Excavations at Burdhopecrag Roman Camp Otterburn

Excavation Report

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Summary

The excavations arose as a response to an encroaching area of landslip immediately to the east of a length of bank, and internal/external ditch of a presumed Roman marching camp (Scheduled Monument Ref: 1011392).

Following the receipt of Scheduled Monument Clearance a 20 m by 8 m excavation area was excavated, targeting (working from east to west), the outer ditch *c.* 2 m wide; the rampart *c.* 0.75 m high x 2 m wide and an area of ground within the camp to the west of the rampart, c.4 m wide. A suspected entrance way into the defences was also targeted

Excavations of the bank and outer ditch confirm that these were open during the Romano-British period and would indeed appear to be the rampart and outer defensive ditch of a Roman marching camp. Although no Romano-British material was recovered from either the rampart or ditch sufficient organic material was recovered from bulk samples of the outer ditch to allow for radiocarbon dating of this feature. The organic samples tested from the outer provided a date range of between 200 BC to AD 547. The rampart itself was constructed of stacked layers of turf with evidence of a central structure against which the layers of turfs were stacked. The most likely explanations for this feature are these deposits demarcate the remains of some form of defensive palisade or that the central deposit of redeposited natural reflects a central dump of material to demarcate the construction route of the rampart. The outer ditch, whilst not especially deep, at *c.* 0.5 m showed evidence of having been waterlogged and would have formed a modest barrier to attacking forces.

Upon removal of the turf around the suspected entranceway to the marching camp a metalled stone surface was identified leading from the exterior of the marching camp. This stone surface sealed the upper fills of the outer ditch and was sat above layers containing post-medieval clay pipe. The stratigraphic relationship and dating evidence would appear to confirm that the 'entranceway' to the Roman camp was in fact a post-medieval alteration, presumably to provide a more solid footing for transport and management of livestock. A rough cobbled surface continued along the eastern edge of the ramparts and sealed the outer ditch. This cobble surface eventually slumping into the soft upper fills of the outer ditch.

An internal ditch associated with the rampart was also confirmed to be post-medieval in date. This drainage ditch truncated the western side of the bank, with the turves being placed on top of the internal side of the older ramparts, possibly completed by a ditch cutting machine during the late 19th or early 20th century.

At the southern limit of the rampart the remains of a stone built hearth were identified on top if the bank. A charred cereal grain, recovered from the associated spread of heat affected silts, was radiocarbon dated to *c*. 1690-1927.

Pollen samples recovered from the outer ditch and rampart are indicative of heathland, cleared land surrounding the marching camp and also plants growing within the ditch. Small volumes of cereal type pollen grains of the Hordeum group within the ditch, perhaps suggesting nearby arable activity.

The excavation recovered a small assemblage of finds comprising of clay tobacco pipe, metalwork and slag. The clay pipes provide the only dating evidence. All three partial bowls are from spurred pipes. The most complete is dated *c.* 1690–1710

The archive and finds from the excavation will be deposited with Great North Museum. Until deposition, the archive will be stored in the Sheffield Office of Wessex Archaeology under project number 117950.

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Wessex Archaeology is also grateful to all the volunteers from North of the Wall Tynedale Archaeology, Altogether Archaeology, Coquetdale Archaeology and other groups who gave their time and effort to making the excavation such a success.

The project was managed for WA by Chris Swales (WA Scotland) and the field team was made up of Martina Tenzer (WA North) who supervised the excavations, along with Ben Saunders (WA Scotland) and Hannah Holbrook (WA North). Additional survey and finds training for the volunteers was provided by Jack Laverick and Jess Tibber (WA North). The report was compiled by Ben Saunders with graphics provided by Ian Atkins. Finds assessment was carried out by Lorraine Mepham. Environmental samples were processed by Liz Chambers, Maxwell Higgins and Stavroula Fouriki. The flots were sorted by Nicki Mulhall and assessed by Inés López-Dóriga. The sediments were described and interpreted by Nicki Mulhall. Radiocarbon dating was undertaken by 14Chrono and liaison was provided by Inés López-Dóriga. The pollen subsamples were prepared at QUEST and analysed by Alex Brown. This report was compiled by Inés López-Dóriga and Alex Brown.

