siltstones and mudstone to the west. The superficial upper geological horizon is also split, with Devensian till comprising a mix of sand, gravel and clays running northeast-southwest through the centre of the site, a band of alluvium following the River Don to the northwest and Pelaw Clay member to the east (British Geological Survey 2020).

1.1.3 The site lies on a steep slope, with the northwest averaging a height of 29m OD (*Ordnance Datum*, above sea level) sloping to 40m OD to the southeast.

1.2 Circumstances of the Project

1.2.1 In July 2020 Vindomora Solutions Ltd were commissioned by Ethical Partnership on behalf of their client, Mr A Le Blond, to undertake a non-invasive archaeological assessment on land at North Road, West Boldon to inform consultation on a proposed planning application for the site. The assessment comprised a desk-based assessment and geophysical survey.

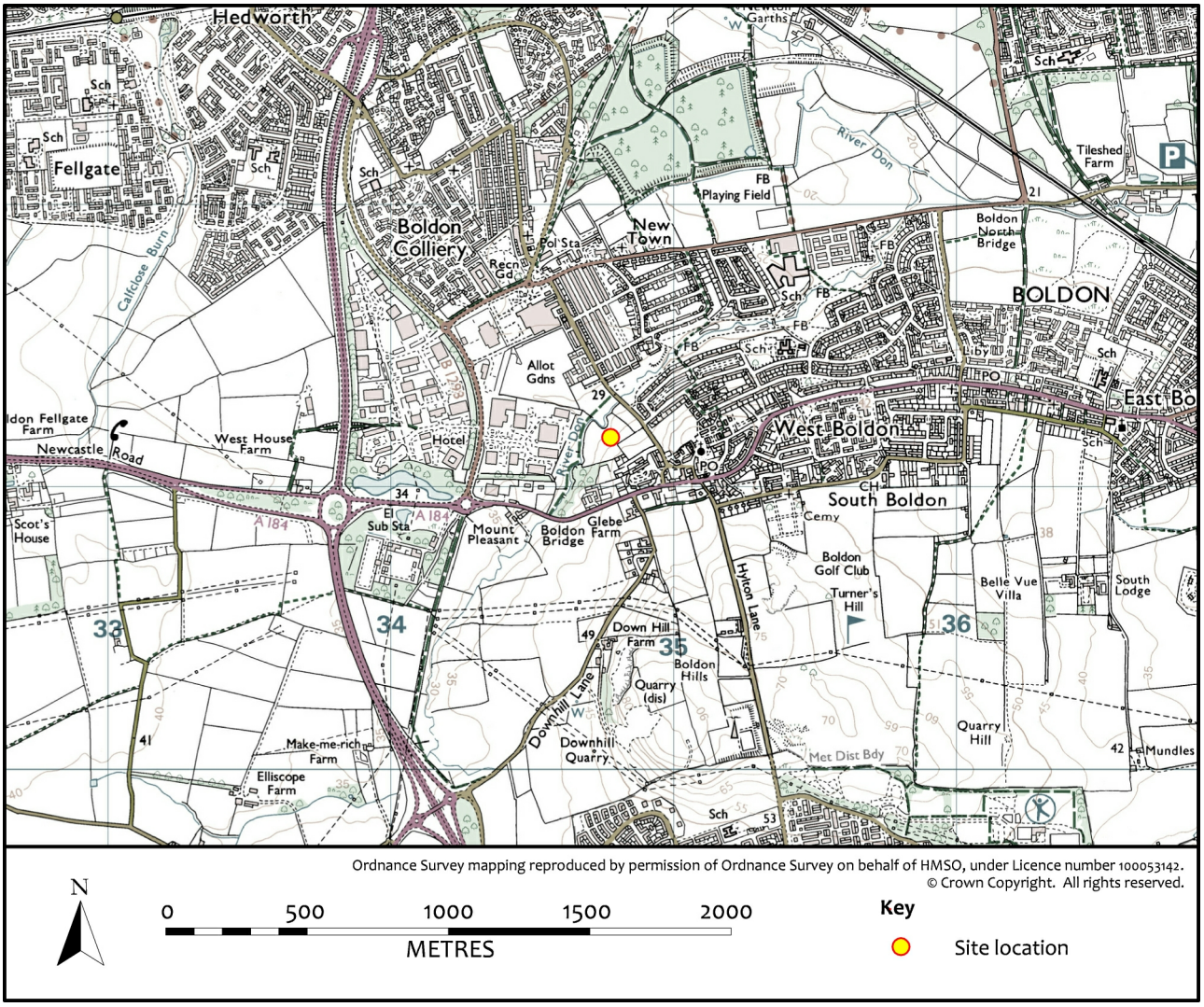


Figure 2. Location of the site, locally.

1.2.2 In April 2020 Sophie Laidler, Archaeology Officer for the Tyne and Wear Archaeology Service requested that prior to the application being determined an assessment should be undertaken, in line with paragraphs 8, 11, 184, 185, 187, 189, 190, 197 and 199 and footnote 63 of the National Planning Policy Framework (NPPF).

1.3 Timetable

1.3.1 The site visit was undertaken on the 20th July 2020.

1.3.2 The geophysical survey, undertaken by Phase Site Investigations Ltd was undertaken on 20th July 2020.

1.3.3 The Historic Environment Record Search data was provided by Newcastle City Council on the 26th August 2020.

1.3.4 This report was finalised on Monday, October 12, 2020.

1.4 Project Personnel

1.4.1 The report, its associated illustrations and research for the desk-based assessment were undertaken and produced by Tony Liddell B.Sc. (Hons), Principal Archaeologist for Vindomora Solutions Ltd. The geophysical survey was undertaken by Phase Site Investigations Ltd.

1.5 Professional standards

1.5.1 All work undertaken was in accordance with the Chartered Institute for Archaeologists' *Code of Conduct* (2014) and their *Standard and Guidance for archaeological geophysical survey* (2014) and *Standard and Guidance for historic environment desk-based assessment* (2014), as well as in accordance with the British Archaeologists' and Developers' Liaison Group's *Code of Practice* (1988).

1.6 Archive

1.6.1 A full archive has been compiled in line with the specification and current UKIC and English Heritage Guidelines. Vindomora Solutions support the **O**nline **A**cces**S** to the **I**ndex of Archaeological Investigation**S** project (OASIS). As a result, this report will be made available to the project under the unique identifier **vindomor1-405240.**

2. THE OVERALL STUDY AREA

2.1 Introduction

2.1.1 Discussion with the Tyne and Wear Archaeology Service suggested that for the purposes of this report, the study area should include a **1km** radius of known material centred at NGR 434773 561171. This section (*Section 2*) details the study area as a whole, with *Section 3* looking at the development area specifically.

2.1.2 The Historic Environment Record (HER) Search data results were provided by Sophie Laidler, Archaeology Officer for the Tyne and Wear Archaeology Service on 26th August 2020. The following report is based on the provided HER data along with the study of appropriate records. **Vindomora Solutions Ltd accept no responsibility for missing or erroneous data within the historical record that impacts on the assessment of the study and development area.**

2.1.3 *Figure 3* shows the extent of the overall survey area with the proposed development area (PDA) centred.

2.2 Scheduled Ancient Monuments

2.2.1 According to the Historic England Map Search facility, no Scheduled Ancient Monuments were recorded within the overall study area.

2.3 Conservation Areas

2.3.1 The PDA lies within the western boundary of the **West Boldon Conservation Area** (see *Figure 3*). Conservation Areas are categorised as "*areas of special architectural or historic interest the character and appearance of which it is desirable to preserve or enhance.*" The West Boldon Conservation Area was designated in 1975, based primarily on the presence of the medieval village. To quote from the area appraisal of 2006, "*West Boldon's location is one of its principal defining characteristics. The village is on the steep western scarp of the northern most of the Boldon Hills (the northern tip of the Durham magnesian limestone plateau), one of the most topographically prominent locations in the region. St Nicholas Church is at the summit and is a major landmark for many miles to the north, with the coal-rich plains of Harton and Simonside panning out below, and the Wear valley towards Hylton to the south. The derivation of Boldon (various historic spellings include Bowedon and Baldon) is 'rounded hill', with don either a reference to the nearby river or derived from dun, an Anglian word for 'hill' (Middleton A, 1983). West Boldon, formerly in Co Durham, is 4 miles south of South Shields, 6 miles north of Sunderland, 4 miles from the coast, and 1 mile from the A19, the main trunk road through the east of the region. The River Don, a tributary of the Tyne rising at Springwell and meandering to Jarrow, flows north-eastwards at the foot of the hill. The village is built on a historic route between Newcastle and Sunderland, now the A184, a busy secondary road. Along the A184 is East Boldon (first identified separately on a 1576 map) and, to the north, Boldon Colliery.*"

2.3.2 With reference to the archaeological potential of development within the Conservation Area, the 2006 appraisal goes on to include "*West Boldon has potentially high archaeological value due to its ancient origins, indicated by designation of the central and eastern part of the conservation area (and a small strip outside it on Addison Road) as an Area of Potential Archaeological Importance in the UDP. As the site of a medieval village, the core of West Boldon could reveal much about such early settlements and contribute to the understanding of its history and that of the county. In addition, several of the standing buildings also have potential archaeological interest including St Nicholas Church, West Boldon Hall, the barns at Hall Green Farm, and other older buildings, eg. on The Folly. A programme of archaeological work, involving an assessment followed by on-site evaluation and/or a watching brief, would be required for any substantial development within the extent of the*

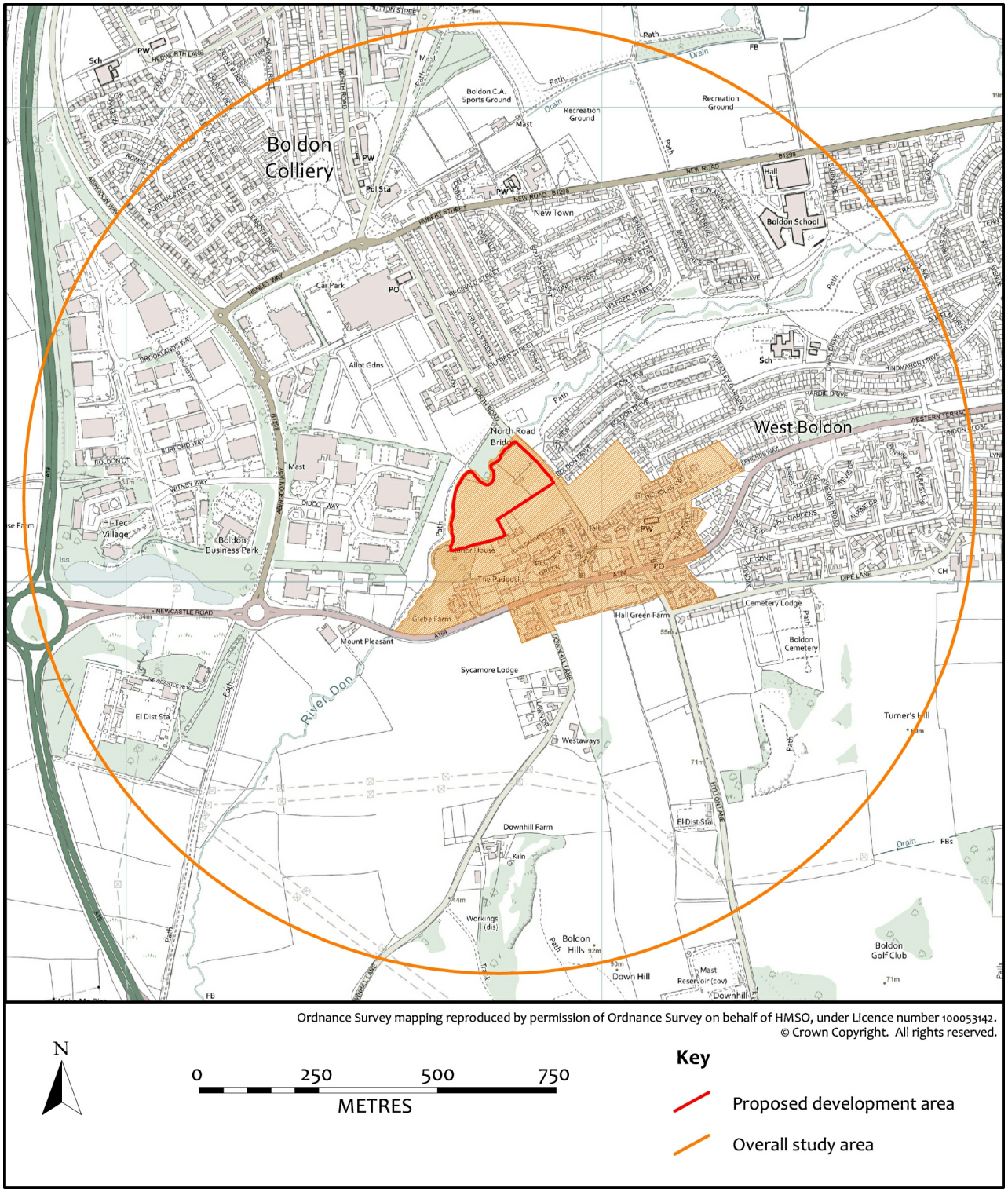


Figure 3. Location of the proposed development site within the West Boldon Conservation Area, and the range of the overall study area.

medieval village as shown on the UDP proposals map. This would be likely to exclude minor development such as conservatories and small domestic extensions."

2.3.3 With direct reference to the PDA, the document states "*As one of the lowest points in the area, the winding valley of the River Don rightly forms the area's boundary, allowing the grassy and tree scattered banks to provide the setting to the conservation area by framing the picture of the village above. It also means that these banks can be one of the wettest parts of the surrounding area, living*

up to their occasional name of the Bog Mires. The river itself is quite shallow though often fastflowing, and contributes to the attractive landscape with many different species of trees along its banks. The paddocks here provide an important green ribbon between the village and Boldon Colliery, though a flat-roofed stableblock intrudes on the hillside scene. A swathe of trees planted on the opposite bank (outside the conservation area) helps mask industry beyond increasing the potential for public enjoyment of the riverbanks, providing this can be accommodated without spoiling their countryside character and nature conservation interests."

2.4 Registered Parks and Gardens

2.4.1 According to the Historic England Map Search facility, no Registered Parks and Gardens were recorded within the overall study area.

2.5 Registered Battlefields

2.5.1 According to the Historic England Map Search facility, no Registered Battlefields were recorded within the overall study area.

2.6 Portable Antiquities Scheme

2.6.1 No finds have been registered on the Portable Antiquities Scheme (PAS) within the overall study area, based upon a 1km search from Post Code NE35 9BL.

2.7 Early prehistoric within the overall study area

2.7.1 Lower and Middle Palaeolithic (*circa* 45,000 to 800,000 BP): *The Lower and Middle Palaeolithic cover the first development of simple tools such as cleavers and hand-axes manufactured from stone. Later lower palaeolithic cultures are associated with early* Homo Erectus*. The Middle Palaeolithic saw changes in tool manufacture techniques, and the development of the species, with a lot of studies concentrating on* Neanderthals*.*

2.7.2 Upper Palaeolithic (*circa* 10,000 to 45,000 BP): *The Upper Palaeolithic often refers to the development of modern* Homo Sapiens *and the increased use of well made tools from stone, bone, antler and wood.*

2.7.3 Mesolithic (*circa* 5,500 to 10,000 BP): *The Mesolithic is often characterised by the beginning of settled communities and the development of more sophisticated weaponry and tools, derived from stone, bone and wood.*

2.7.4 No known archaeological material relating to these periods lies within the study area.

2.7.5 Neolithic (*circa* 2,200 to 4,000 BC): *This period of prehistory marks the introduction and establishment of farming in Britain, as well as the building of a number of monumental structures.*

2.7.6 **HER 17545**: *Tools and Equipment | Cutting Equipment | Axe.* Boldon Hills, two stone axes. Two stone axes were found by a member of the public in fields east of Downhill Quarry and north-west of Nanny Cow Hill, where a barrow was located. The axes were identified as being Neolithic in date by Dr Rob Young on 1 November 2016. One is black and is probably basalt or dolerite. The other is green and is probably Group VI rock from the Lake District.

2.8 Late prehistoric within the overall study area

2.8.1 Bronze Age (700 to 2,600 BC): *Named as such because of the notable increase in bronze being utilised for tools, arms and decoration. This period also includes the Neolithic-Bronze Age transitional period.*

2.8.2 Iron Age (AD 43 to 800 BC) *This period marks the increased use of iron for tools and general use, moving away from the softer bronze-work. It also marks the increased building of large structures such as hillforts and includes the transitional Bronze Age to Iron Age period.*

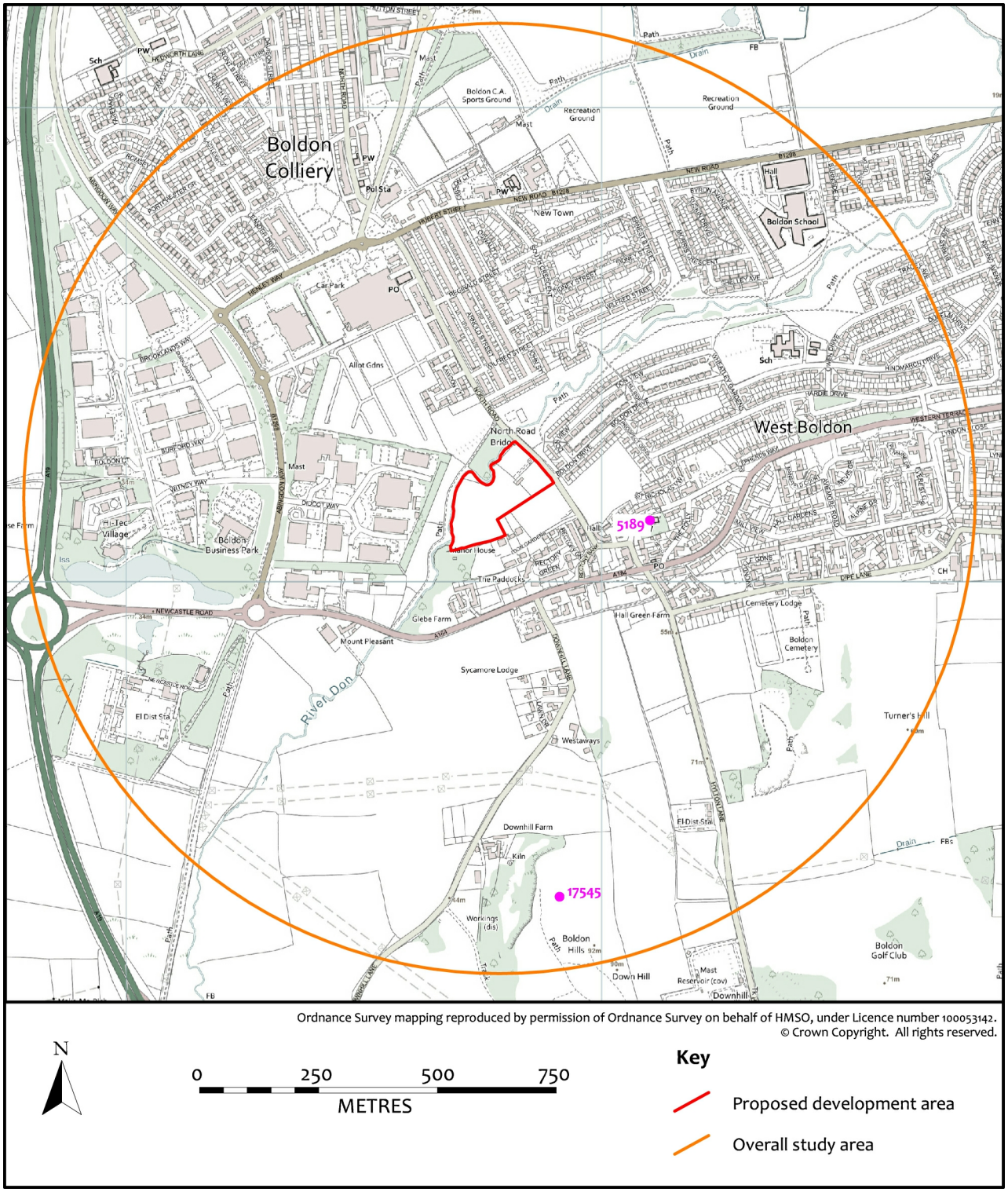


Figure 4. Location of known prehistoric and Roman sites within the overall study area.