Excavations at Burdhopecrag Roman Camp, Otterburn

Excavation Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology (WA) has been commissioned by Landmarc Support Services Ltd (hereafter the 'Client') to carry out an archaeological excavation at Burdhopecrag Roman Camp, Otterburn Training Area Northumberland (Figure 1), centred on National Grid Reference (NGR) 382846, 598689, and hereafter referred to as 'the Site').

1.1.2 The excavations arose as a response to an encroaching area of landslip immediately to the east of a length of bank, and internal/external ditch of a presumed Roman marching camp (Scheduled Monument Ref: 1011392).

1.1.3 The scope of archaeological works was designed by the Principal Archaeologist for the Defence Infrastructure Organisation (DIO) and set out in a Written Scheme of Investigation (WSI) for the project (Wessex Archaeology 2017). The WSI was submitted for approval To Historic England (HE), Northumberland National Park Authority (NNPA) and the Client prior to works commencing. All works were undertaken in accordance with this WSI and all conditions of Scheduled Monument Clearance, as well as national guidance (HE 2015, CIfA 2014a-c).

1.2 Scope of this report

1.2.1 This document sets out the project background and the results of the excavation. The results are inclusive of a description of the key features as well post-excavation assessment of the finds and environmental data, inclusive of pollen analysis and radiocarbon dating. A detailed list of contexts and the tabulation of all finds and environmental samples is also included.

1.3 The Site

1.3.1 Burdhopecrag Roman Camp is a Scheduled Monument located within Otterburn Training Area (OTA). OTA itself is a 23,000 ha. upland estate and a major UK training area predominantly used for artillery firing and field firing by infantry, with the majority of OTA within Northumberland National Park.

1.3.2 The Scheduled Monument includes two Roman camps, one within the other, situated on a gentle northeast-facing slope, 200 m southwest of Dere Street Roman road.

1.3.3 The outer camp, is now rather fragmented, but clearly visible on aerial photographs. It can be seen as a segmented rampart 4m wide on three sides with gateways in the south and west sides. The northern side of the camp is visible in parts as a slight

narrow ditch. The camp has maximum dimensions of 311 m north to south and 372 m east to west.

1.3.4 The inner camp is exceptionally well preserved. It is sub-rectangular in shape with rounded corners. It measures a maximum of 205 m north to south and 175 m east to west within a prominent earthen bank which is 4 m wide and 1.5 m high adjacent to an external ditch measuring 3 m wide. Gateways are 10.5 m wide on all four sides of the camp and are protected by traverses, the northern example has been severely reduced.

1.3.5 The eastern defences of the outer camp overlook a steep-sided scarp that runs down to Sills Burn.

1.3.6 In 2012 a landslip caused the edge of the scarp to encroach on the defences of the outer camp. Subsequent site inspections have shown that further slippage has occurred, resulting in the edge of the scarp to be no more than 4 m from the camp defences. As such, there was a high probability of further landslips which could destroy part of the defences of the camp.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 The name of Otterburn means otter stream, a stream frequented by otters (Old English "otor" + "brunna"). Otterburn lies in west Northumberland in the Northumberland National Park. It has a long history, much of it associated with defence from prehistoric times to the present day. The remote and inaccessible nature of much of the parish, together with the presence of the army's Otterburn Training Area, has led to exceptional preservation of some prehistoric and later settlements and field systems. A selection of records of the archaeology and historic environment of Otterburn is available online at Keys to the Past (http://www.keystothepast.info/). A summary of the archaeological and historical background, based on the records referred to, is provided below.

2.2 Prehistoric to Romano-British

2.2.1 The earliest remains in the parish are Neolithic. They include a piece of pottery and some stone tools, such as a flint, polished stone axe and axehead.