2.8.3 No known archaeological material relating to these periods lies within the study area.

2.9 The Roman period within the overall study area

2.9.1 *The Roman period in Britain is marked by Claudius' invasion in AD 43 and ends with Honorius' withdrawal of Roman legion support from the island in AD 410.*

2.9.2 **HER 5189**: *Architectural Fragment.* Roman stones with lewis holes (for the lifting devices of Roman cranes) have been found in West Boldon church. Similar stones have been found at Roker harbour.

2.10 The early medieval period within the overall study area

2.10.1 Post-Roman Britain (AD 410 to mid/late 5th century): *The post-Roman period covers Britain from the breakdown of society after the departure of the Roman legions in Ad 410, to the invasion and subsequent settlement of the Saxons in the later years of the same century.*

2.10.2 The Saxon Migration (Mid/late 5th century to AD 1066) *The Saxons first arrived en-masse in Britain following the departure of the Roman legions, though the date of the actual establishment of Saxon colonies is unknown, and assumed to be in the mid-late 5th century. It is also unknown whether the colonisation was peaceful or enforced, though the one written description of the process by Gildas suggests the latter. The Saxon period came to an end in the battle of Hastings in 1066.*

2.10.3 The Viking incursions and settlement (8th to 11th centuries) *There were a number of viking raids and limited colonisation of Britain during this time period, the oldest known attack being at Lindisfarne, Northumberland, in AD 793.*

2.10.4 No known archaeological material relating to these periods lies within the study area.

2.11 The later medieval period within the overall study area

2.11.1 The later medieval Period (AD 1066 to 1485) *The later medieval period starts with the success of the Norman invasion at the Battle of Hastings in 1066, and sees a huge increase in building technology (such as the building of stone castles) and social expansion. The period ends with the beginning of the Tudor period in AD 1485.*

2.11.2 **HER 954**: *Domestic Settlement | Village.* West Boldon village. The earliest reference to Boldon is 1183 when it formed the model, in Boldon Book, for the management of the bishop's estates. It was a large settlement, with 22 villeins and by the late C13 at the latest had a parish church. In c. 1380 there were 23 holdings of 10 acres each of demesne, 23 bondage lands consisting of a messuage and 2 bovates, 6 cottagers holding 2 cottages and 50+ acres of land, and 9 cottagers with a cottage but no demesne land. Many of the tenants were in all categories. Though West and East Boldon were not distinguished in these surveys, it seems likely that West Boldon was the original settlement, and that East Boldon was a new village of perhaps the C13 and represents a division of the original township. West Boldon is described as "an irregular cluster without a green". Originally the main road passed W and N of the church on its way E.

2.11.3 **HER 958**: *Windmill.* Boldon windmill. In 1381 the tenants of Boldon paid £17 13s 4d rent for one windmill and one watermill: it is not clear which of these might have been the mill mentioned in Boldon Book (a 1183 survey of land belonging to the Bishop of Durham, Hugh du Puiset) . There is no medieval evidence for the location of this windmill. The above grid reference applies to the site of the surviving 18th century windmill situated east of West Boldon.

2.11.4 **HER 956**: *Church | Parish Church.* Listed Building Grade I. Church of St. Nicholas. It had previously been agreed that the church originated in the early C13, and initially consisted of an aisleless nave and chancel, with tower/spire. Before the mid C13 north and south aisles were added to the nave, this going on while the tower and broach spire were being built, the aisles being taken to the west face of the tower. The nave thus acquired three-bay arcades with octagonal piers. A stone-vaulted south porch also dates from the C13.The building underwent several 18th century and 19th century restorations, and the only original windows to survive are those in the tower, and the west walls of the aisles (with dog tooth). Two 14th century priests' effigies. Peter Ryder suggests that this building may date from the Anglo-Saxon period with reused Roman stonework. Ryder suggests Saxon nave. Fittings: One medieval bell and base and shaft of font perhaps 13th century in date. Part of the churchyard wall was archaeologically recorded before demolition and rebuild in May

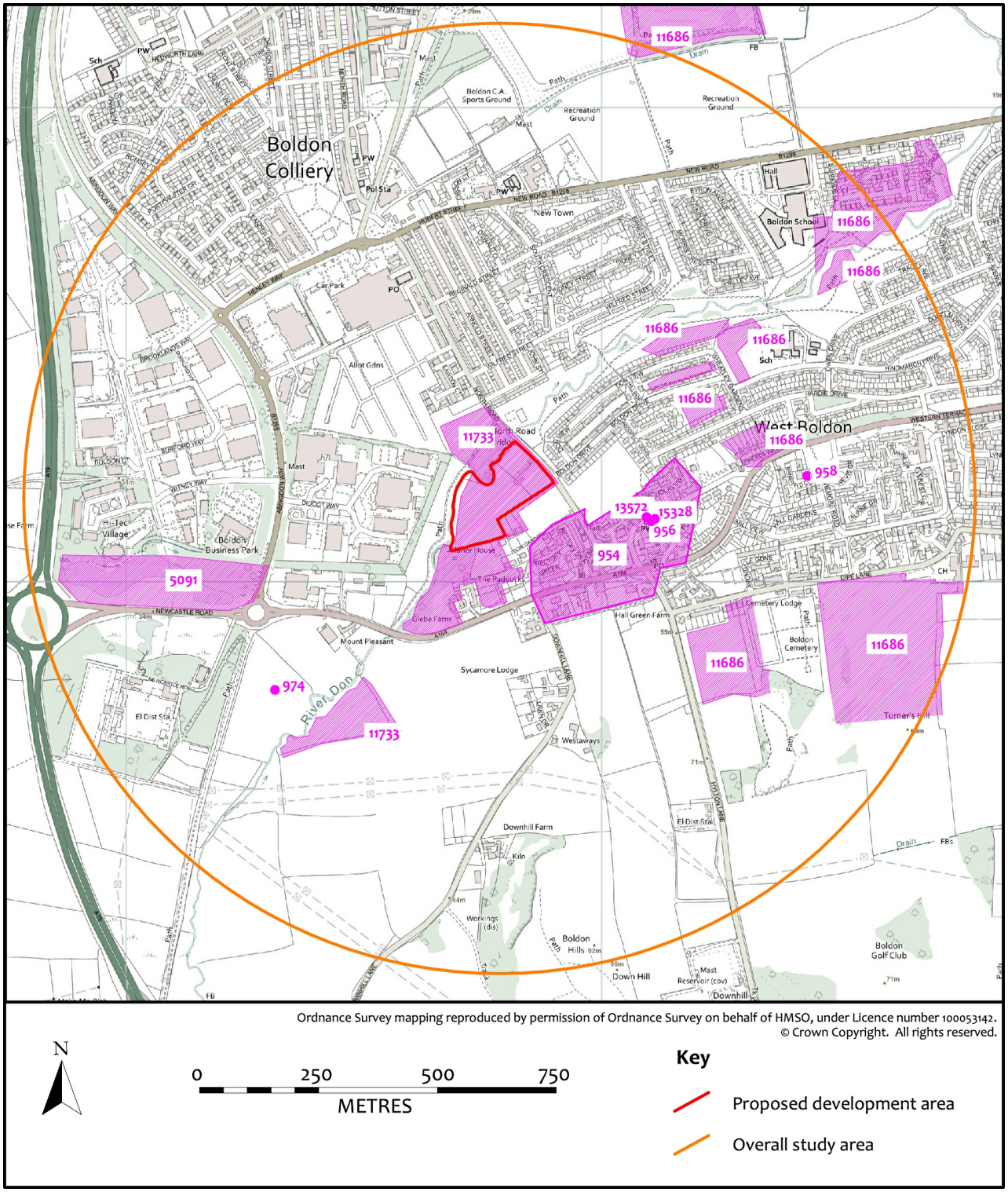


Figure 5. Location of known Later medieval sites within the overall study area.

2004. The upper part of the wall was found to be modern, but the lower third is of an undated earlier build, still with its original mortar. WWI war memorial inside.

2.11.5 **HER 13572**: *Commemorative Monument | Effigy*. Church of St. Nicholas, effigies of priest. The first effigy is located beneath a modern recess in the north wall of the chancel. It is of an unknown priest and is early C14 in date. It is made of sandstone in rough workmanship. The head is tonsured and rests on a square pillow. The hands are joined in prayer. The feet rest on a block carved with foliage. Vestments: amice, alb, stole, chasuble and maniple. The second effigy is beneath a recess

with a segmental arch enriched with roll mouldings, in the south wall of the aisle. Again, it is C14 in date and is an unknown priest. The sandstone is in good condition but the work is crude. The head has been restored and rests on a single cushion. The hands are joined in prayer. The feet rest on two animals joined in one head. Vestments: amice, alb, stole, chasuble and maniple.

2.11.6 **HER 15328**: *Religious Ritual and Funerary | Font*. Church of St. Nicholas, font. The font is the same date as the church - 13th century. Hodgson described it as being 'of very exceptional design indeed'. It is similar to that at Thornley, with its enormous base, the slender stem, minute bowl and the peculiar space between the bottom of the bowl and the torus moulding at the top of the shaft. The font in St. Helen's Auckland has similar decoration. Dimensions of font: depth of bowl 10.5 inches, depth of stem 1 foot 2 inches, depth of base 1 foot 9 inches, diameter of bowl 1 foot 6 inches, diameter of stem 9 inches, diameter of base 2 feet 3 inches, total height 3 feet 9.5 inches.

2.11.7 **HER 974**: *Cultivation Marks | Ridge and Furrow*. Boldon common fields. Ridge and furrow survives as earthworks, or on air photos, east of East Boldon on Boldon Flats (NZ 37 61), south of East Boldon (NZ 36 61 and 36 60), and west of West Boldon (NZ 33 60, 33 61, 34 60 and 34 61). Area retains considerable ridge and furrow, with what appear to be large ditched boundary banks. There are a few mysterious lumps which seem to overlie the ridge and furrow. Miket suggested a site at Boldon Flats NZ 377 614 as a possible prehistoric site. Steve Speak of Tyne and Wear Museums says this is a pond, possibly within a subsidence hollow or collapsed shaft. Now filled in. A channelled drain on its northern drain is of no antiquity.

2.11.8 **HER 5091**: *Cultivation Marks | Ridge and Furrow*. Ridge and furrow earthworks survived [in 1998] on either side of the A184. The site is of botanical importance for its ancient wet grassland (itself evidence for an absence of recent ploughing). The area north of the road (centred on NZ 3392 6097) is bounded to the north by a lake. Ridge and furrow survives to the west of a relict field boundary. The ridges are c7m wide, run north-suth, there are no reversed S curves or headlands, but no original ends survive. The features appear typical of Medieval to 18th century broad rigg. The area to the south of the road (centred on NZ 3413 6084) is very wet, with standing water in furrows at time of visit in 1998. The western part forms a shallow pond, presumably formed either by recent excavation or by mining subsidence. Within the eastern part, faint ridge and furrow is visible. The ridges run east-west and are c2.6m across. They are at least partly bounded to the west by a faint bank. No reversed S curves or headlands are visible. The width of the ridges is abnormally narrow for broad rigg, and the system does not have the rigid straightness and sharpness typical of late 18th century -19th century narrow rigg. However the width is also abnormally wide for cord rigg. Examination of aerial photographs taken before recent development of the area might allow the context and date of the features to be established.

2.11.9 **HER 11733**: *Cultivation Marks | Ridge and Furrow.* Jarrow, ridge and furrow. Several blocks of medieval or later ridge and furrow seen on air photographs. Some of the blocks have the classic curved pattern indicative of medieval cultivation. Much has been built over but some still survives.

2.11.10 **HER 11686**: *Cultivation Marks | Ridge and Furrow.* Boldon Flats, ridge and furrow. Ridge and furrow of Medieval or Post Medieval date seen as earthworks and mapped from air photographs. Most of these remains still survive. There is particularly good earthwork survival from the west beside the River Don, on Boldon Flats and to the east in the area of Cleadon Hills Farm. Other remains have been destroyed by development in Cleadon and Boldon. A small area of ridge and furrow north of Mundles Farm on Mundles Lane, East Boldon (NZ 3662 6011), is on South Tyneside Council's Local List. The ridge and furrow north of Cleadon Hills Farm is also on the Local List. Surveyed as part of a ridge and furrow project by ASUD in 2013. The report concluded that the narrow ridge and furrow suggests cultivation continued on from the medieval into the post-medieval period on the common fields. Later field boundaries overlying cultivation remains may date from enclosure c.1658.Ridge and furrow varies in size between c.3.5-6m between the crowns of ridges and c.0.1-0.3m in height. Several banks were also recorded which may relate to upcast from drainage ditches or used as boundaries. To the east, north-south orientated furrows with a

wavelength of c.5m were found during an evaluation at Albert Elliot School. To the south of Cleadon Hills Farm the R&F has been ploughed out but the line of the S-curve is preserved in boundary walls.

2.12 The post-medieval period within the overall study area

2.12.1 The Tudor Period and Elizabethan Era (AD 1485 to 1603): *This marks the period of time where Britain was ruled by the Tudor monarchs and includes pivotal events such as the Dissolution of the Monasteries in circa 1540. The Elizabethan era marked the end of the Tudor period and was named such due to the reign of Queen Elizabeth I (1558-1603).*

2.12.2 No known archaeological material relating to this period lies within the study area.

2.12.3 Stuart Period (AD 1603 to 1714): *This era covers the reign of the Stuart monarchs, with King James I being the first and the last being Queen Anne. This period is known for civil unrest and includes the English Civil War, the Popish Plot, the Glorious Revolution of 1688 and the Anglo-Dutch Wars. The last of the Stuart monarchs, Queen Anne died in 1714 without an heir to the throne and was succeeded by her second cousin, George of the House of Hanover, who became George I on the 1st August 1714.*

2.12.4 **HER 5070**: *Burial | Inhumation*. Human skeleton discovered by workmen laying sewers on a building site in 1976. The remains were found 2ft below the surface on a layer of solid limestone. Three skeletons were found nearby in 1965, and these were suggested as plague victims or soldiers from the Battle of Boldon Hill in 1644.

2.12.5 **HER 888**: *Inhumation Cemetery | Friends Burial Ground*. West Boldon, Quaker Burial Ground. "In process of time, when frds increased", the Sunderland Meeting's burying ground was usually "at West Bowden in ye garden of Christopher Trewhitt, where...a great many of our frds were buried, as also from Shields". The distance from Sunderland proved too inconvenient, and in 1670 the Friends acquired the first of their burial grounds in Sunderland (HER 64). The earliest reference found to a burial at Boldon is 1657, the latest 1670. Phillips could not locate this cemetery. The OS give the grid ref used in the HER, based on a published letter from Rev. J.T. Brown, who said that in the extreme north-west corner of the garden of the old hall 11 skeletons in soft wood, unmarked, coffins were dug up in c. 1899. He had learned that this was traditionally, the site of the Quaker burying ground.

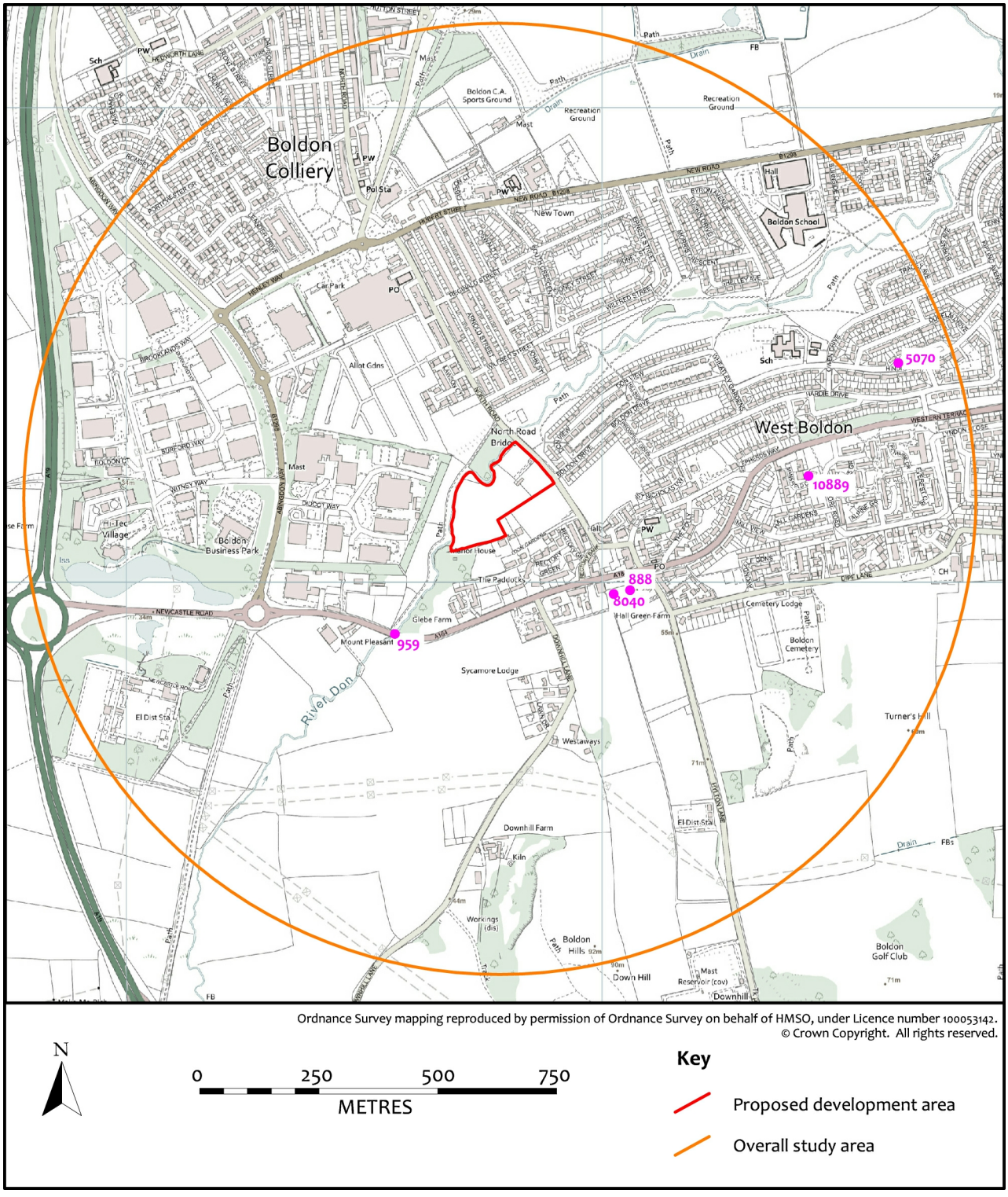
2.12.6 **HER 959**: *Transport Bridge*. Boldon bridge. In 1609 Richard Fawcett, parson of Boldon, left in his will 20s for the mending of Boldon Bridge. On the 1st ed. OS map this name is applied to the bridge which carries the Newcastle to Sunderland road across the River Don west of West Boldon.

2.12.7 **HER 8040**: *Domestic dwelling house*. Listed Building Grade II*. Large house, dated 1709 on Fawcett arms over door; incorporating part of an earlier house. Sandstone ashlar with Welsh slate roof. Simple block plan. 2 storeys, 5 windows, central door on west side with moulded architrave and open segmental pediment on brackets. Windows have 24-pane sashes, with broad glazing bars, except for the rear which has cross windows at ground and first floor north, a central round-headed staircase window with narrow glazing bars, and the south elevation which has, at its east, 4-light ground and 3-light first floor mullioned and transomed windows. String course at first floor level, and moulded eaves cornice. Roof is hipped with swept eaves and a central rectangular well; two massive stone chimneys at rear have 3 sets backs; 2 others on the side ridges. The interior has bolection moulded fielded panelling throughout the ground floor save in the kitchen at the south east; all chimney pieces are bolection moulded, most are in the corners of rooms; the kitchen has a flattened Tudor-arched stone lintel at the chimney breast. There are early C18 niches, a corner cupboard, round-headed arches, architraves, doors and hinges. Staircase has small open well; decorated tread ends; balusters with turned and graduated twist sections. Kitchen door plank and batten. Restored in 1939.

2.12.8 **HER 10889**: *Battlefield*. On 25th March the Scots dug in cannon emplacements and at 2pm there was a skirmish at Boldon windmill. Hand-to-hand fighting near Boldon Hills followed (the so-called Battle of Boldon Hills is described under the Battle of Hylton, HER 26).

2.12.9 Georgian era (AD 1714 to 1837): *The Georgian era covers the period from when George I was crowned on the 1st August 1714 to when Queen Victoria became monarch in 1837. The Georgian era marked a period of further unrest, and includes the Jacobite Risings or 1715 and 1745.*

Figure 6. Location of known sites dating to the Stuart Period within the overall study area.



2.12.10 **HER 1601**: *Domestic house | Farmhouse.* Listed Building Grade II. Downhill Farmhouse. House and hind's cottage, now one dwelling. Rendered, with Welsh slate roof. Two storeys; 4 bays. House at east: central door in architrave, 3 sash windows. Cottage at west, of one bay, has sash windows, the ground floor one wider. Roof has flat stone coping, end brick chimneys and chimney between house and cottage.

2.12.11 **HER 8370**: *Farm Building | Barn*. Listed Building Grade II. Downhill Farm, barn and gin-gang. Late C18/early C19. Three builds. Roughly squared coursed limestone and sandstone rubble; pantile and Welsh slate roofs with stone gable coping. Two low storeys. Older part with first floor loading bay. Later part has gin at right angles with internal beams and horse wheel complete, a rare survival.

2.12.12 **HER 8050**: *Domestic Lodge.* Listed Building Grade II. Pair of lodges. C18. Eastern cottage: rendered stone; pantiled roof. 2 storeys, the 2nd very low; central door in stone architrave with sash window at left and blank wall at right; 2 small windows above; gable facing road has large Gothick window, band which continues along front eaves, and crenellated parapet; roof hipped at other end; rear chimney. Western cottage: rendered stone; gable has empty Gothick window, band, and crenellated parapet; no roof; derelict at time of survey.

2.12.13 **HER 8058**: *Domestic dwelling house.* Listed Building Grade II. House and wings now 5 separate dwellings. Late C18/early C19. Main house: coursed squared limestone with ashlar sandstone porch; Welsh slate roof. 2 storeys, 5 windows originally but 2 late C19 windows and doors inserted in 2nd bay. Square, one-storey porch, 2nd bay from right, has open-pedimented Tuscan doorcase with 8-panelled door and decorated round fanlight in deep reveal panelled in same style as door; margined sashes in side walls; dentilled cornice and blocking course. low-pitched roof to house has wide eaves, 3 transverse chimneys. Wing to west : rendered; 2 storeys, 1 window, door; flat roof. Wing to east at rear : ashlar with canted bay window, brick return; pantiled hipped roof.

2.12.14 **HER 8164**: *Domestic dwelling house.* Downhill House. Listed Building Grade II. C18. Rendered brick with stone quoins; Welsh slate roof. Simple block plan. 2 storeys; 5 windows, having lost glazing bars, with architraves: central 6-panelled door in architrave with brackets and pediment; band at first floor cill level. Mansard- roof has stone coping on moulded kneelers; 4 end brick chimneys. Interior has later staircase balustrade, doors and chimney pieces; window shutters remain. Historical note: this was an early Aged Miners' Home bought by the Boldon miners soon after the Association was founded in 1894, but has since returned to private occupation. Recording was carried out by TWM in 2008 ahead of proposed renovation work. ASUD conducted a Phase 2 recording of the building in 2010. A number of decorative and utilitarian features were recorded including plaster cornices, painted wall decoration, former cellar windows and a kitchen range with cylindrical oven. The recording was carried out ahead of a conversion to residential use.

2.12.15 **HER 9631**: *Domestic dwelling house.* Rectory Bank, Nos. 27 and 29. Pair of three-bay Georgian houses. No. 27 has new windows. Unusual two-leaf outer doors to classical timber door cases. Remnant of railings to No. 29.

2.12.16 **HER 9632**: *Domestic dwelling house.* Rectory Bank, Osborne House and Gateshead House. An impressive double-fronted Georgian house in hand-made bricks and original slare roof. Sliding sash windows and a smart classical timber door surround with dentilled cornice and panelled pilasters. One of the most authentic and charming groups in the Conservation Area.

2.12.17 **HER 9633**: *Domestic dwelling house.* Gateshead Terrace, No. 10. An early C18 stone house with a later hand-made brick frontage. A carriage arch, stone corniced chimneys and large timber scroll door hood.

2.12.18 **HER 11461**: *Domestic Multiple Dwelling | Terrace*. St. Nicholas Road. Early limestone cottages and Victorian red-brick terraces. The west side of the road has two C18 cottages, one of which is part of the Wheatsheaf Public House range, and has large quoins. Despite replacement timber windows it is otherwise intact and attractive. There are two carriage arches near to Dhaka Tandoori.

2.12.19 **HER 11462**: *Domestic House | Detached House.* Newcastle Road, Hill Top House. A large impressive house built in 1701 for the overseer of the Newcastle Road when it was a toll road. Well restored, with 6-over-6 sash windows and a small well-designed extension. The concrete pantile roof is not in keeping.

2.12.20 **HER 11464**: *Domestic Dwelling House.* Rectory Bank, Harper's Buildings. C18 houses with a strong back-of-pavement presence, hefty roof, early sash windows, panelled doors and porch canopies. Rendered.

2.12.21 **HER 8679**: *Domestic Clergy House | Vicarage.* Church of St. Nicholas, rectory. An ancient building, now demolished. Refaced in 1785 by the Rev. Blackett. The rectory was the home of Rev. Henry George Liddell and his wife Charlotte Bowes Lyon from 1814 to 1829. They were the grandparents of Alice Liddell for whom Lewis Carroll wrote "Alice in Wonderland". A door to the former rectory green survives and is listed (HER 8061).

2.12.22 **HER 8061**: *Doorway*. Listed Building Grade II. Doorway in wall of grounds of demolished rectory. C18. Sandstone. Moulded architrave, pulvinated frieze, moulded pediment with stone coping. Pevsner tells us that the rectory on Rectory Bank was a two-storey Dobsonian classical building with south front of c.1840 with two big canted bay windows at either end. Behind it were much older parts. It was demolished around 1970.

2.12.23 **HER 8150**: *Barrier wall.* Listed Building Grade II. Ashlar dressed walls at front of house with moulded coping having 4 square piers with plinths, pilasters which are fluted on the central piers, overhanging cornices and bell capitals with ball finials.

2.12.24 **HER 958/1588**: *Windmill.* Boldon windmill. 18th century windmill situated east of West Boldon. Listed Building Grade II. Boldon Mill, which dates from 1834 once stood in virtual isolation but is now surrounded by modern housing. It has recently been adapted and extended as a dwelling although its basic form is still clearly discernable. Constructed of sandstone rubble with roughly dressed cills and lintels to openings, it has entrances to both north and south elevations together with small square windows at each floor level on all four sides except at first floor facing west. The cap and sails were removed some time ago and the top floor is protected by a flat roof hidden behind the upper courses of masonry. Built in 1834 but had a short working life. On 18th November 1893 a storm caused the sails to rotate so fast that when the miller applied the wooden brake to the brake wheel, the heat caused a fire. Everything except the stone tower was destroyed. In wartime it was used as an observation post.

2.12.25 **HER 2290**: *Transport Railway*. Stanhope & Tyne Railway (NER, Pontop and South Shields Branch) An unnamed waggonway is shown on Gibson's map of 1788 labelled 'to the staith 6 3/4 mile'. Also shown on Hobson, 1839, Bell 1843 and the tithe map 1847. Originally the Stanhope and Tyne Railway, the line opened in 1834. The Stanhope and Tyne Railway Company quickly went bankrupt, and the railway had several subsequent owners. Built by an Act of Parliament. In the west, between Stanhope and Vigo, where it was steeper, there were stationary engines, self-acting inclines and horsepower. In the east locomotive engines were used. At South Shields the three drops (HER 2336) each had a vibrating frame and counterbalance weight, which allowed vessels to receive their cargoes even at low tide. The line was designed to carry coal from colleries to the kilns in the limestone quarries at Stanhope, and limestone back again. Construction utilised iron fish-bellied rails on stone blocks. The gauge of the line was 4ft 8 inches. Passenger services between South Shields and the Durham turnpike commenced in 1835 - this was the first public railway on Tyneside. From 1842-1846 the line was run by the Pontop and South Shields Railway Company, which included many of the original shareholders. George Stephson was Chairman. Coal freight was the main traffic. In 1844 part of the line was run by the Newcastle and Darlington Junction Railway Company as part of the east coast route from London to Gateshead. In 1847 the Pontop and South Shields Railway Company was absorbed by the Newcastle and Darlington Junction Railway Company, run by George Hudson. The company changed its name to the York, Newcastle and Berwick Railway Company in 1848, and to the North Eastern Railway Company in 1854. Passenger services ceased

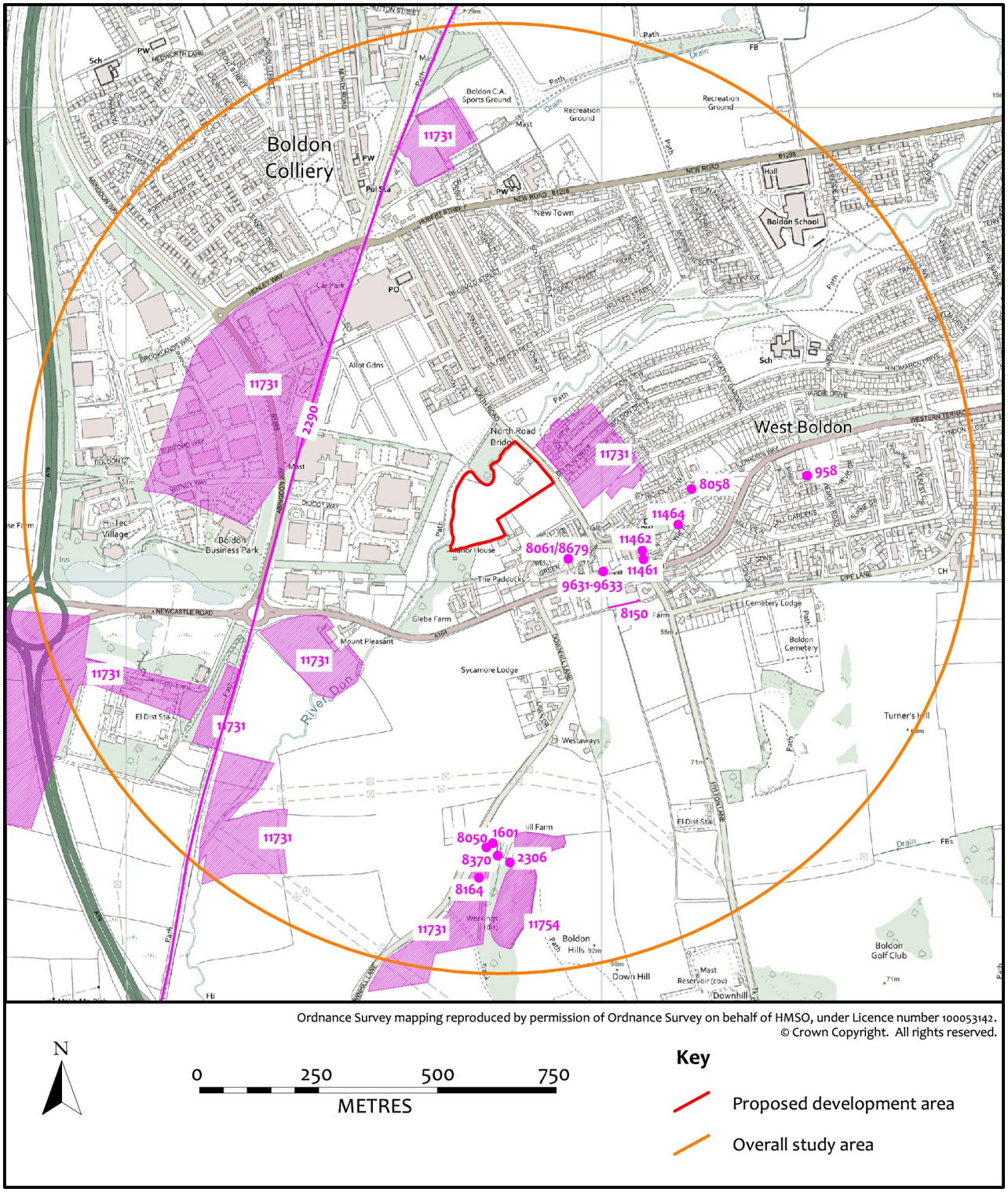


Figure 7. Location of known sites dating to the Georgian era within the overall study area.

east of Washington in 1853 and west of Washington in 1869. The National Coal Board used the line until it was closed to freight traffic in 1966. The line finally closed in 1981. The track was lifted and the section from Consett to Washington East became the Sustrans cycle route, which opened in 1990. Much of the dismantled railway line remains unused however.

2.12.26 **HER 2306**: *Industrial kiln site | Lime kiln | Post-medieval (C18-C19).* A lime kiln, on east side of Down Hill, is not shown on the 2nd edition OS mapping, so out of use by 1895. A three arched kiln of limestone rubble dating from the late 18th century or early 19th century set into a steep

escarpment, being more typical of the small kilns producing lime for agricultural purposes than any of the other surviving kilns in the county.

2.12.27 **HER 2305/11754**: *Industrial Stone Quarry | Limestone Quarry.* Downhill Quarry. Two limestone and sand quarries at NZ 3481 6037 and NZ 3484 6011 with a lime kiln (HER 2306, listed grade 2) set into the side the northernmost quarry. The northern quarry was used for a Prisoner of War Camp (HER 5852).

2.2.28 **HER 11731**: *Agriculture and Subsistence | Cultivation Marks | Narrow Ridge and Furrow.* Jarrow, ridge and furrow. Several blocks of post medieval narrow ridge and furrow seen on air photographs. Most has been built over but some survives south of Jarrow. A section on Monkton Fell (NZ 3217 6257) next to the Metro line is on the Local List.

2.12.29 The Victorian era (1837 to 1901): *The Victorian era covers the reign of Queen Victoria from her coronation on 20th June 1837 to her death on 22nd January 1901. This era marked a period of prosperity and reform.*

2.12.30 **HER 9623**: *Farm | Farmstead.* Dipe Lane, Hall Green Farm. Converted for residential use in 2006. Two out of three barns were rebuilt due to structural issues. The farm is first shown on the tithe map of 1840. Evaluation trenching by TWM Archaeology produced 19th century remains. A watching brief in 2007 recorded a stone walled pit and stone drain.

2.12.31 **HER 9640**: *Farm | Farmstead.* Newcastle Road, Mount Pleasant Farm. 19th century farm. Shown on the 1st edition Ordnance Survey map.

2.12.32 **HER 2308**: *Industrial stone extraction site | Quarry | Post-medieval (C18-19).* Quarry marked as 'Old' on the 1st edition OS mapping so out of use before 1857. The 1st edition mapping also shows a track to limekilns (HER 2309), suggesting that this was a limestone quarry, supplying those kilns. This quarry seems to have been reworked between 1855 and 1895 as 2nd edition OS mapping, where it is again marked as Old shows that it had expanded during that period.

2.12.33 **HER 2309**: *Industrial kiln site | Lime kilns.* Limekilns. These appear to be the two shown on 1st edition OS mapping, 1857 survey, with a track linking them to quarry (HER 2308). They are not shown on 2nd edition OS mapping, so out of use by 1895.

2.12.34 **HER 2310**: *Industrial stone extraction site | Quarry.* Quarry marked as 'Old' on the 1st edition OS mapping so out of use before 1857.

2.12.35 **HER 2312**: *Industrial stone extraction site | Quarry.* Quarries at West Boldon, marked as 'Old' on 1st edition OS mapping so out of use by 1857.

2.12.36 **HER 2307**: *Industrial stone extraction site | Quarry.* Robinson's Quarry is marked as 'Old' on the 2nd edition OS mapping, so out of use by 1895.

2.12.37 **HER 2304**: *Industrial leather industry site | Tannery.* West Boldon, Down Hill, Tannery shown on 1st edition Ordnance Survey Map, c.1855, 6 inch scale, Durham, 7.

2.12.38 **HER 16741**: *Water Storage Site | Well.* North Road, well. North Lane Well marked on the First Edition Ordnance Survey Plan, 1862. Gone by 1897 edition.

2.12.39 **HER 8063**: *Funerary Site | Tomb.* Listed Building Grade II. Church of St. Nicholas, Edward family tomb. Mid C19. W Wilson, Tweedmouth, mason. A low stone kerb, from which iron railings have been cut, surrounds a village pump-like column of sandstone capped by an ogee dome. Inscription : THE FAMILY OF EDWARD ..... and a band of quatrefoil decoration.

2.12.40 **HER 16740**: *Religious Ritual and Funerary | Methodist Chapel | Wesleyan Methodist Chapel.* Addison Road, Wesleyan Methodist Chapel. Wesleyan Methodist Chapel shown on the First Edition Ordnance Survey Plan, 1862. Seated 200 people.

2.12.41 **HER 2311**: *Railway Transport Site | Railway Station.* Boldon Station, on the North Eastern Railway, Pontop and South Shields Branch (SMR 2290). Marked as a Coal and Lime Depot on the 1st edition OS mapping, 1857 survey. May have been conveying lime from the quarries and kilns around Down

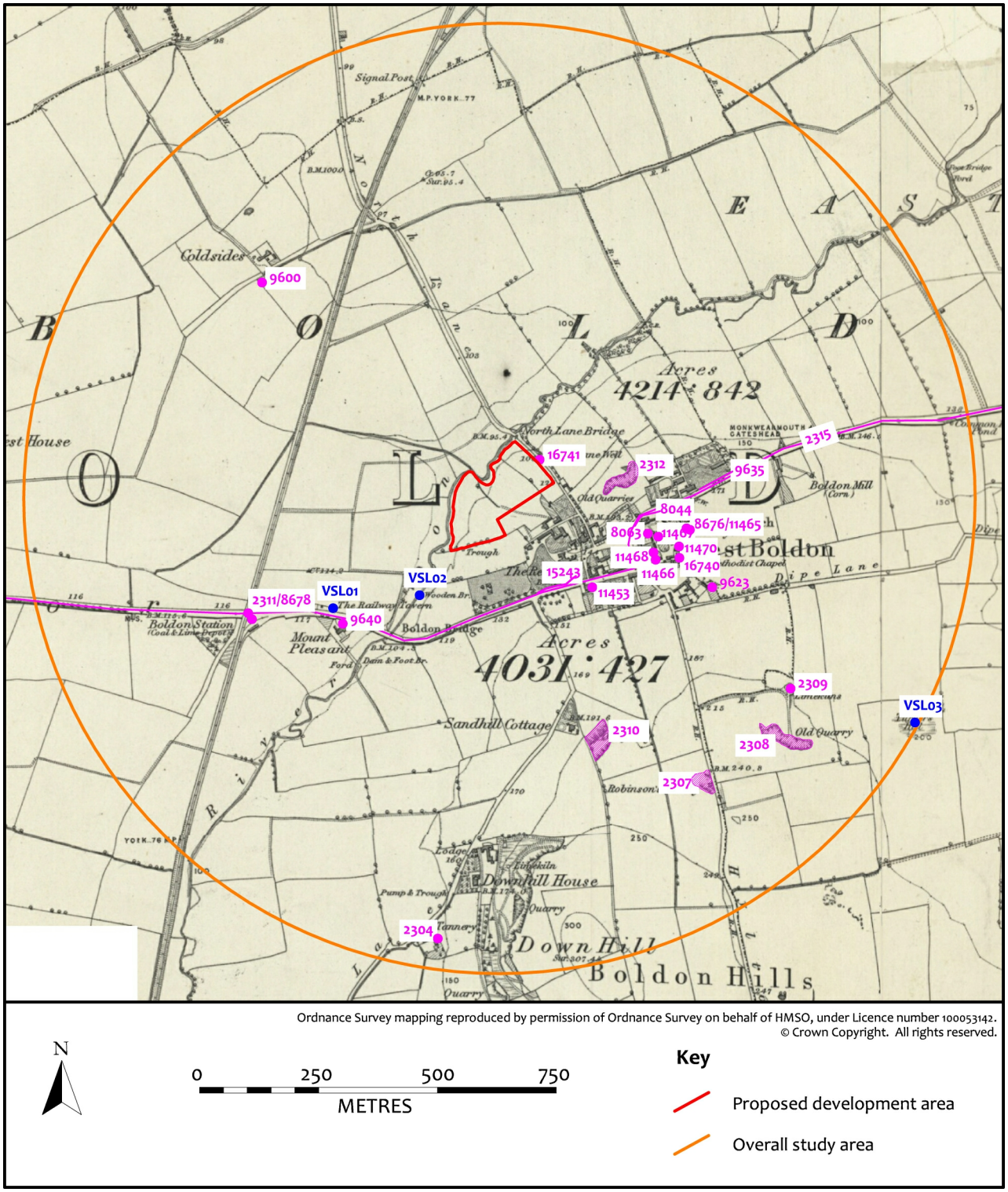


Figure 8. Extract from the 1855 Ordnance Survey showing sites in place by 1855.