2.2.2 The oldest structures are Bronze Age and they are mainly ritual monuments and cairns. Many of these remains lie in places where people reused the same places in the Iron Age Roman and medieval periods, such as on Barracker Rigg. Here, a round cairn lies amongst remains of a Roman period settlement and field system. At Todlaw Pike, a round cairn and enclosed cremation cemetery have been discovered, and another round cairn cemetery stands on Levey Bog. Many more round cairns have been discovered across the parish, suggesting there was a great deal of activity here in the Bronze Age. Few bronze objects have been discovered, but those that have include a spearhead and axehead.

2.2.3 The oldest settlements in the parish are Iron Age. Two different types of settlement have been found in Otterburn: defended settlements on Colwell Hill and Fawdon Hill

and an unenclosed hut circle settlement on Todlaw Pike. The first settlement is encircled by three ramparts and ditches, while the latter sits unprotected amidst its field system of cairnfields and small rectangular plots. None of these settlements seems to have been used in the Roman period and a series of small farmsteads appear to have been established instead. For example at Woodhill East, Wood Hill, Greenchesters, Little Crag and Barracker Rigg. On Fairney Cleugh there are at least four Roman farmsteads and one of the most extensive cord rig field systems in the county. The Roman army built two roads through this area: the High Rochester to Bridge of Aln road and Dere Street.

2.3 Medieval

2.3.1 Otterburn also lay on medieval route ways, such as the Elsdon to Gamelspath road. One of the most notable medieval events in the parish was the Battle of Otterburn, fought in 1388 between the Scots and the English. The dangers of living so close to the Scottish border meant that some people built defensive buildings called tower houses, such as at Otterburn Tower Hotel and Greenchester. There appear to have been few villages in the area at this time although Roman farmsteads on Barracker Rigg and near Shittleheugh were reoccupied at this time, and there may have been a village at Heatherwick, Davyshiel and Branshaw.

2.4 Post-medieval

2.4.1 In the 16th and 17th century, Otterburn lay in the midst of Border reiver country. Those who could afford it built defensive farmhouses, now called bastles. Some of these buildings have survived, albeit in ruins, at Shittleheugh, Branshaw and Girsonfield.

2.4.2 The 18th century brought a more peaceful way of life to the area and people began to build less defensive homes, such as Monkridge Hall, The Vicarage, Old Town Farmhouse and Overacres, whose gate piers are all that survive. Later, Otterburn Hall was built as a county retreat for Lord James Douglas. The parish registers record many farmsteads in the parish, including Potts Durtrees, Hopehead East, Hopeshield West and Hopefoot. People also adopted new ideas in farming that came from the Agricultural Revolution at this time and a new, planned farm, was built at Otterburn Hall Farm.

2.4.3 The boundaries of landownership seem to have been formalised at this time and a series of boundary stones were erected from Rigg Moss to White Crag, Black Hill to Todlaw Pike, Cowey's Cairn to Cooper Stones and elsewhere. Transport links were improved in the late 18th century when the Jedburgh to Newcastle turnpike opened. Some early 19th century milestones still stand alongside the road (A696) at Shittleheugh Bridge and north of Otterburn. Alongside farming, other economic activities were established, including a woollen mill at Otterburn, coal mining near Hopefoot, a tile kiln at Garretshields, corn mills at Davyshiel and Troughend, and lime burning at Greenchesters. The spiritual side of life was also provided for with a Presbyterian chapel, Church of St John the Evangelist and Quaker burial ground.

2.5 Modern

2.5.1 The modern village grew up around a coaching inn and Otterburn Tower. It was enlarged in the 1950s with the addition of Brierley Gardens, a council estate which

was expanded in the 1970s. The village further expanded in the 1990s and 2000s with the new housing development on former farm land at Willow Green.

2.5.2 More recently, Otterburn has been adopted by the Ministry of Defence as a training area and military remains from the 20th century are becoming important monuments in their own right, such as the target operator bunkers north of Hopehead.

2.6 Previous archaeological works

2.6.1 The first comprehensive archaeological survey of the Training Area was carried out by the Conservation Group of Otterburn Estate and the Field Research Group of the Society of Antiquaries of Newcastle upon Tyne between 1975 and 1977. Directed by Beryl Charlton, this survey resulted in the production of a gazetteer and review of archaeological remains on the estate (Charlton & Day 1977; Charlton 1996). There is an abundance of archaeological sites of most periods in the Training Area, ranging from Neolithic burial monuments to Roman forts, medieval farmsteads and post-medieval industrial sites, all of which suggest that the area was considerably more densely populated than in recent times.

2.6.2 Following MoD proposals for the 'Options for Change' project, archaeological surveys and evaluations were undertaken at a number of locations in the Training Area in 1995 to 1997, in order to assess the potential archaeological significance of specific areas affected by the road-widening proposals. These investigations were undertaken jointly by Lancaster University Archaeological Unit and The Archaeological Practice, University of Newcastle upon Tyne. The evaluations identified a number of areas where the survival of significant archaeological remains would be threatened by the proposed developments (LUAU/NUAP 1996, 1997).

2.6.3 Subsequently, in 2002, Archaeological Services undertook excavation of a number of sites threatened by development for the AS90/MLRS Project, as well as further topographic survey and historic building recording (Archaeological Services 2004; 2005a).

2.6.4 Additional archaeological works, consisting of watching brief, evaluation and excavation, were carried out by Archaeological Services during the construction works for the AS90/MLRS Project at the Otterburn Training Area between 2003 and 2005 (Archaeological Services 2005b).

3 AIMS AND OBJECTIVES

3.1 General aims

3.1.1 With due regard to the CIfA *Standard and guidance: archaeological excavation* (CIfA 2014b), the principle aim of the archaeological excavation was to determine the character, extent, date, integrity, state of preservation and quality of any identified archaeological deposits within the area of the Scheduled Monument at risk from further landslips. The works were fully in compliance with national guidelines (CIfA 2014a-c)

3.2 Project objectives

3.2.1 In furtherance of the project aim, the following objectives were defined as:

- to undertake an archaeological excavation within a section of the eastern defences of the outermost of the three Roman camps at Burhopecrag;
- to identify any potential damage of the scheduled monument to inform future management decisions;
- to provide training and participation of volunteers on the excavation and if possible, with some of the post-excavation processes; and
- to prepare a report on the results of the archaeological works.

4 METHODOLOGY

4.1 Fieldwork methodology

4.1.1 The area of excavation measured approximately 20 m long x 8 m wide and included (working from east to west), the outer ditch c. 2 m wide; the rampart c. 0.75 m high x 2 m wide and an area of ground within the camp to the west of the rampart, c.4 m wide (Plate 1). The excavation area was cited adjacent to the area of the landslip to ensure that the entire area of threatened deposits were exposed, and also covered half of a suspected entrance way into the defences, at its southern end.

4.1.2 The excavation was supervised by core WA staff working alongside volunteers from local archaeological groups.

4.1.3 The topsoil, grasses and overburden were carefully excavated using a mechanical excavator fitted with a toothless ditching bucket to exposure the archaeological layers across the trench. In areas where sensitive archaeology was suspected, a proportion of the overburden was left on, and then removed using hand excavation. A single 1 m slot was machine cut through the rampart, halting above the ditch fills of the inner and outer ditch.

4.1.4 All further work was undertaken by hand. Individual discrete features were half sectioned while the larger ditches and gullies were investigated through slot excavation, with 20% of the ramparts and ditches sampled.

4.1.5 On completion of the excavation, the Site was reinstated to conform to the existing earthwork profiles adjacent to the excavation area using a mechanical excavator working under archaeological supervision.

4.2 Recording

4.2.1 Written and drawn records were made of the stratigraphy within the areas investigated, with full written and drawn records of all excavated contexts made in accordance with best archaeological practice. Unexcavated archaeological deposits were recorded to the maximum extent possible.