Hill. Originally a passenger station, later a lime and coal depot. The goods yard and coal depot have been reconstructed at Beamish Museum.

2.12.42 **HER 2315**: *Transport Road | Toll Road*. Toll Road from Gateshead to Monkwearmouth, including Scot's House Turnpike Toll House (HER 2299) and Whitburn Moor Check Gate (HER 2324).

2.12.43 **HER 8678**: *Railway Transport Site | Level Crossing*. Level crossing on the Newcastle to Sunderland Road (HER 2315). Opened in 1834 on the Pontop & South Shields branch of the Stanhope line (HER 2290). There was no signal box until 1903.

2.12.44 **HER 8676**: *Domestic dwelling house.* Situated in the area known as "The Folly". A strange looking house which was demolished for a new road. Legend says that a retired sea captain built this tall house so he could gaze out to sea from an upper window. Close to this site, near Folly Gate, local victims of the 1874 smallpox epidemic were buried in communal graves.

2.12.45 **HER 9600**: *Domestic dwelling house | Post-medieval (C19).* Henley Way, Dunelm House.

2.12.46 **HER 11465**: *Domestic Dwelling House.* The Folly, Nos. 1 and 2. C19 irregular sized houses with some original pantiles. Windows are modern replacements. Rendered and painted white.

2.12.47 **HER 11466**: *Domestic Dwelling House.* The Folly, No. 5. C19 house with some original pantiles. Windows are modern replacements. Rendered and painted white. Collection of agricultural outhouses to the rear. Boundary walls and sturdy five bar gate give a pastoral feel.

2.12.48 **HER 11467**: *Domestic Dwelling House.* The Folly, Avery Cottage. C19 house. Guards the now blocked entrance to St. Nicholas churchyard.

2.12.49 **HER 11468**: *Domestic Dwelling House.* Addison Road, Hillside and Grosmont. C19 houses.

2.12.50 **HER 11470**: *Domestic Dwelling House.* The Folly, Brown's Buildings. C19 houses.

2.12.51 **HER 11453**: *Domestic multiple dwelling | Terrace.* Newcastle Road, Rectory Terrace. At the centre of the terrace is a pair of Victorian houses in local stone faced with red brick. They have attractive margined sashes (well-designed double-glazed replacements) and simple classical door surrounds (No. 7 is a replica). One chimney has been shortened. No. 5, a shorter 1950s house (known as the doll's house) is a simple unassuming infill development.

2.12.52 **HER 8044**: *Barrier wall | unknown date.* Listed Building Grade II. Church of St. Nicholas, dwarf retaining wall of limestone rubble with stone coping either side of the path leading from the main gate to the south porch. The sandstone ashlar gate piers support an overthrow and lampholder of wrought iron.

2.12.53 **HER 15243**: *Boundary Wall.* Rectory Green, boundary wall. Sandstone wall.

2.12.54 **HER 9635**: *Boundary Wall.* Harton View, Mansion House, wall and railings. Rubble stone boundary wall.

2.12.55 **VSL01**: *Commercial Licensed Premises | Public House.* Site of the Railway Tavern, illustrated on the 1st edition Ordnance Survey map (NGR 434436 560944). Tavern site in use until the late 20th century.

2.12.56 **VSL02**: *Bridge*. Site of wooden footbridge, illustrated on the 1st edition Ordnance Survey map (NGR 434617 560971).

2.12.57 **VSL03**: *Hill*. Site of 'Turner's Hill', illustrated on the 1st edition Ordnance Survey map (NGR 435659 560704).

2.12.58 **HER 2571**: *Industrial stone extraction site | Quarry | Post-medieval (C19).* Quarry, marked as 'Old' on 2nd edition OS mapping, so out of use by 1895. These are not shown on the 1st edition OS mapping, so quarrying occurred after 1855.

2.12.59 **HER 2567**: *Industrial Coal Mining Site | Colliery.* Boldon Colliery, possibly associated with the adjacent brickworks (HER 2569). It was adjacent to and served by the Pontop and South Shields Branch of the North Eastern Railway (HER 2290). Opened 1862 (or 1866?), closed 24 June 1982. It was opened by the Harton Coal Company, and owned by the National Coal Board from 1947. Whellan, 1894, reports that this was "a parish of miners". The colliery worked the Bensham and Hutton seams. It had two powerful winding engines. 1600 men and boys worked here in 1894. The associated colliery village including over 500 miners' cottages, several shops, chapels for the Wesleyans, Primitives, Free Church and Lay Church. The nearest station was Brockley Whins. The miners hall was at the south end of the village. It was brick-built was stone dressings. Built in 1892, it cost £2000. It included a large lecture hall and several smaller rooms. The institute and reading room held about 300 volumes, a bagatelle and recreation room. The institute moved into the former Wesleyan Chapel when a new chapel was built. The colliery had pre-Frizell pithead baths.

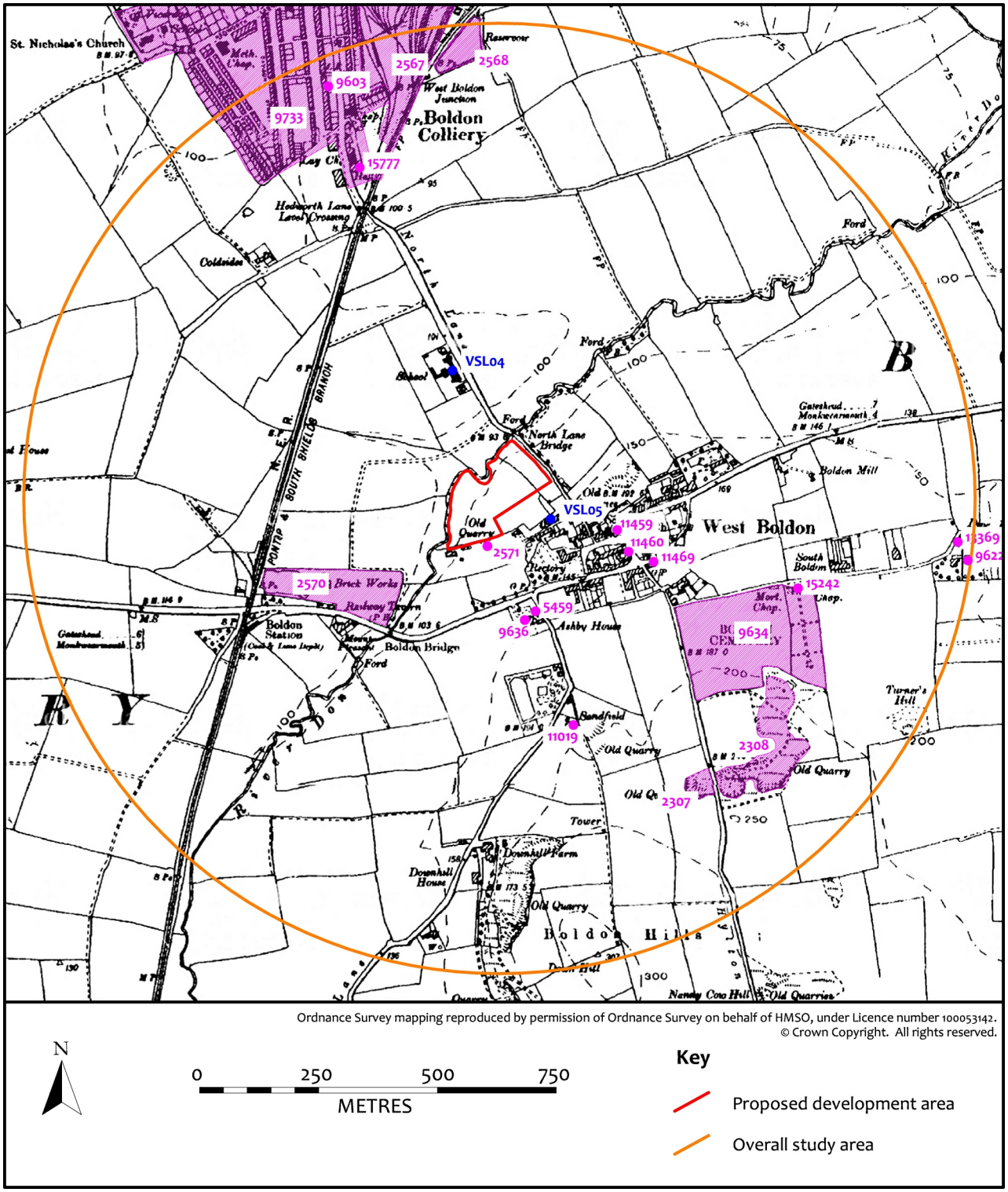


Figure 9. Extract from the 1898 Ordnance Survey showing sites developed between 1855 and 1898.

2.12.60 **HER 2570**: *Industrial Brick and Tilemaking Site | Brickworks | Post-medieval (C19)*. These are not shown on 1st edition OS mapping, so were built after 1855. 1894-1921.

2.12.61 **HER 2568**: *Water Storage Site | Reservoir*. Reservoir which is not shown on the 1st edition OS mapping - so was built after 1855.

2.12.62 **HER 5459**: *Water Storage Site | Well.* During the construction of new houses in the grounds of Ascot House ("Wayside" on modern maps) two brick lined wells were found. One was better preserved than the other as an interceptor sewer had been built over one of them. The better

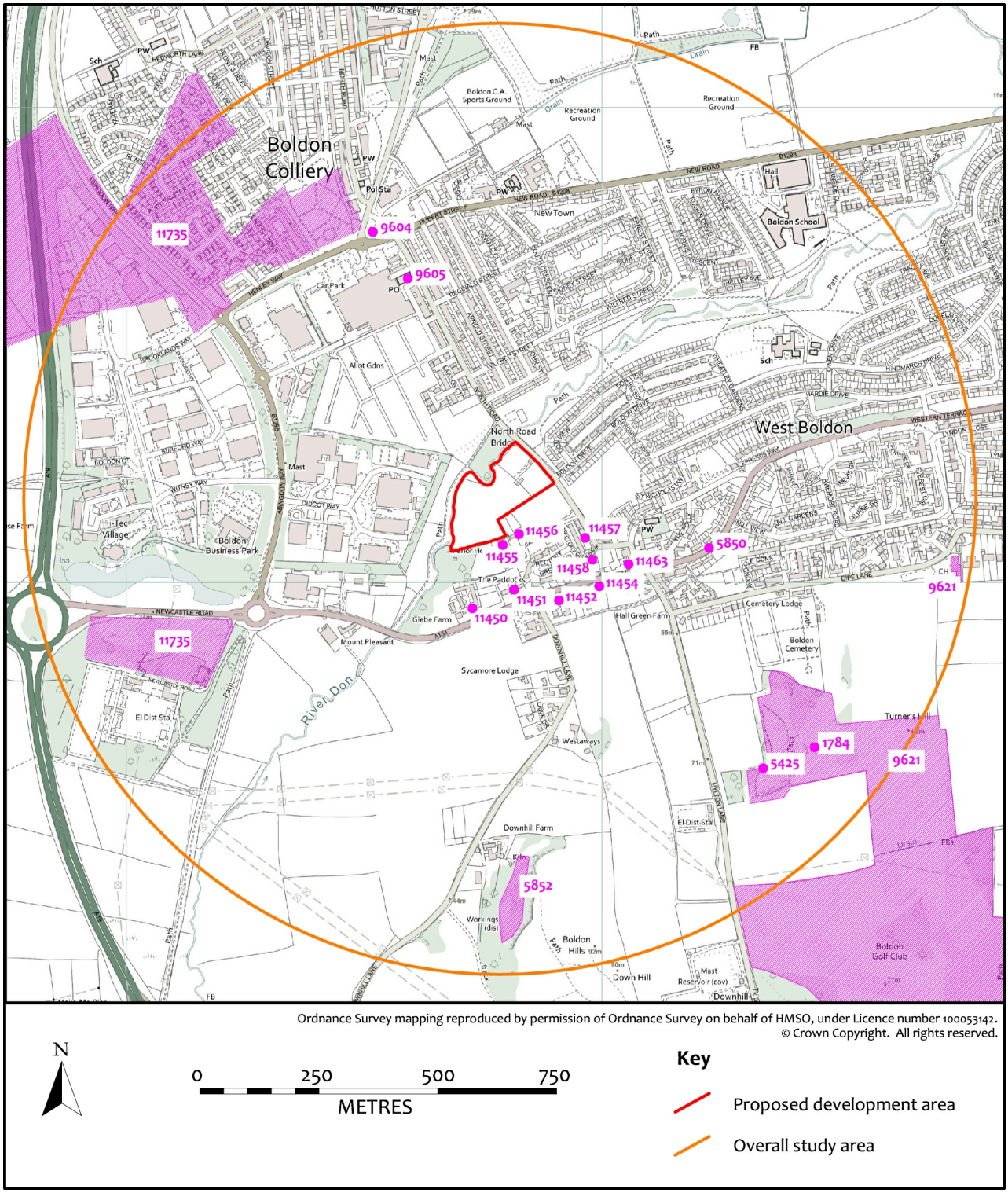


Figure 10. Known sites dating to the modern period within the study area as a whole.

preserved well measured c2.5m in diameter and was at least 8m deep. Not shown on 1st edition Ordnance Survey map, so later than 1850. Probably associated with the market gardens of Ascot House (late C19). The wells have been infilled with concrete for safety.

2.12.63 **HER 15777**: *Religious Ritual and Funerary | Methodist Chapel | Independent Methodist Chapel.* North Road, Independent Methodist Church. Shown as a Lay Chapel on the second edition Ordnance Survey map with a hall to the south (now gone). Single storey building in brick with a renewed slate roof. Arched doorway. The front elevation is broken up by large square windows with

renewed frames and brick pilasters. To the immediate north is a single storey stable and cart shed (now a storage building), brick with a raised collar timber trussed roof with hipped gables. The original slates have been replaced with corrugated cement sheeting. The brick walls are now pebble dashed.

2.12.64 **HER 15242**: *Religious Ritual and Funerary | Chapel | Cemetery Chapel.* Dipe Lane, Cemetery Chapel. 19th century cemetery chapel and mortuary. Brick with ashlar dressings and slate roof.

2.12.65 **HER 9634**: *Funerary Site | Cemetery | Post-medieval (C19).* West Boldon Cemetery.

2.12.66 **HER 9733**: *Domestic Village | Workers Village | Post-medieval (C19).* Boldon Colliery village. Equipped with a variety of house types, commercial buildings and sacred and secular institutions, this was a classic example of a Durham mining settlement. Brick terraces laid out north to south in parallel streets, single-pile in Donkins, Davison and Topping Street; double pile in Fenwick and Wells Street. Superior houses for officials in The Terrace.

2.12.67 **HER 9622**: *Domestic dwelling house.* Dipe Lane, Shotley Grove. Was on Local List in 1995 but since demolished.

2.12.68 **HER 9636**: *Domestic House | Detached House.* Newcastle Road, Ashby/Wayside. Brick house with ashlar dressings. Later Ascot Court Nursing Home. Now known as Ascot Court. A large detached house in modest grounds, typical of late Victorian suburban villas. Grand, square, richly detailed, two storeys. Reached by a curved drive from an imposing gateway. Low extensions to the south, outhouses to the rear, two wide dormers, uPVC windows throughout. Hipped slate roof, sturdy clustered chimneys.

2.12.69 **HER 11019**: *Domestic dwelling house.* Downhill View, Sandfield and High Cross. Sandfield is an attractive unspoilt Italianate style house in an elevated position. It is said to have been built by the owner of the local colliery.

2.12.70 **HER 9603**: *Commercial Licensed Premises | Public House.* Queen's Head Public House.

2.12.71 **HER 11459**: *Commercial Inn | Coaching Inn.* Rectory Bank, Black Horse Public House. Former coaching inn. Rendered.

2.12.72 **HER 11460**: *Commercial Inn | Coaching Inn.* St Nicholas Road, Wheatsheaf Public House. Former coaching inn. Rendered. First floor bay windows.

2.12.73 **HER 11469**: *Postal System Structure | Post Office.* Addison Road, post office. The outhouses to Hill Top House (HER 11462) have been nicely converted to incorporate the village Post Office, which has an attractive bay window.

2.12.74 **HER 13369**: *Postal System Structure | Post Box.* Dipe Lane, post box. Victorian post box set into boundary wall beside Coach House.

2.12.75 **VSL04**: *School*. Shown on the 2nd Edition Ordnance Survey map.

2.12.76 **VSL05**: *Abattoir*. Shown on the 2nd Edition Ordnance Survey map.

2.13 The early modern period within the overall study area

2.13.1 The Edwardian Period (1901 to 1914): *The Edwardian period begins with the coronation of King Edward VII in 1901 and whilst his reign ended in 1910, the period is extended until the beginning of the Great War in 1914.*

2.13.2 **HER 11450**: *Farm | Farmstead.* Newcastle Road, Glebe Farm. Dates from the early C20. Includes a double-fronted red brick farm house and farm buildings with green painted joinery.

2.13.3 **HER 9604**: *Fountain | Drinking Fountain.* Replica 19th century drinking fountain.

2.13.4 **HER 9605**: *Recreational | Cinema*. North Road, Boldon Electric Palace. A 400 seat cinema which opened in 1913. It was managed by a Mr Gilbert for twelve years. There were two cinemas in Boldon until 1930. The other was Tim Ward's Star Cinema. In 1933 the first "talkies" were shown. Five years

later the Allom family took over the Electric Palace until it closed in 1959. It reopened as a bingo hall.

2.13.5 **HER 9621**: *Recreational | Club | Golf Club*. Dipe Lane, Boldon Golf Club. The Golf Club was founded in 1912. The 'Old Vale Course' had 9 holes. As demand increased the Club moved its 9 hole course to its present site. In 1926 six time Open Champion, Harry Vardon, designed the 18 hole course on this 100+ acre site. Ridge and furrow earthworks survive on the course (HER 11686).

2.13.6 **HER 11463**: *Commercial | Shop.* Gateshead Terrace, Nos. 1 and 2. Simple terrace with an altered shopfront on the canted corner but original roofs, chimneys and a short section of railings.

2.13.7 **HER 11452**: *Domestic House | Semi-detached House.* Newcastle Road, Ashby Villas. An interesting pair of semi-detached bungalows built by the owner of Boldon Brick Co. Good examples of well-detailed brick cottages from first half of C20. Enlivened with Dutch gables, and an unusual green glazed pantile roof. Both have similarly detailed and eye-catching outhouses. The long garden to No.2 has been developed with a modern infill bungalow.

2.13.8 The War Years (1914 to 1945): *The period in the 20th century beginning with the Great War and ending with the close of the 2nd World War.*

2.13.9 **HER 1784**: *Pillbox.* West Boldon, pillbox.

2.13.10 **HER 5425**: *Pillbox.* Pillbox, demolished.