4.2.2 All archaeological features were related to the Ordnance Survey datum and to the National Grid. Survey was undertaken using a GNSS system to a three-dimensional accuracy of 0.05 m or better.

4.2.3 All archaeological deposits were recorded using the WA *pro forma* recording system. This written record is hierarchically based and centred on the context record. Each

context record fully describes the location, extent, composition and relationship of the subject and was cross-referenced to all other assigned records.

4.2.4 A full photographic record was maintained comprising of digital images taken with a suitable camera of at least 10 megapixels in addition to 35 mm monochrome prints.

4.3 Specialist strategies

Artefact

4.3.1 Finds were treated in accordance with the relevant guidance given in the CIfA *Standard and guidance: archaeological excavation* (2014a), the UK Institute of Conservators Guidelines *Conservation Guideline No 2* and the Museums and Galleries Commissions *Standards in the Museum Care of Archaeological Collections* (1994).

4.3.2 All artefacts from excavated contexts were retained, except those from features or deposits of obviously modern date. All retained artefacts were washed, weighed, counted and identified.

Environmental

4.3.3 Sampling followed the Historic England (HE) guidelines *Environmental Archaeology: a guide to theory and practice of methods, from sampling and recovery to post-excavation* (EH 2011, 2nd edition, reissued 2015) and the WA *Guidelines for Environmental Sampling*. The sampling strategy was developed with input from the WA environmental manager and was undertaken under the guidance of a geoarchaeologist.

4.3.4 Bulk environmental soil samples were taken from well-sealed and dated or datable archaeological features for plant macro-fossils (charred and/or waterlogged and wood charcoal), small animal bones and small artefacts.

4.3.5 Monolith/column samples were also taken, being key to representative sequences on the Site within the ramparts and ditch infills. These were examined in laboratory conditions by a geoarchaeologist to further elucidate the depositional history of the Site and enable sub-sampling for microfossils and radiocarbon samples as appropriate.

4.3.6 Bulk environmental soil samples were processed by flotation and scanned to assess the environmental potential of deposits, but were not fully analysed. The residues and sieved fractions were recorded and retained with the project archive. The monoliths are subject to detailed description by the geoarchaeologist and sub-samples taken as appropriate for microfossils and radiocarbon dating, which has been brought into this report.

Scientific dating

4.3.7 Bulk samples and monoliths provided sufficient organic material to allow for radiocarbon dating from deposits within the outer ditch and also a charred grain associated with a hearth above the rampart. Samples were dated at the 14Chrono Centre, Queens University, Belfast.

Other

4.3.8 An OASIS online record[1] has been initiated and key fields completed on Details, Location and Creators Forms. All appropriate parts of the OASIS online form will be completed for submission and this will include an uploaded .pdf version of the entire report (a paper copy will also be included with the archive).

5 ARCHAEOLOGICAL RESULTS

5.1 Introduction

5.1.1 The following section provides a detailed summary of the results of the archaeological excavations as well as the results of all post-excavation work on finds and environmental samples recovered. Archaeological features will be discussed by period. A comprehensive list of all recorded contexts can be found within Appendix 1.

5.2 Overburden and natural geology

5.2.1 Topsoil layer 1001 consisted of a dark brown to black peat layer containing poorly clumped reed and moss deposits. This peat layer was on average 0.2 m thick and directly overlay natural 1002. Layer 1002 consisted of a mottled yellow grey sandy clay.

5.3 Romano-British

5.3.1 Radiocarbon dating has confirmed that both rampart 1036 and the outer western ditch 1041 are of a late Iron Age to Romano-British date with samples from deposits.

5.3.2 Ditch group 1041 (comprising cuts 1006, 1013, 1043 and 1063) was north to south aligned and extended along the length of the trench, continuing to the south of where the rampart ceased (Figure 2, Plates 1-2). Four 1 m wide slots were excavated through the ditch fills, demonstrating that the extant remains were roughly 1 m-1.5 m wide with a small ledge on the western slope. The ditch had a maximum depth of 0.5 m below ground level.