2.13.11 **HER 5850**: *Defence Obstruction | Road Block* . Site of WW2 concrete roadblock. In vicinity of Addison Road. Stop-lines included permanent and moveable road barriers. The most substantial works were formed from square or cylindrical concrete blocks entwined with barbed wire and fitted with explosives. Moveable obstacles consisted of horizontal or vertical bars or poles of steel, set between concrete blocks. Bent steel girders could also be slotted into sockets cut into the road surface. Modern road improvements are removing evidence for both, but some of the original blocks or aperatures have been observed in-situ. Cylindrical blocks have been used to line private roads or placed on river banks to combat erosion.

2.13.12 **HER 5852**: *Military Camp | Prisoner of War Camp*. Site of World War Two prisoner of war camp. Air photographs from 1946 show 14 huts in the quarry. Nothing is visible on immediate post-war aerial photographs. NGR given for centre of quarry. Each camp was allocated an official number during World War Two within a prescribed numerical sequence, ranging from Camp 1 (Grizedale Hall, Ambleside) to Camp 1026 (Raynes Park, Wimbledon). The West Boldon camp was Camp 605. Not all of the sites were true Prisoner of War camps, many were hostels situated some distance away from the parent site or base camp. It is not known what category West Boldon Camp was. During the early part of the war there was no standard design of camp, but following the success of the 8th Army's North African Campaign against the Italian Army, during which a substantial number of prisoners were taken, many prisoners were eventually brought to Britain and held in purpose built 'standard' camps, many of which were built by the prisoners themselves. 14 Nissen Huts are shown on a 1945 AP.

2.13.13 **HER 11735**: *Defence | Anti Aircraft Defence Site | Aircraft Obstruction*. Jarrow, aircraft obstructions. An extensive system of WW2 aircraft obstructions seen on air photographs and located during a geophysical survey by ASUD in 2011. Over 150 sections have been recorded. They include a variety of forms - a long continuous bank flanked by a ditch, a ditch flanked by small mounds, a ditch flanked by two parallel banks. The obstructions have been ploughed level or have been built over. No trace of the aircraft obstruction was found at Lukes Lane during an archaeological evaluation in 2013 by ARS.

2.13.14 **HER 11454**: *Commercial | Inn.* Newcastle Road, Red Lion Public House. A early C20 travellers inn. Abundant joinery detailing, shaped dormers and original slate roof.

2.13.15 **HER 11455**: *Domestic House | Detached House.* Don Gardens, Belvedere. Modernised early C20 villa in a large garden.

2.13.16 **HER 11456**: *Domestic House | Detached House.* Don Gardens, Don Villa. Modernised early C20 villa in a large garden.

2.14 Sites of a modern date (1946 to present)

2.14.1 **HER 11451**: *Domestic multiple dwelling | Terrace*. Newcastle Road, Glebe Farm Cottages. Built in the 1950s.

2.14.2 **HER 11457**: *Civil Meeting Hall | Parish Hall*. North Road, Sunday School/Parish Hall. Small low red-brick building with shaped roof in original slates, surrounded by a lawn, hedge and several large trees.

2.14.3 **HER 11458**: *Domestic Multiple Dwelling | Flats*. Rectory Bank, Nos. 19 to 25. Small group of Tyneside flats with outhouses and original chimney pots.

2.15 Previous archaeological investigations undertaken

2.15.1 **HER Event 2043**: St Nicholas' Church. Building Recording by Peter Ryder, 1998. Recording during a series of restoration works to this medieval church.

2.15.2 **HER Event 2107**: St Nicholas Church. Assessment by Peter Ryder, 1996. A medieval church with pre-conquest origins. The underfloor heating system will have disturbed subsurface deposits but nevertheless any sub-floor disturbance would require archaeological monitoring. Early plaster may survive on the walls of the chancel and aisles. The cross finial on the east gable is eroded - this is C13 and merits preservation.

2.15.3 **HER Event 2162**: Fellgate. Assessment by Neil Holbrook, 1990. No known archaeological sites are within the site but there are a number of neolithic sites in the vicinity. The area was fieldwalked and a metal detector survey was carried out adjacent to the line of the Wrekendyke Roman road - no finds were recovered but the depth of ploughsoil is in excess of 0.20m, perhaps sealing archaeological deposits. From Hedworth to Monkton Mill Lane, the hedge on the south side of the A194 lay on top of the north side of the Roman road. The Wrekendyke is circa 4.9m wide. Ridge and furrow survives in the study area.

2.15.4 **HER Event 2385**: St Nicholas Churchyard Walls. Building Recording by Tyne and Wear Museums, 2004. Archaeological recording and watching brief before and during the demolition of a section of churchyard wall. The upper wall build is modern, but the lower wall, mortar and foundations are much older.

2.15.5 **HER Event 2634**: Hall Green Farm, West Boldon. Assessment & building recording by Tyne and Wear Museum Service, 2006. The standing farm buildings on the site were recorded using written, drawn and photographic methods. The assessment demonstrated that the current buildings on the site, the earliest of which may be early 19th century in origin, replaced earlier structures and that the farm may, indeed, have developed over several phases, particularly given its association with Boldon Hall. The proximity of the site to the Saxon church further adds to its archaeological potential. A series of evaluation trenches is recommended in order to investigate the site for surviving sub-surface archaeological remains.

2.15.6 **HER Event 2663**: Hall Green Farm, West Boldon. Evaluation by Tyne and Wear Museum Service, 2006. Evaluation on the site of a suspected medieval and post-medieval farming settlement revealed no archaeological remains of significance, other than the remains of a 19th century farm building. No further archaeological work was recommended for this site.

2.15.7 **HER Event 2719**: Dunelm House, Boldon Colliery. Building Recording by Tyne and Wear Museum Service, 2006. An historic buildings record comprising written, drawn and photographic records was made for this house of 1911 prior to redevelopment.

2.15.8 **HER Event 2740**: The Folly, West Boldon. Assessment by North Pennines Archaeology Limited, 2006. Archaeological assessment suggests that this proposed development site lies within or close

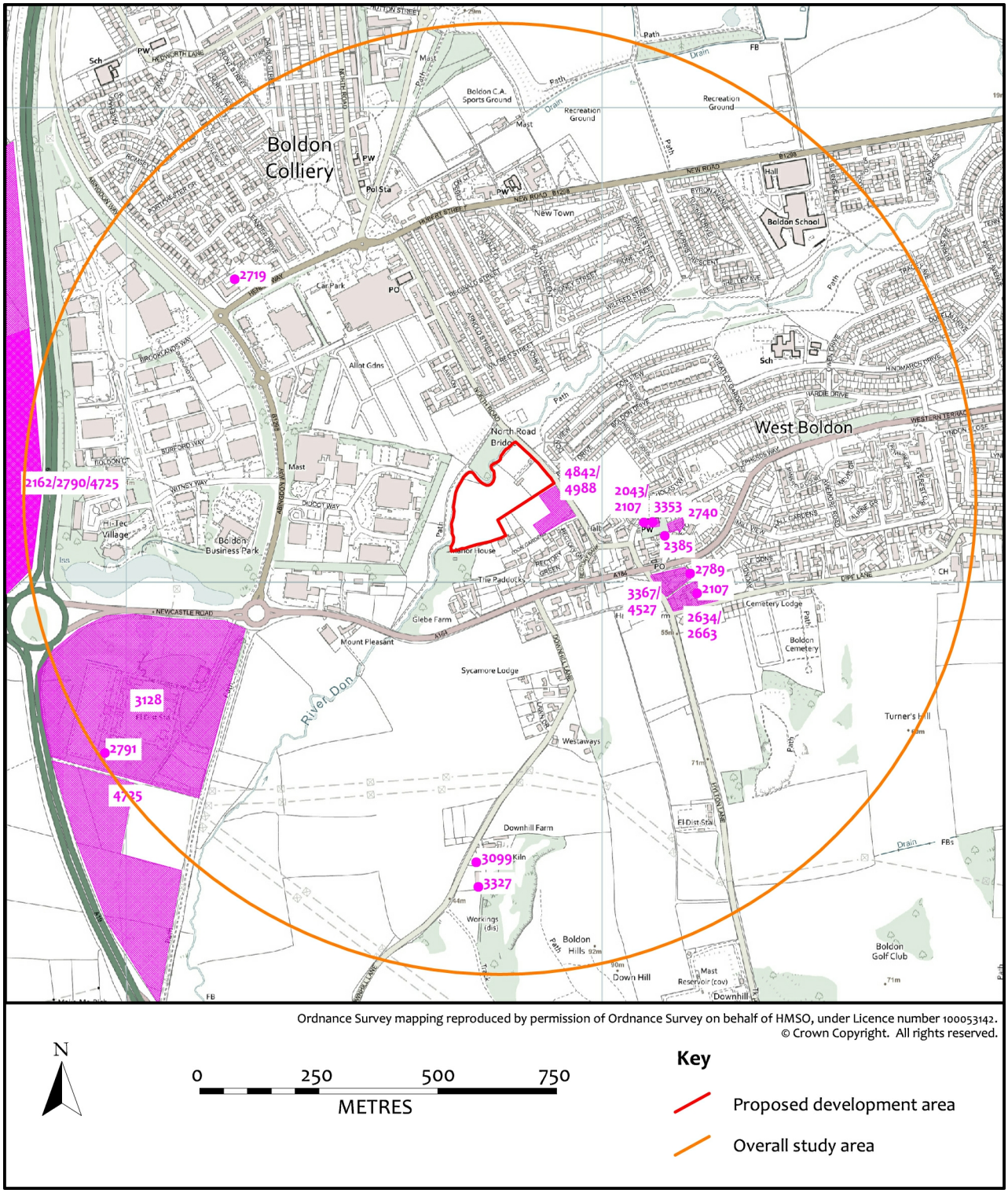


Figure 11. Previous archaeological investigations within the overall study area.

to the presumed medieval or post-medieval village core and, therefore, merits evaluation in advance of the determination of planning consent. The site may also include the site of a 19th century building known as The Folly.

2.15.9 **HER Event 2789**: Hall Green Farm, West Boldon. Watching Brief by Tyne and Wear Museum Service, 2007. Monitoring of groundworks on this farm site revealed the remains of probably 19th century farmbuildings.

2.15.10 **HER Event 2790**: A19 Junction Improvement. Geophysics by Archaeological Services WYAS, 2007. Geophysical survey carried out over an area of approximately 5 hectares revealed traces of rig & furrow earthworks and possible associated field boundary ditches, but no anomalies of significant archaeological potential.

2.15.11 **HER Event 2791**: A19 Junction Improvement. Watching Brief by Jacobs UK Ltd. A watching brief carried out on the excavation of 14 geotechnical test pits in October 2006 revealed no archaeological remains of significance.

2.15.12 **HER Event 3099**: Downhill House. Building Recording by Tyne and Wear Museum Service, 2008. An historic building recording was carried out ahead of the renovation and extension of Downhill House, West Boldon. Four phases of construction and alteration were noted within the building from c.1780-1820 through later modifications in the 19th century and 1940s, up to recent additions such as double glazing. The proposed renovation and extension will be carried out in such a way to preserve as much of the historic fabric as possible. No further recording work is required prior to the determination of planning permission.

2.15.13 **HER Event 3128**: West Boldon Substation. Assessment by WSP Environmmental, 2008. An assessment at West Boldon Substation revealed that the site lies in an area of unknown potential for archaeological remains from the prehistoric-early medieval period. From the medieval period onwards the site lay within the agricultural lands surrounding West Boldon. Remains of an unusual narrow form of ridge and furrow are located within the site. The site remained undeveloped during the post-medieval/industrial period. The location of the new building does not encroach into the area of surviving ridge and furrow. Due to the uncertain or low potential for archaeological remains on the site and the minimal impact that the development of the new Environmental Centre will have- no further archaeological works are required.

2.15.14 **HER Event 3327**: Downhill House, West Boldon. Building Recording by Archaeological Services Durham University, 2009. A building recording of the 18th century Grade II listed Downhill House. A number of decorative and utilitarian features including plaster cornices, painted wal decorations and the former cellar windows were recorded.

2.15.15 **HER Event 3353**: St. Nicholas, West Boldon. Watching Brief by Archaeological Services Durham University, 2010. A watching brief was conducted during development at St. Nicholas Church, West Boldon. The excavation of a pipe trench was monitored. The topsoil was removed to a depth of 0.5m. Charnel was recovered from the topsoil suggesting that burials in this area may have been disturbed in the past. No significant archaeological resource was identified.

2.15.16 **HER Event 3367**: Former Springfield Cars, Addison Rd. Assessment by Archaeological Services Durham University, 2010. An archaeological assessment revealed that the site of the former Springfield Cars site, West Boldon lies at the southern limit of the known extent of the medieval village. It is possible that the land was used agriculturally during the medieval and later medieval periods. The buildings on the site are of no merit. Evaluation trenches are recommended following the demolition of the buildings.

2.15.17 **HER Event 4527**: Springwell Cars. Evaluation by Archaeological Services Durham University, 2011. The works comprised the excavation of four trial trenches. Any archaeological deposits that may have existed on the site have been removed by subsequent activity, including shallow quarrying to a depth of a few metres. The area has subsequently been backfilled / levelled.

2.15.18 **HER Event 4725**: A19 Testos and Downhill. Geophysics by Sunderland Network Archaeology, 2018. Geophysical survey ahead of improvements to A19 Downhill Junction and Testos Roundabout. Possible ring-ditch feature identified.

2.15.19 **HER Event 4842**: West Boldon School. Assessment by Archaeological Services Durham University, 2018. The former C of E School of West Boldon is located within the West Boldon conservation area which is centred on the medieval village. The archaeological heritage statement highlights the range of archaeological remains associated with the conservation area. These include

prehistoric, Roman, medieval, post-medieval, early modern and modern remains. The report concludes that the redevelopment of the former school site has limited potential to impact unknown archaeological deposits and features on the site and will not affect the setting of designated heritage assets.

2.15.20 **HER Event 4988**: West Boldon School. Heritage Statement by Archaeological Services Durham University, 2019. Heritage statement produced in advance of a proposed development at the former West Boldon School. The site is located within a conservation area and a medieval village. The report identifies that the proposed development will not impact individual designated or undesignated heritage assets within the conservation area and that there is limited potential that unknown archaeological resources will be affected which cannot be mitigated through further archaeological works. The heritage statement identifies that there is limited evidence for prehistoric or Roman remains in the area. The site was likely to have been medieval agricultural land. In the post-medieval and modern periods, it was used as a farm and subsequently an abattoir. The construction of West Boldon school in the 20th century is likely to have truncated and removed earlier archaeological evidence.

3. FOCUS ON THE PROPOSED DEVELOPMENT AREA

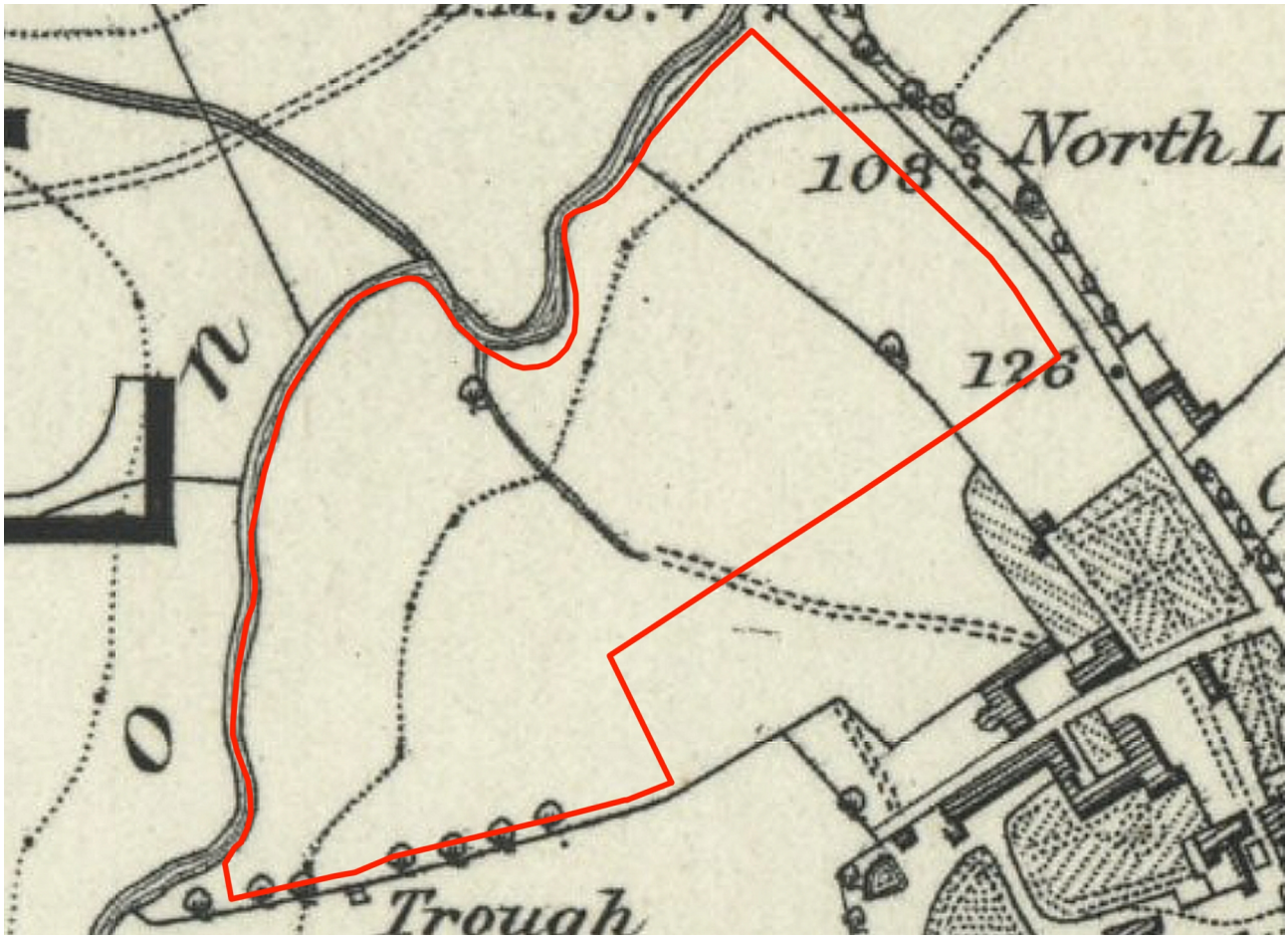


Plate 2. Extract from the 1862 Ordnance Survey map with the Proposed Development Area outlined in red.

3.1 Introduction

3.1.1 With *Section 2* dealing with the 1km study area as a whole, *Section 3* focuses on the proposed development area and its immediate surroundings. The site visit was undertaken on the 20th July 2020.

3.2 Historic mapping

3.2.1 *Plate 2* shows an extract from the 1862 Ordnance Survey mapping (surveyed in 1857). Centrally to the plot is a tributary running downslope from the southeast to the northwest, signifying a spring at the source. A track can be seen at the source running to the southeast toward a series of buildings. The southern boundary of the PDA does not fully align with the field boundary on this map: this may suggest either an inaccuracy within the map, or the slight realignment of the boundary in the early 20th century.

3.2.2 The northeastern boundary of the PDA at this time did not align with the edge of North Lane. The field boundary in the northeastern section of the PDA remains on the alignment shown in 1857 through to modern times.

3.2.3 *Plate 3* shows an extract from the 1897 Ordnance Survey mapping (surveyed in 1895). Little had changed since the 1857 survey, barring the central tributary stream was no longer shown, suggesting that the springhead had failed or had been deliberately backfilled. The track from the

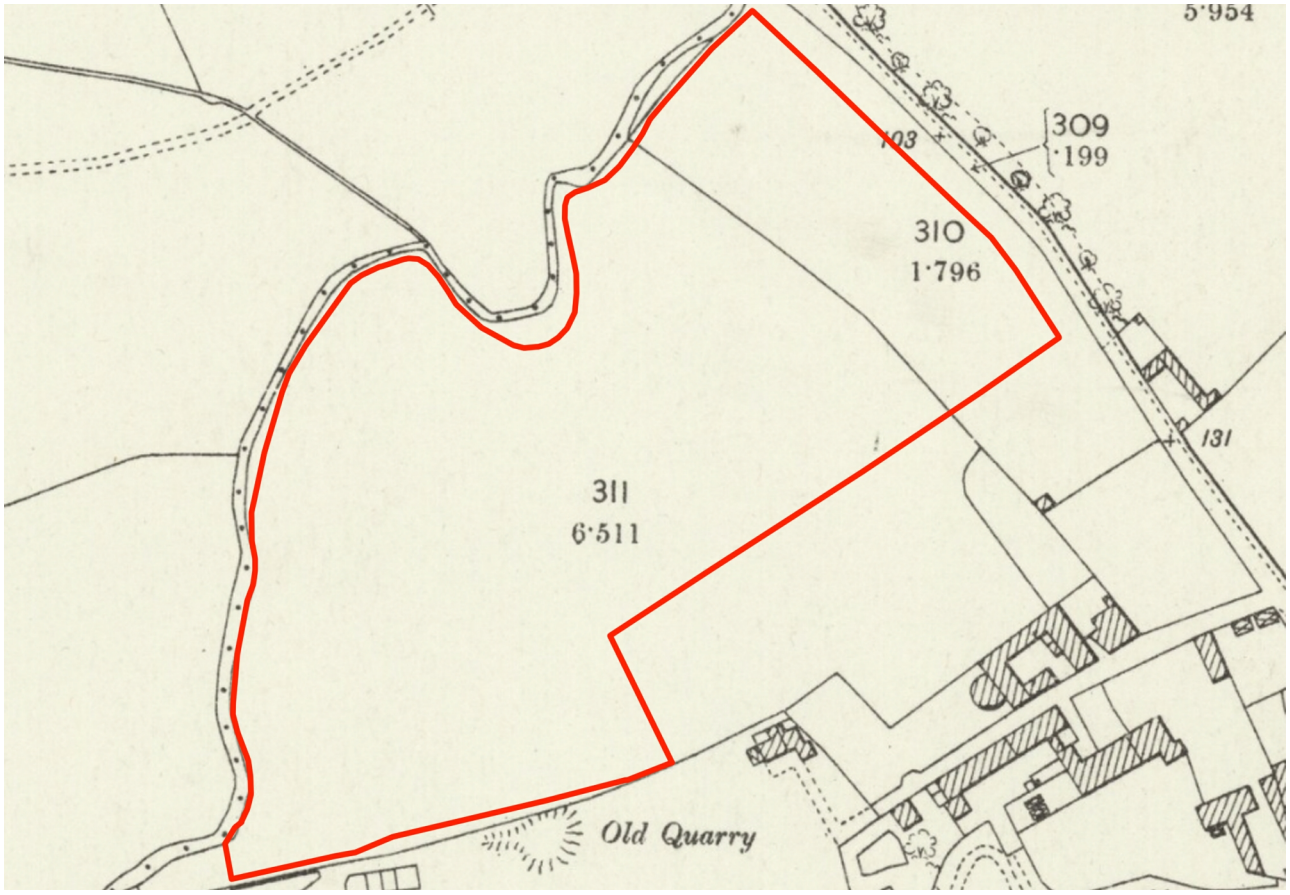


Plate 3. Extract from the 1897 Ordnance Survey map with the Proposed Development Area outlined in red.

Plate 4. Extract from the 1919 Ordnance Survey map with the Proposed Development Area outlined in red.



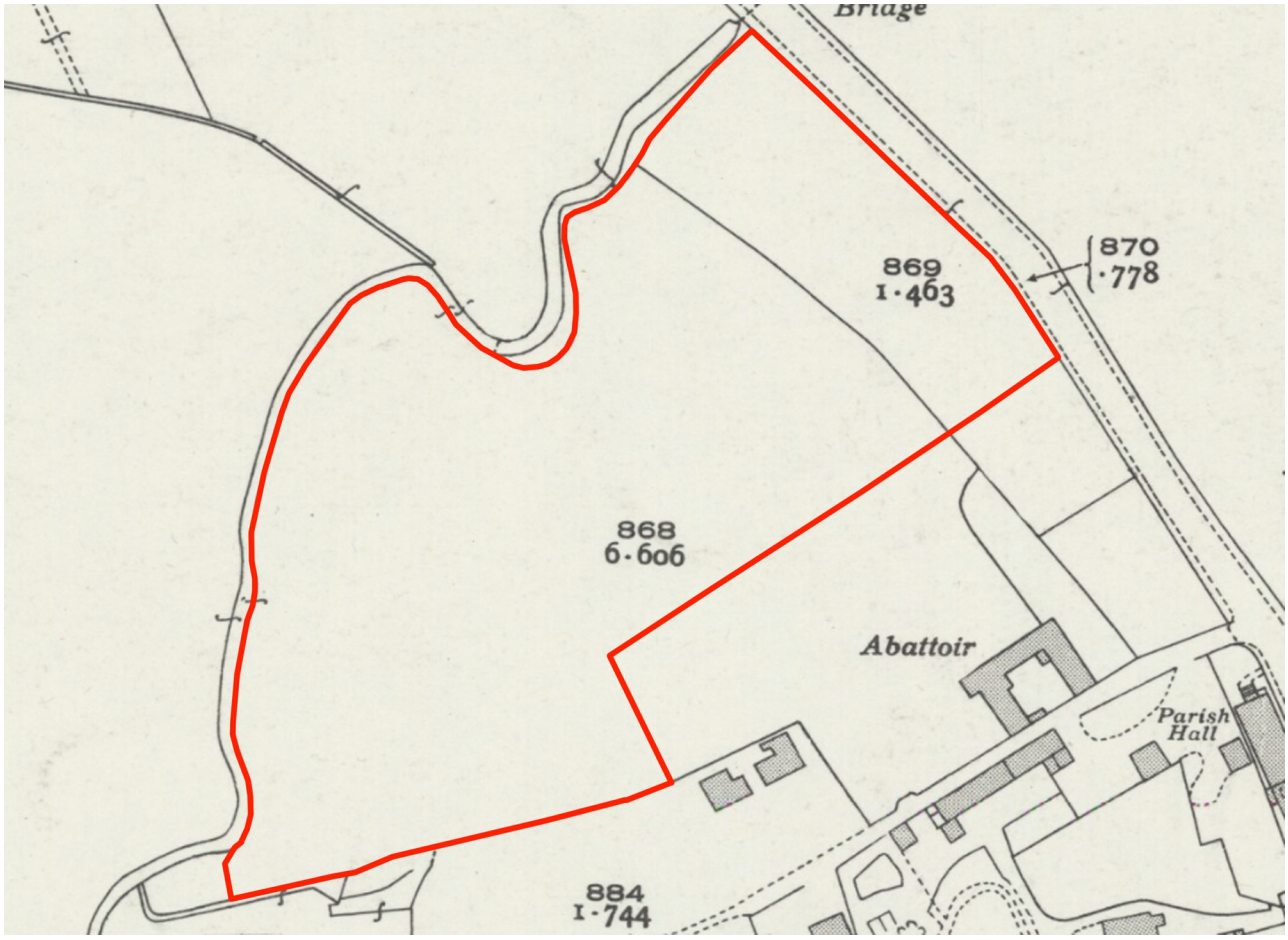


Plate 5. Extract from the 1947 Ordnance Survey map with the Proposed Development Area outlined in red.

springhead to the southeast was also no longer shown, though by this time the farm the track originally led to had been replaced by an abattoir.

3.2.4 The 1919 Ordnance Survey mapping (*Plate 4*, surveyed in 1914) shows no change within the PDA since the 1897 edition.

3.2.5 *Plate 5* shows an extract of the 1947 Ordnance Survey mapping (surveyed in 1939). The only notable changes at this point are the southern boundary of the site now aligning with the modern boundary and also North Road had been constructed, bringing the edge of the road/path in line with the PDA boundary.

3.2.6 By the time the 1968 mapping was produced (not shown here due to copyright restrictions) the southeastern field boundary was in place.

3.3 Previous planning applications

3.3.1 The South Tyneside Planning Portal does not hold any records of previous planning applications within the PDA.

3.5 Aerial photography

3.5.1 Plates 6-9 show a series of aerial photographs, dating from 2002, 2009, 2012 and 2018 respectively. All four show the extant earthworks within the PDA forming medieval ridge and furrow cultivation systems (two directions) and with the earlier 2002 image also suggesting earthworks within the western extent of the PDA that could represent a potential platform, hollow or other working/habitation feature associated with the period. These features are not visible on later



Plate 6. Aerial view of the site in 2002 (dataset © 2020 Infoterra Ltd & Bluesky).

Plate 7. Aerial view of the site in 2009 (dataset © 2020 Getmapping plc).

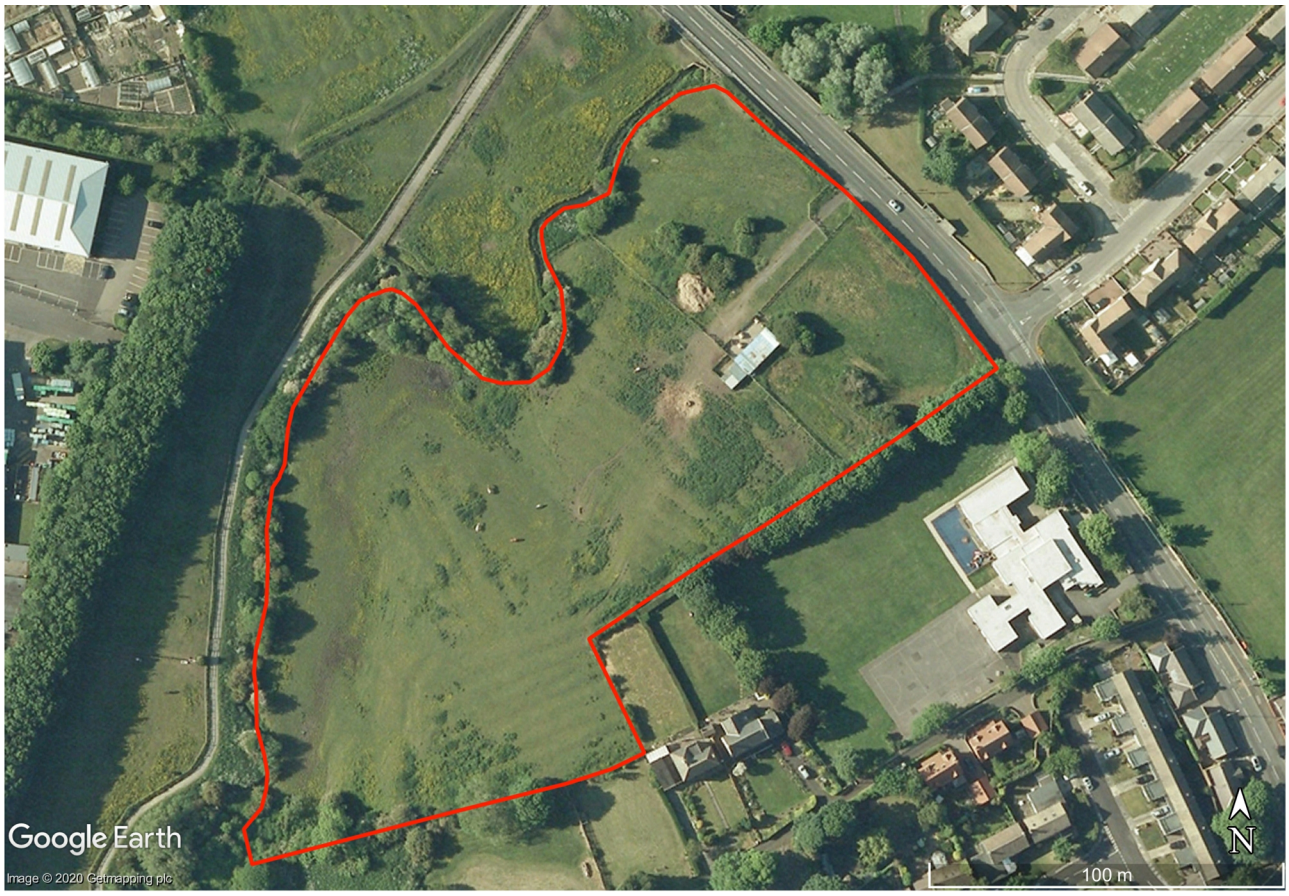




Plate 8. Aerial view of the site in 2012 (dataset © 2020 Bluesky).

Plate 9. Aerial view of the site in 2018 (dataset © 2020 Google).





Plate 10. LIDAR plot of the Proposed Development Area (outlined in red).

photographs due to light and undergrowth conditions. A plot of these earthworks can be seen in *Section 4*.

3.4 LIDAR

3.4.1 *LIDAR is an abbreviation of Light Detection and Ranging which is a survey method wherein light is used in the form of a pulsed laser to measure heights and distances from an overhead aircraft, essentially generating a 3D laser model of the landscape. Originally conceived in the 1960s to detect submarines from aircraft, the method is now used to map terrain. The data set available for general use and in this case for identifying potential archaeological surface features is open data provided by the Environment Agency, with the best resolution for the study area being 1m. For the most part, the LIDAR data is centred around water systems and as such is often incomplete.*

3.4.2 The dataset covering the PDF was surveyed at 1m resolution and is designated as file NZ36sw.

3.4.3 Plate 10 shows a plot of the LIDAR dataset, with the azimuth of the light set at 45° and the altitude of the light source at 15m. This setting was found to highlight the features within the PDA as well as suggest the steep pitch of the land from the southeast to the northwest.

3.4.4 The LIDAR clearly shows the medieval ridge and furrow field systems, essentially confirming and adding to the earthworks noted in the aerial photographs. The LIDAR also picks up two northeast-southwest aligned ridges over which the eastern set of ridge and furrow flows, as well as the termination of the systems at the western edge of the PDA. As with the 2002 aerial photograph, the LIDAR picks up ground disturbance in the southwest corner, possibly suggesting a covered building platform and potential landslips or spoil heaps. A plot of these earthworks can be seen in *Section 4*.

3.6 Geophysical survey

3.6.1 A geophysical survey was undertaken of the PDA by Phase Site Investigations Ltd. The survey was undertaken on the 20th July, and the report prepared for September 2020. **This section is a direct extract from their report (Project No. ARC/2873/1072)**.

3.6.2 The survey was undertaken using a Phase Site Investigations Ltd multi-sensor array cart system (MACS). The MACS comprised 8 Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The MACS data was collected on profiles spaced 0.5 m apart with readings taken at between 0.1 and 0.15 m intervals. Due to the presence of dense vegetation, stables, hardstanding ground, steep slopes and areas of uneven ground the area accessible / suitable for survey was reduced to approximately 1.2 ha.

3.6.3 The MACS comprised 8 Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The Foerster gradiometers do not require balancing as each sensor is automatically 'zeroed' using the control unit software.

3.6.4 The MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The sensors have a separation of 0.5 m which means that data was collected on profiles spaced at 0.5 m apart. Readings were taken at between 0.1 m and 0.15 m intervals.

3.6.5 Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features by several metres to reduce the detrimental effect that these surface magnetic features have on the data. The location of the MACS data is converted direct to Ordnance Survey co-ordinates using the UK OSTN 02 projection. As the survey is referenced direct to Ordnance Survey National Grid co-ordinates temporary survey stations are not established.

3.6.6 The MACS data was stored direct to a laptop using in-house software which automatically corrects for instrument drift and calculates a mean value for each profile. A positional value is assigned to each data point based on the sensor number and recorded GNSS co-ordinates. The data is gridded using in-house software and parameters are set based on the sensor spacing and mean values. No additional processing is required. The gridded data is then displayed in Surfer 9 (Golden Software) and image files of the data are created.

3.6.7 The data was exported as greyscale raster images (PNG files) and is shown with an accompanying interpretation at a scale of 1:1000. All greyscale plots were clipped at -2 nT to 3 nT. Greyscale plots have been 'smoothed' using a visual interpolation but the data itself has not been interpolated.

3.6.8 The data has been displayed relative to a digital Ordnance Survey base plan provided by the client as drawing *'NRWB-assessment area.dwg'*. The base plan was in the Ordnance Survey National Grid co-ordinate system and as the survey grids / data were referenced directly to National Grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

3.6.9 X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar and bipolar responses that will probably be associated with surface / near-surface iron objects. However, X-Y trace plots have not been presented here as they do not show any additional anomalies that are not visible in the greyscale data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot is provided in the digital archive.

3.6.10 All isolated responses have been assessed using a combination of greyscale and X-Y trace plots. There are a large number of 'iron spike', isolated dipolar anomalies present in the data. There is no evidence to suggest that they are associated with archaeological features and so these have not been shown in the interpretation.

3.6.11 Anomalies associated with agricultural regimes are present in the data but each individual anomaly has not been shown on the interpretation. Instead the general orientation of the regime is indicated.

3.6.12 The data was examined over several different ranges during the interpretation to ensure that the maximum information possible was obtained from the data.

3.6.13 The anomalies have been categorised based on the type of response that they exhibit and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided.

3.6.14 The areas (three in total) able to be surveyed can be seen on *Figures 12* and *13*, with *Figure 12* being the initial plot and *Figure 13* the subsequent interpretation.

3.6.15 **Area 1**:

- Numerous isolated dipolar and small bipolar responses, that are all thought to be associated with modern material. These have not been shown on the interpretation.
- A larger isolated bipolar response. This will be related to a concentration of, or a larger object or feature of, relatively modern ferrous or fired material.
- Areas of magnetic disturbance. These are usually associated with relatively modern features/ material but can be caused by natural variations.
- Very strong responses associated with strongly magnetic relatively modern features / material. These responses can extend for some distance beyond the feature and in some cases the feature causing the strong response may be located beyond the survey area.
- Positive linear responses associated with one or possibly more regimes of ridge and furrow.
- Trends of uncertain origin.
- Numerous isolated positive responses. The majority of these are probably geological / pedological in origin or related to relatively modern deeper buried ferrous / fired material but some could be caused by archaeological features / activity.

3.6.16 **Area 1 discussion**: The areas of magnetic disturbance could be caused by concentrations of relatively modern material but the responses could also relate to natural variations, such as areas of sands and gravels. In this instance both causes are possible or the areas could be a product of both modern material and natural variations. There are suggestions of broad linear / curvi-linear trends (**Anomalies A**) in or adjacent to the areas and these could be related to natural features, such a palaeochannels, but could also be a product of modern material / activity.

3.6.17 There are relatively large, strong isolated positive responses adjacent to one area of magnetic disturbance (**Anomalies B**). It is likely that these are related to the same features / activity causing the magnetic disturbance and are either natural or relatively modern in origin.

3.6.18 There are several weaker broad, diffuse trends (**Anomalies C**). These could be associated with natural features / variations but they could be related to anthropogenic activity, either caused by agricultural activity or possibly the remnants of sub-surface features. The remaining trends within the survey area are all too weak and short to reliably interpret. They could be caused by the remnants of sub-surface features but they do not form any obvious patterns or relationships that would indicate that they are related to archaeological features / activity and it seems more likely that they are a product of agricultural activity or natural feature / variations.

3.6.19 In the east of the area there are a number of large, broad, positive and negative responses (**Anomalies D**). It seems likely that they are, in part, related to agricultural activity as they follow alignments related to possible ridge and furrow. It is possible that the responses are stronger in this area because of natural features / variations or possibly modern material beyond or on the edge of the survey area has produced stronger responses that have combined with the possible ridge anomalies. These responses are not thought to be archaeologically significant.