5.3.3 Three of the excavated slots recorded an upper fill made up of the slumped cobbles (eg 1016) derived from post-medieval stone surface 1057. This upper layer overlay a slumped turf and soil secondary fill (eg. 1015) interpreted as the gradual erosion of the bank deposits slowly sliding into the ditch (Figure 3, Plates 3-4). A primary fill of silt and organics was recorded at the base of the ditch (eg. 1014).

5.3.4 Rampart group 1036 (comprising deposits 1003, 1033 and 1059) was orientated north to south, with a well defined southern terminus. Excavated slots demonstrated that the rampart was constructed using layers of stacked turves, represented by the horizontal striations of dark organic material within the paler redeposited natural soil (Figures 2-3, Plates 5-7). The turfs appear to have been stacked either side of a dump of redeposited natural running along the centre of the bank at. Several of the sections through the rampart show a central band of yellow sand and clay with the bands of decayed turfs abutting this deposit (Plate 5). The entire rampart was constructed on

top of the former, now buried land surface (1034) which remained as a thicker dark organic band, unbroken below the piled turf deposits.

5.3.5 The three slots through the bank (each 1 m wide, the northernmost and southernmost dug by machine and the centre one by hand) showed the original bank as a roughly symmetrical bank 2 m wide and 0.5 m high, although the inner edge was slightly steeper, with horizontal degraded turf dark striations throughout. Occasional large rounded stones were present within the deposit. A later deposit of darker material on the western side was interpreted as being redeposited from post-medieval drain cut 1042

5.4 Post-medieval and modern

5.4.1 To the east of the bank under the topsoil/turf was a slumped layer of loose rounded cobbles (group context 1057) which covered the whole eastern side of the trench: running 20 m north-south, 1.5 m wide at the northern end and 0.5 m at the southern end of the trench (Figure 2, Plate 2). This layer continued into the east side of the trench but was not visible in the exposed section of landslip. The western most cobbles overlay the eastern lower break of slope of the bank, but the remainder had slumped into the outer ditch 1041. Cobble layer 1031, 1014, 1058 and 1046 (listed from north to south) were clearly originally laid to form a hard surface in what was probably a very boggy area immediately outside of the bank. They gradually sank into the soft deposits of the ditch infill as the lower deposits compacted over time. The cobbles overlaid the edges of metalled stone surface 1010 within the entranceway through the bank and over the burnt areas (1056) on the edge of the bank, and so post-date these features, potentially dating to the late 19th century or 20th century, when the area was reworked for military training just prior to or during WWI.

5.4.2 The metalled surface (1010) with a curvilinear bounding wall along its northern side filled the northern half of the entranceway through the bank that was uncovered, with the half to the south remaining untouched. The retaining wall was made up of roughly shaped and squared blocks of limestone up to two courses in height (0.25 m high) running west-east from the western trench edge to the centre line of the bank before curving north in an arc following the lower break of slope around the east side of the bank terminus. The metalled surface itself was laid into a pale yellow friable lime mortar following the construction of this boundary wall, and extended beyond the trench edges to the south and west, although there was evidence that it was beginning to fade out towards the western edge. A make-up layer of grey silty sand (1053) with coal fragments was found below the mortar, containing a copper disc, likely to be a button, making it likely that the metalled surface was of post-medieval date. The eastern edge of the surface ended around the edge of the eastern ditch (1041), although the relationship between the two could not be ascertained. It is probable that the eastern ditch had already been infilled when the metalled surface was put down, within a cutting through the previously continuous bank to allow easier access. This access route may have been for animals and carts carrying the coal from the bell pits present to the northwest around the Roman camps.

5.4.3 Cited at the southern terminus of the rampart a stone built hearth was recorded. Hearth 1056 survived as a loose collection of angular stones measuring *c.* 1 m by 1 m and a single course in height (Figure 2, Plate 8). The hearth was associated with a

spread of heat affected silts (1047-1050). The hearth was assumed to be post-medieval in date and associated with the reworking of the ramparts associated with the post-medieval stone surface 1010/1057.