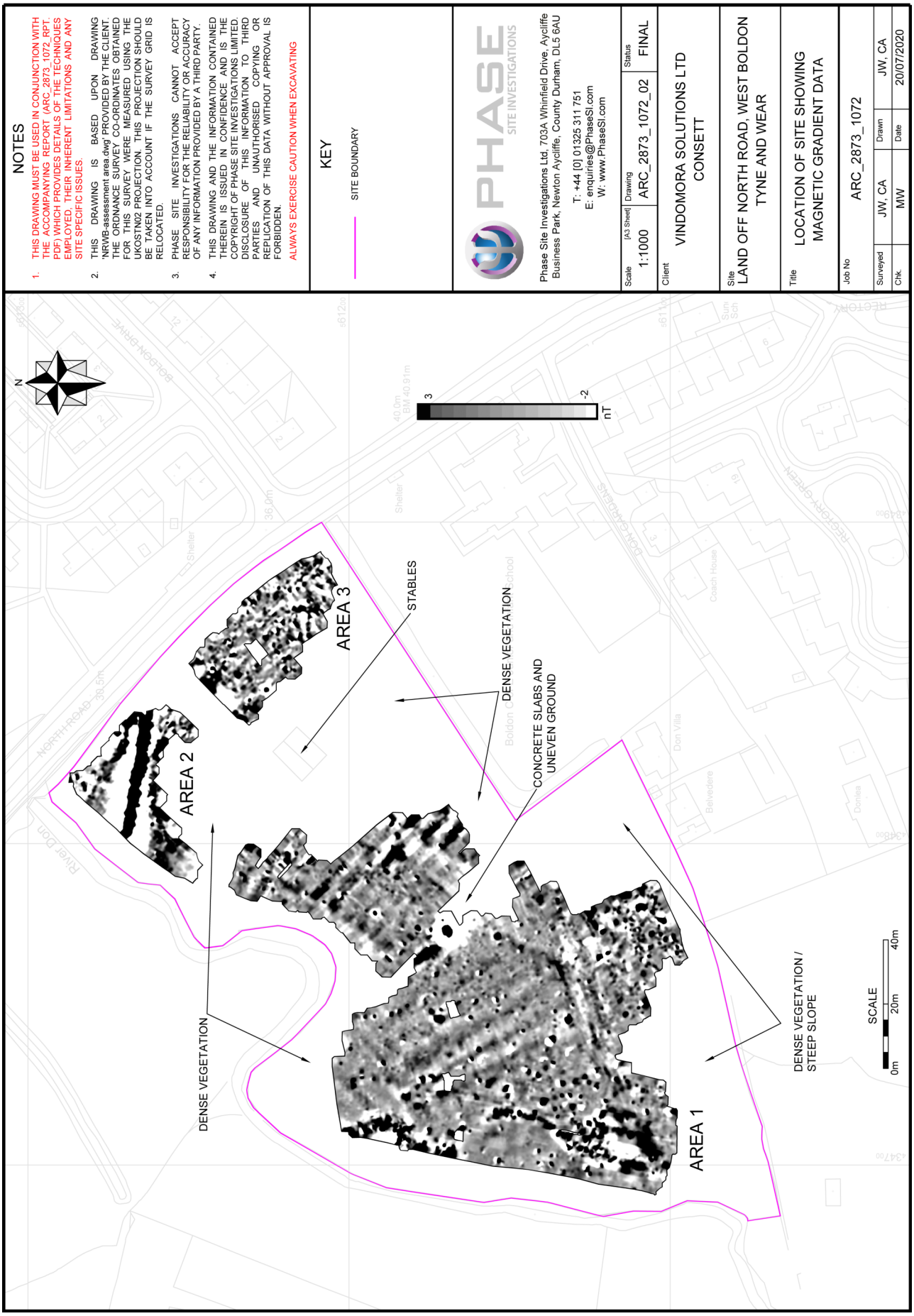


Figure 12. Geophysical survey plot of the PDA produced by Phase Site Investigation Ltd.

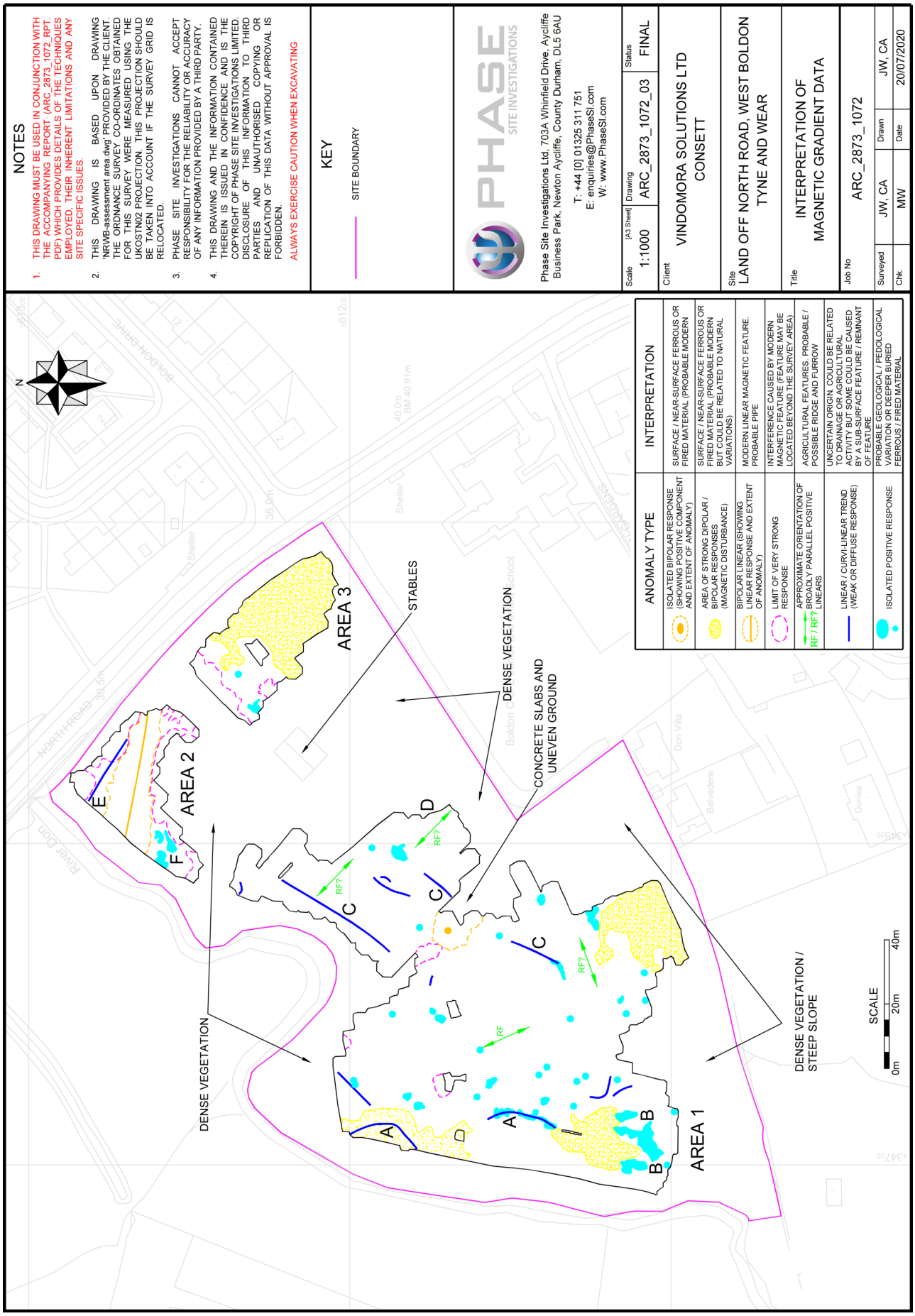


Figure 13. Interpretation of the geophysical survey plot produced by Phase Site Investigation Ltd.

3.6.20 **Area 2**:

- A number of isolated dipolar and small bipolar responses, that are all thought to be associated with modern material. These have not been shown on the interpretation.
- A linear bipolar anomaly associated with a sub-surface utility apparatus (probable pipe).
- Very strong responses associated with strongly magnetic relatively modern features / material. These responses can extend for some distance beyond the feature and in some cases the feature causing the strong response may be located beyond the survey area.
- A trend of uncertain origin.
- Several isolated positive responses. These are probably geological / pedological in origin or related to relatively modern features / activity.

3.6.21 **Area 2 discussion**: The area is dominated by responses related to a probable metal pipe and other very strong responses related to other modern material / objects. These responses would probably mask anomalies relating to any other sub-surface features, should any such features be present. There is a suggestion of a broad, diffuse trend in the east of the area (**Anomaly E**). It is not certain if this relates to a feature or if it is a product of the adjacent strong responses.

3.6.22 There are several strong isolated positive responses (**Anomalies F**) but it is likely that these are related to modern material or associated with the adjacent strong responses.

3.6.23 **Area 3**:

- A number of isolated dipolar and small bipolar responses, that are all thought to be associated with modern material. These have not been shown on the interpretation.
- An area of magnetic disturbance associated with relatively modern features / material.
- Very strong responses associated with strongly magnetic relatively modern features / material. These responses can extend for some distance beyond the feature and in some cases the feature causing the strong response may be located beyond the survey area.
- Several isolated positive responses. These are probably geological / pedological in origin or related to relatively modern features / activity.

3.6.24 **Area 3 discussion**: The area is dominated by magnetic disturbance but the strength of responses are such that they suggest a spread of relatively shallow modern material, rather than a significant depth of made ground. If this is the case then it is possible that sub-surface remains, should any be present, may not have been disturbed by the modern activity. The remaining responses in this area also probable relate to modern material / activity.

3.6.25 **Conclusions**: The majority of the anomalies identified by this survey relate to modern material / objects (including a probable pipe), agricultural activity (including ridge and furrow) and geological / pedological variations. There are several linear / curvi-linear trends of uncertain origin, some of which are suggestive of sub-surface features. These could be related to natural features / variations or agricultural activity but an archaeological origin for some of them cannot be completely ruled out.

3.6.26 There are several areas of magnetic disturbance and strong responses that dominate the surrounding area. It should be recognised that the strength of these responses could mask anomalies from other sub-surface features in those areas, should any such features be present. The strength of the responses within the magnetic disturbance suggest that they are caused by surface / near surface spreads of material, rather than significant made ground, although some of these areas could also relate to natural variations.

3.6.27 *It should be noted that a geophysical survey does not directly locate sub-surface features - it identifies variations or anomalies in the background response caused by features. The interpretation of geophysical anomalies is often subjective and it is rarely possible to identify the cause of all such anomalies. Not all features will produce a measurable anomaly and the effectiveness of a geophysical*



Plate 11. The northeast extent of the site, looking northwest

survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a geophysical survey will identify all sub-surface features. Confirmation on the identification of anomalies and the presence or absence of sub-surface features can only be achieved by intrusive investigation.

3.7 Site visit

3.7.1 The site visit was undertaken in clear conditions. Varying topography was noted. The ground generally slopes downwards to the northwest, in places steeply. The land itself can be classed as rough, scrub pasture.

3.7.2 At the time of the site visit, the small section of paddock was only visible from the outside as there were still horses within the area. It was photographed from two directions, seen on *Plates 15* and *25*.

3.7.3 While the ridge and furrow in the southern section of the site was visible as low earthworks (*Plate 17*) the profile was hidden by the scrub. The ridge and furrow within the central part of the site to the southwest of the stable was not visible on the walkover (*Plates 14, 16* and *21*).

3.7.4 The earthworks in the southwest corner of the development area were suggestive of spoil heaps (see *Plates 18* and *19*), perhaps associated with the late 19th century small quarry to the south of the PDA boundary in this area. The platform noted on the 2002 aerial photograph and the LIDAR was not especially visible, presumably due to the undergrowth.

3.7.5 The undergrowth against the northern boundary with the River Don was suggestive of frequent local flooding (which can be seen on the aerial images in Section 3.5). While this may suggest the potential for archaeological preservation within any deeper features within this area, it is also suggestive of a high water table.

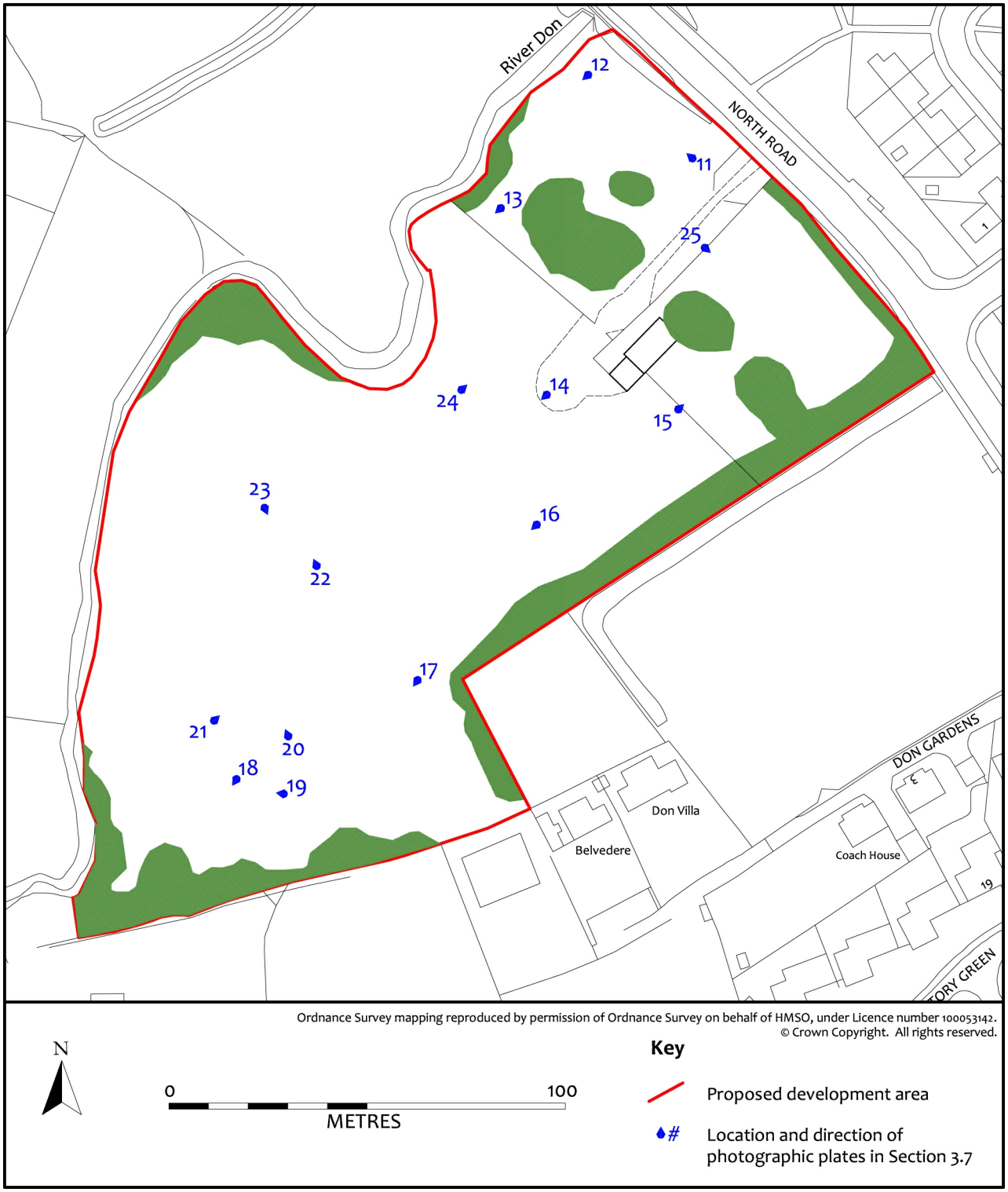


Figure 14. Location and direction of photographic plates 11-25 in Section 3.7.

3.7.6 The source of the spring and historic stream line was visible within the landscape, though the source appeared to have subsided over time.



Plate 12. The northeast extent of the site, looking southwest

Plate 13. The northeast extent of the site, looking southwest at the field boundary





Plate 14. The centre of the site, looking southwest from the gate

Plate 15. The northeast extent of the site, looking northeast into the paddocks





Plate 16. The centre of the site looking along the eastern border

Plate 17. The southeast extent of the site. The ridge and furrow is overgrown.





Plate 18. The earthworks at the southwest extent of the site

Plate 19. The earthworks at the southwest extent of the site





Plate 20. The northern extent of the centre of the site, looking northwest

Plate 21. The central belt of the site looking northeast





Plate 22. The central (north) section of the site at the turn in the river, looking northwest

Plate 23. Looking southeast toward Don Gardens





Plate 24. The entrance and stables looking northeast

Plate 25. The paddock looking southeast



4. ARCHAEOLOGICAL IMPACT ASSESSMENT

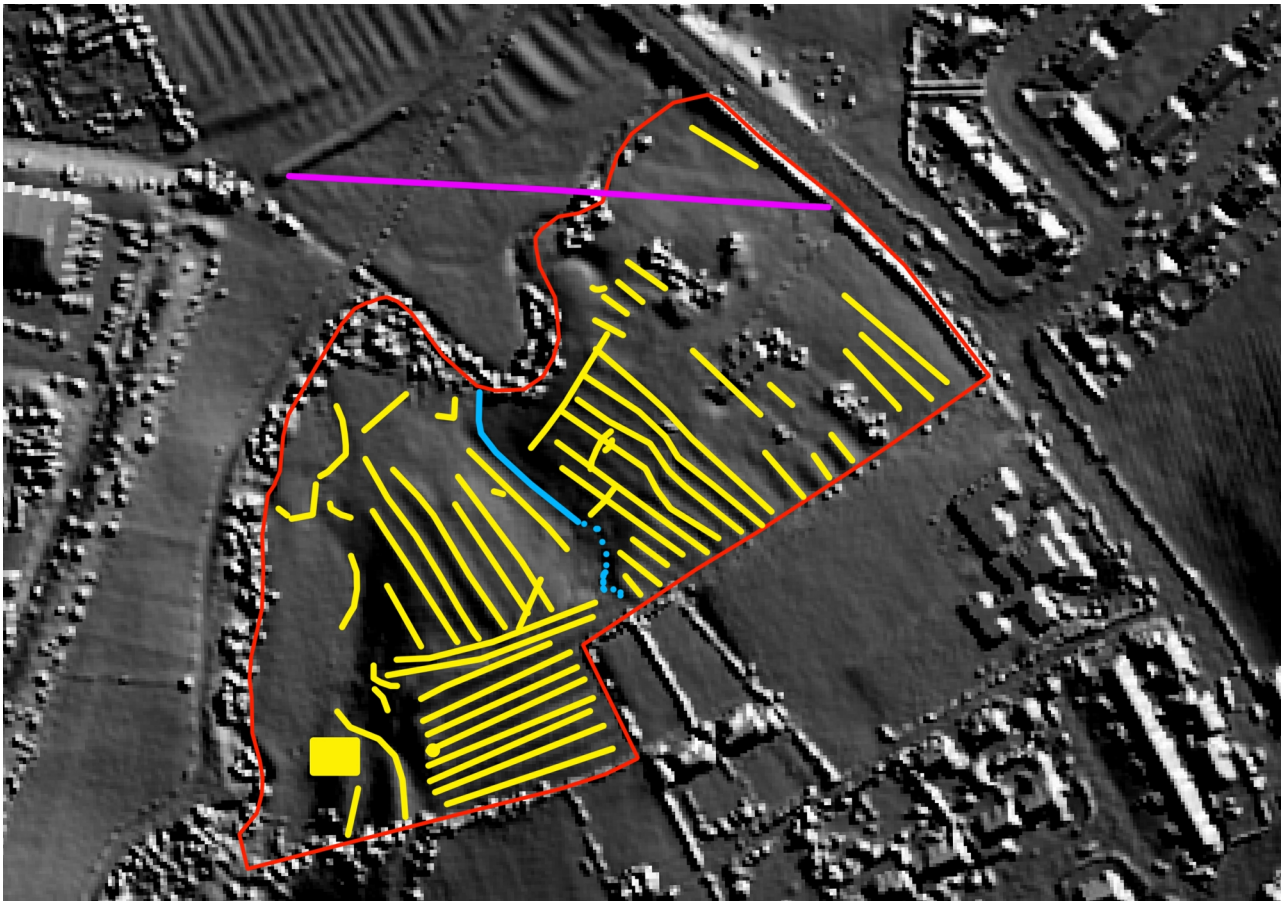


Plate 26. The interpretation of archaeological remains within the PDA combining aerial photography, geophysical survey and LIDAR (yellow=archaeological, blue=stream and spring, magenta=modern service).

4.1 The archaeological potential within the overall study area

4.1.1 The study of the known archaeological/historical sites and historic mapping of a 1km radius study area from the centre of the PDA highlights that the site lies primarily within an area of later medieval activity, though a low level of background material belonging to earlier periods does exist within the overall study area. The closest prehistoric element, two Neolithic axes, were found 770m to the south of the PDA; the closest Roman instance are architectural fragments found within the fabric of the medieval stonework of West Boldon's Church of St. Nicholas, 230m to the southeast of the PDA boundary.

4.1.2 As noted, the primary archaeological period of interest within the study area is the Later-medieval period, with the PDA lying directly to the northwest of the heart of the 12th century West Boldon Village. The PDA also lies within the expansive system of medieval cultivation, with the earthworks from ridge and furrow still visible within the PDA itself.

4.1.3 According to historic mapping, the PDA appears to have been largely untouched since the Later-medieval period, while the study area as a whole sees a massive increase in development from the 17th century onwards.

4.2 Known archaeology within the development area

4.2.1 As noted within *Section 2.11.9*, the PDA lies within HER entry 11733: "*... ridge and furrow. Several blocks of medieval or later ridge and furrow seen on air photographs. Some of the blocks have the*

classic curved pattern indicative of medieval cultivation. Much has been built over but some still survives."

4.2.2 The study of the aerial photography, LIDAR and geophysics suggests ridge and furrow lying in two directions, potentially with a road or track between them. This track leads to the southwest of the PDA, where the geophysical survey detected a large area of disturbance and the photography and LIDAR suggest a potential building platform, possibly part buried by what appears to be spoil heaps generated by the 19th century quarry located due south of the PDA boundary. If this is a building, it may be medieval in date, relating to the ridge and furrow field systems, or it could be post-medieval in date relating to the quarry, though a building is not shown on the historic maps, so the latter is unlikely.

4.2.3 The geophysical survey report identified the ridge and furrow systems within the PDA as well several linear/curvi-linear potential sub-surface features. These could be related to natural features/variations or agricultural activity but an archaeological origin for some of them cannot be completely ruled out. The survey also detected strong magnetic disturbances within the survey area, with the survey report noting that the strength of those responses could mask anomalies from other sub-surface features in those areas, should any such features be present.

4.3 Archaeological Potential

4.3.1 Based upon the data within this study, the presence of early prehistoric features within the site boundary is classed as **LOW**.

4.3.2 Based upon the data within this study, the presence of late prehistoric features within the site boundary is classed as **LOW**.

4.3.3 Based upon the data within this study, the presence of Roman features within the site boundary is classed as **LOW**.

4.3.4 Based upon the data within this study, the presence of Early medieval features within the site boundary is classed as **LOW**.

4.3.5 Based upon the data within this study, the presence of medieval features within the site boundary is classed as **HIGH**.

4.3.6 Based upon the data within this study, the presence of post-medieval and/or modern features within the site boundary is classed as **HIGH**.

4.4 Recommendations

4.4.1 The majority of the PDA has some level of extant earthworks relating to the medieval ridge and furrow systems. While these can be mapped in plan from LIDAR especially, with the site being covered by a 1m resolution dataset, the production of a series of earthwork profiles across the cultivation systems may provide interesting insight and may differentiate more between the ridge and furrow and the dividing track between them, which may drop into a hollow way running to the southwest.

4.4.2 From the geophysical survey report, the following should be highlighted: "*It should be noted that a geophysical survey does not directly locate sub-surface features - it identifies variations or anomalies in the background response caused by features. The interpretation of geophysical anomalies is often subjective and it is rarely possible to identify the cause of all such anomalies. Not all features will produce a measurable anomaly and the effectiveness of a geophysical survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a geophysical survey will identify all sub-surface features. Confirmationon the identification of anomalies and the presence or absence of sub-surface features can only be achieved by intrusive investigation.*"

4.4.3 This would suggest that an archaeological evaluation comprising trial trenching should take place within the PDA, to ascertain the nature of the anomalies detected within the geophysical survey. It should also be noted that ridge and furrow itself can often act as a masking agent in geophysical survey, and as such the areas of ridge and furrow should be evaluated themselves, first to obtain section views and possible palaeoenvironmental samples from the ridges and second to ascertain whether or not the medieval landscape masks an earlier phase. Trenching could also be utilised to investigate the potential building platform in the southwestern extent of the earthworks.

4.4.4 To conclude, due to the nature and extent of the Later medieval remains within the proposed development area, the following investigations are recommended:

- **Earthwork survey**: An earthwork survey utilising a survey quality GPS to map and log the extant earthworks in plan and profile form;
- **Archaeological evaluation**: An archaeological evaluation (trenching) investigating the geophysical anomalies detected in the survey, sampling the areas of ridge and furrow and investigating the potential building platform.

5. REPOSITORIES AND SOURCES

Please note that this project was undertaken within Covid-19 lockdown restrictions, and as such access to historical data repositories was extremely limited.

5.1 Repositories

Beamish Museum People's Collection. Online at http://collections.beamish.org.uk/

Britain from Above Project. Online at http://www.britainfromabove.org.uk/

British Library. Online at http://www.bl.uk/

British Geological Survey. Online at http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

Durham Record Office. County Hall, Durham DH1 5UL

Google Earth Pro 2019

Historic England Archive. Online at http://archive.historicengland.org.uk

Keys to the Past. Online at http://www.keystothepast.info

Newcastle City Library. Local studies section, Princess Square, Newcastle upon Tyne, NE99 1DX

PastScape Project. Online at http://www.pastscape.org.uk/default.aspx

Portable Antiquities Scheme. Online at https://finds.org.uk/

Tyne and Wear Archives. Blandford House, Blandford Square, Newcastle upon Tyne NE1 4JA

ViewFinder Project. Online at http://viewfinder.english-heritage.org.uk/

Vindomora Solutions Ltd Archive. Prospect House, Prospect Business Park, Leadgate, Consett, County Durham DH8 7PW

5.2 Sources

CIfA (2014) Code of Conduct. *Chartered Institute for Archaeologists*

(CIfA revised 2014) *Standard and Guidance for historic environment desk based assessment*. Chartered Institute for Archaeologists.

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Department for Communities and Local Government (2019) Communities and Local Government: *National Planning Policy Framework*

English Heritage (2008) *Conservation Principles - Policies and Guidance*

English Heritage (1991) *Managing Archaeological Projects*. Second edition

Historic England (2015) *Management of Research Projects in the Historic Environment - The MoRPHE Project Managers' Guide*

Historic Environment Record Search. Dataset 2020.

Ordnance Survey mapping: 1855, 1862, 1897, 1898, 1919, 1947, 1968 and 2020 editions

Petts, D. & Gerrard, C. (2006) *Shared Visions: The North-East Regional Research Framework for the Historic Environment*. Durham

Skelton, A. (2006) *West Boldon Conservation Area Character Appraisal*. South Tyneside Council

APPENDIX 1: TECHNICAL SPECIFICATIONS

Geophysical survey specifications, provided by Phase Site Investigations Ltd:

Magnetic survey: technical information

2.1 Theoretical background

2.1.1 Magnetic instruments measure the value of the Earth's magnetic field; the units of which are nanoTeslas (nT). The presence of surface and sub-surface features can cause variations or anomalies in this magnetic field. The strength of the anomaly is dependent on the magnetic properties of a feature and the material that surrounds it. The two magnetic properties that are of most interest are magnetic susceptibility and thermoremnant magnetism.

2.1.2 Magnetic susceptibility indicates the amount of ferrous (iron) minerals that are present. These can be redistributed or changed (enhanced) by human activity. If enhanced material subsequently fills in features such as pits or ditches then these can produce localised increases in magnetic responses (anomalies) which can be detected by a magnetic gradiometer even when the features are buried under additional soil cover.

2.1.3 In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. Less magnetic material such as masonry or plastic service pipes which intrude into the topsoil may give a negative magnetic response relative to the background level. The strength of magnetic responses that a feature will produce will depend on the background magnetic susceptibility, how rapidly the feature has been infilled, the level and type of human activity in the area and the size and depth of a feature. Not all infilled features can be detected and natural variations can also produce localised positive and negative anomalies.

2.1.4 Thermoremnant magnetism indicates the amount of magnetism inherent in an object as a result of heating. Material that has been heated to a high temperature (fired), such as brick, can acquire strong magnetic properties and so although they may not appear to have a high iron content they can produce strong magnetic anomalies

2.1.5 The magnetic survey method is highly sensitive to interference from surface and near-surface magnetic 'contaminants'. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult, or even impossible, in the vicinity of surface magnetic features. The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.

2.1.6 The interpretation of magnetic anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a magnetic survey will identify all sub-surface features.

2.1.7 Most high resolution, near surface magnetic surveys utilise a magnetic gradiometer. A gradiometer is a hand-held instrument that consists of two magnetic sensors, one positioned directly above the other, which allows measurement of the magnetic gradient component of the magnetic field. A gradiometer

configuration eliminates the need for applying corrections due to natural variations in the overall field strength that occur during the course of a day but it only measures relative variations in the local magnetic field and so comparison of absolute values between sites is not possible.

2.1.8 Features that are commonly located using magnetic surveys include archaeological ditches and pits, buried structures or foundations, mineshafts, unexploded ordnance, metallic pipes and cables, buried piles and pile caps. The technique can also be used for geological mapping; particularly the location of igneous intrusions.

2.2 Instrumentation

2.2.1 A multi-sensor array cart system (MACS) utilising 8 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 0.5 m intervals, with a control unit and data logger was used for the magnetic survey.

2.3 Survey methodology

2.3.1 The MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The sensors have a separation of 0.5 m which means that data was collected on profiles spaced at 0.5 m apart. Readings were taken at between 0.1 m and 0.15 m intervals.

2.3.2 Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features by several metres to reduce the detrimental effect that these surface magnetic features have on the data. The location of the MACS data is converted direct to Ordnance Survey co-ordinates using the UK OSTN 02 projection. As the data is related direct to Ordnance Survey National Grid co-ordinates temporary survey stations are not established.

2.3.3 The Foerster gradiometers have a resolution of 0.2 nT but the stability of the cart system significantly reduces noise caused by instrument tilt and movement when compared with a traditional hand-held gradiometer system and the increased data intervals provide a higher resolution data set. The sensors have a range of ± 10,000nT and readings are taken at 0.1 nT resolution.

2.4 Data processing and presentation

2.4.1 The MACS data is stored direct to a laptop using in-house software which automatically corrects for instrument drift and calculates a mean value for each profile. A positional value is assigned to each data point based on the sensor number and recorded GNSS co-ordinates. The data is gridded using in-house software and parameters are set based on the sensor spacing and mean values. No additional processing is required. The gridded data is then displayed in Surfer 9 (Golden Software) and image files of the data are created.

2.4.2 The data was exported as raster images (PNG files), and are presented in greyscale format at 1:1000.

2.4.3 The data has been displayed relative to a digital Ordnance Survey base plan provided by the client as drawing *'NRWB-assessment area.dwg'*. The base plan was in the Ordnance Survey National Grid co-ordinate system and as the survey grids were set-out directly to National Grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

2.5 Interpretation

2.5.1 The anomalies have been categorised based on the type of response that they have and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided. The following anomaly types may be present within the data:

Dipolar, bipolar and strong responses

Dipolar and bipolar responses are those that have a sharp variation between strongly positive and negative components.

In the majority of cases these responses are usually caused by modern ferrous features / objects, although fired material (such as brick), some ferrous or industrial archaeological features and strongly magnetic gravel could also produce dipolar and bipolar responses.

Isolated dipolar responses are those that have a single positive and negative element. They are usually caused by isolated, ferrous or fired material on or near to the surface. The objects that cause dipolar responses are usually relatively small, such as spent shotgun cartridges, iron nails and horseshoes (hence they are often referred to as 'iron spikes') or pieces of modern brick or pot. Some types of archaeological artefacts can also produce this type of response but unless there is strong supporting evidence to the contrary they are assumed not to be of archaeological significance.

Bipolar anomalies have strong positive and negative components but are not technically magnetic dipoles. The majority of **isolated bipolar responses** are caused by ferrous or fired material on or near to the surface. These responses tend to be produced from larger objects, compared to dipolar anomalies, or a concentration of smaller objects. Some archaeological features/ activity, including areas of burning or industrial activity can also produce this type of response but unless there is strong supporting evidence to the contrary they are assumed not to be of archaeological significance.

Smaller isolated dipolar and bipolar responses have not been shown on the interpretation as there is no evidence to suggest that they are related to archaeological activity. Several larger isolated bipolar responses have been shown as these could be associated with more significant sub-surface features or material (although in this instance they are not thought to be of archaeological interest).

Bipolar linear anomalies are usually produced by buried pipes / cables that are usually metallic, although in some instances ceramic pipes can also produce popular anomalies. In some instances the anomaly can extend for a sigfncaint distance beyond the feature that produces the anomaly. Bipolar anomalies are often very strong and can potentially mask responses from other sub-surface features in the vicinity of the pipe or cable.

Areas containing numerous **strong dipolar / bipolar responses** (**magnetic disturbance)** are usually caused by greater concentrations of ferrous or fired material and are often found adjacent to field boundaries where such material tends to accumulate. Above ground metallic or strongly magnetic features, such as fences, gates, pylons and buildings can also produce very strong bipolar responses. If an area of magnetic disturbance is located away from existing field boundaries then it could indicate a former field boundary, several large isolated objects in close proximity, an area where modern material has been tipped or an infilled cut feature, such as a quarry pit. Areas of dipolar / bipolar response can occasionally be caused by features / material associated with archaeological industrial activity or natural deposits that have varying magnetic properties but they are usually caused by modern activity. Responses in areas of magnetic disturbance can sometimes be so strong that archaeological features located beneath them may not be detected.

Very strong responses, notably bipolar anomalies, from modern features can dominate the data for a significant distance beyond the feature. The extent of these areas is usually shown either as part of the bipolar anomaly or as a **limit of very strong response.** It should be noted that this effect extends beyond the feature and so the limit of the response does not correspond to the actual size or location of the feature within it. In many cases where these strong responses are present at the edge of survey area the feature causing the anomaly be actually be located beyond the survey area. It should be recognised that other sub-surface features located within these areas may not be detected.

Negative linear anomalies

Negative linear anomalies occur when a feature has lower magnetic readings than the surrounding material and can often be associated with ploughing regimes or plastic / concrete pipes or natural features.

They can also indicate the presence of a feature that cuts into magnetic soils or bedrock and which is infilled with less magnetic material and in certain geologies can be associated with archaeological features.

There are no significant negative linear anomalies in this data set.

Linear / curvi-linear anomalies (probable agricultural)

In many geological / pedological conditions agricultural features / regimes can produce magnetic anomalies due to the accumulation / alignment of magnetic topsoil. In most cases these are exhibited as a series of **broadly parallel positive linear** anomalies. The majority of these responses are associated with modern ploughing regimes but in some instances, where the responses are broader and more widely spaced, they can indicate the presence of the remnants of ridge and furrow.

Field drain systems can also produce linear anomalies, usually where the drains are made from fired ceramic or infilled with magnetic gravels.

Where a series of parallel anomalies are present then the approximate orientation of the anomalies are shown on the interpretation drawing to indicate the direction of the agricultural regime but for the sake of clarity individual anomalies have not been shown.

Individual anomalies may be shown if the response is not part of a regime.

Broad area of positive / negative responses

Broad areas of positive / negative responses can have a variety of causes. If the areas are generally quite large and irregular in shape then they are usually suggestive of natural features, such as lenses of sand and gravel deposits, palaeochannels or other natural features / variations where the natural material differs from the surrounding sub-surface. In some instances anomalies of this type can be associated with anthropogenic (usually modern) activity.

Linear / curvi-linear trends

An anomaly is categorised as a **trend** if it is not certain that the response is associated with an extant sub-surface feature. Trends are usually weak, irregular, diffuse or discontinuous and it is usually not certain what their cause is, if they represent significant sub-surface features or even if they are associated with definite features.

It is possible that some of the trends are associated with geological / pedological variations. Others may be produced by artificial constructs within the data, either caused by processing or in some instances by intersecting anomalies (usually different agricultural regimes) that give the appearance of curving or regular shapes. Many trends are a product of weak, naturally occurring responses that happen to form a regular pattern but which are not associated with a sub-surface feature.

In some instances former features that have been severely truncated can still produce broad, diffuse or weak responses even if the underlying feature has been removed. This is due to the presence of magnetic soils associated with the former feature still being present along its route. In other instances the magnetic properties of the soils filling a feature may vary and so the magnetic signature of the feature can change, even if the sub-surface feature itself remains uniform. If a response from a feature becomes significantly weak or diffuse then part of the anomaly may be shown as a trend as it is uncertain if the feature is still present or has been severely truncated or removed.

Isolated positive responses

Isolated positive responses can occur if the magnetism of a feature, area or material has been enhanced or if a feature is naturally more magnetic than the surrounding material. It is often difficult to determine which of these factors causes any given responses and so the origin of this type of anomaly can be difficult to determine. They can have a variety of causes including geological variations, infilled archaeological features, areas of burning (including hearths), industrial archaeological features, such as kilns, or deeper buried ferrous material and modern fired material.

The large number of isolated responses and lack of an obvious pattern to their distribution suggests that the majority of these anomalies are probably associated with geological / pedological variations or deeper buried ferrous or fired material. Only the larger or stronger areas of positive response have been shown on the interpretation. The majority, if not all of these responses, will be related to natural variations or relatively modern material but have been shown as their exact cause cannot be determined with certainty.

Positive linear / curvi-linear anomalies

Positive magnetic anomalies indicate an increase in magnetism and if the resulting anomaly is linear or curvi-linear then this can indicate the presence of a man-made feature. **Positive or enhanced linear /**

curvi-linear anomalies can be associated with agricultural activity, drainage features but they can also be caused by ditches that are infilled with magnetically enhanced material and as such can indicate the presence of archaeological features. Some natural infilled features can also produce positive anomalies.

There are no significant positive linear anomalies in this data set.

2.5.2 Several different ranges of data were used in the interpretation to ensure that the maximum information possible is obtained from the data.

2.5.3 X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar / bipolar responses that will probably be associated with surface / near-surface iron objects. X-Y trace plots have not been used in the report as they do not show any additional anomalies that are not visible in the greyscale data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot has been provided in the digital archive.

2.5.4 All isolated responses have been assessed using a combination of greyscale and X-Y trace plots.

2.5.5 Anomalies associated with agricultural regimes are present in the data. The general orientation of these regimes has been shown on the interpretation but, for the sake of clarity, each individual anomaly has not been shown.

2.5.6 The greyscale plots and the accompanying interpretations of the anomalies identified in the magnetic data are presented as 2D AutoCAD drawings. The interpretation is made based on the type, size, strength and morphology of the anomalies, coupled with the available information on the site conditions. Each type of anomaly is displayed in separate, easily identifiable layers annotated as appropriate.

2.6 Limitations of magnetic surveys

2.6.1 The magnetic survey method requires the operator to walk over the site at a constant walking pace whilst holding the instrument. The presence of an uneven ground surface, dense, high or mature vegetation or surface obstructions may mean that some areas cannot be surveyed.

2.6.2 The depth at which features can be detected will vary depending on their composition, size, the surrounding material and the type of magnetometer used for the survey. In good conditions large, magnetic targets, such as buried drums or tanks can be located at depths of more than 4 m. Smaller targets, such as buried foundations or archaeological features can be located at depths of between 1 m and 2 m.

2.6.3 A magnetic survey is highly sensitive to interference from surface and near-surface magnetic 'contaminants'. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult or even not possible in the vicinity of surface and near-surface magnetic features.

2.6.4 The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.

2.6.5 It should be noted that anomalies that are interpreted as modern in origin may be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

2.6.6 A magnetic survey does not directly locate sub-surface features - it identifies variations or anomalies in the local magnetic field caused by features. It can be possible to interpret the cause of anomalies based on the size, shape and strength of response but it should be recognised that a magnetic survey produces a plan of magnetic variations and not a plan of all sub-surface features. Interpretation of the anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Geological or pedological (soil) variations or features can produce responses similar to those caused by man-made (anthropogenic) features.

2.6.7 Anomalies identified by a magnetic survey are located in plan. It is not usually possible to obtain reliable depth information on the features that cause the anomalies.

2.6.8 Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. It is not possible to guarantee that a magnetic survey will identify all sub-surface features. A magnetic survey is often most-effective at identifying sub-surface features when used in conjunction with other complementary geophysical techniques.