5.4.4 To the east of the southern rampart terminus were patches of reddish-purple oxidised soil and charcoal/coal (1047-1050). These deposits were overlain to the east by the cobbles of the rough cobbled surface 1057. These burnt layers overlaid the northern most stones of the curbing stones of metalled surface 1010, making the burning later than this post-medieval feature. The upper most layer (1047) was made up of black coal fragments around a flattish stone identified as a possible fuel store for the hearth areas 1048, 1049 and 1050, all of which were oxidised reddish-purple sand and clay mixes. Deposit 1048, overlaid in to the northwest by deposit 1047, overlay the western edge of deposit 1049, while deposit 1050 was separate, slightly off to the east and may have been a continuation of 1048. Deposit 1048 contained fragments of unburnt coal and pieces of clay pipe, dating it to the post-medieval period, with the clay pipe bowls giving a date range of *c*. 1690-1710. All were sampled by quadrant, with four 10 litre samples taken from each. These deposits all overlay grey clay layer 1054/1061. A charred grain recovered from deposit 1050 has produced a radiocarbon date range of between AD 1690-1927.

5.4.5 Immediately below the topsoil and turf layer (1001) on the west side of the rampart was a narrow north to south aligned drain cut (Figure 2). This cut, 0.6 m wide and 0.3 m deep was flat bottomed with near vertical sides and a near right angle break of slope between the sides and the base. It ran for 17 m from the northern edge of the trench. Four slots were cut through it along its length: cuts 1004; 1051, 1017 and 1019. The southern terminus was at the edging curb of metalled surface 1010 where the edges flared outwards on both sides to a maximum width of 2 m, the eastern edge tracing the base of the bank. This feature, identified as a drain, (assigned the group number 1042. An associated drainage feature (1023), cut through metalled surface 1010 and contained a cast iron pipe. Cut 1023 was backfilled with the material excavated from metalled surface 1010.

5.4.6 A north to south aligned linear feature measuring. 0.2 m wide extended for 4.5m to the west of drain 1042 (Figure 2). Hand dug slots 1011 and 1027 were excavated with additional sections excavated for finds retrieval. This feature has been interpreted as a wheel rut from a ditch cutting machine, probably in use during the late 19th or early 20th century to cut the drainage ditch 1042 on the western edge of the rampart. This machine typically lifted the excavated material up to one side, which is seen in the dump of additional darker mixed material on the western slope of the rampart (Figure 3, Plate 6), It is possible that these processes were part of the construction of the WWI camp installations around Burdhopecrag. The broken nature of the feature was suggested to be due to differing ground conditions when the ditch cutter was in operation, causing the wheel to sink in to the ground and push soil down into the natural at certain points, possibly where the ground was softer/wetter.

5.5 Features of uncertain date

5.5.1 A shallow circular depression (1025) was present to the south of the southern end of the wheel rut cut (1027). Filled with a firm brown silty soil, there was no evidence for burning. The purpose and date of this feature are therefore unknown; however, it may

relate to the wheel rut or drain nearby and therefore would date to the post-medieval or modern period.

6 ARTEFACTUAL EVIDENCE

6.1 Introduction

6.1.1 The finds were quantified and assessed by Lorraine Mepham (WA South). The following is a condensed version of her report.

6.1.2 A very small number of finds were recovered from the excavations, made up of clay tobacco pipe, metalwork and slag as shown in Table 1.

Table 1 Finds by context

Context	Material Type	Quantity	Description
1001	Iron	1 object	Blade fragment
1049	Clay Pipe	1 frag	Stem with partial spurred bowl
1050	Clay Pipe	8 frags	3 plain stems; 2 partial spurred bowls (1 milled); 1 bowl frag (milled)
1050	Animal Bone	2 frags	Small burnt fragments
1050	Slag	1 frag	Iron smithing slag
Unstratified	Copper alloy	1 object	Plain disc, probably button

6.2 Clay tobacco pipe

6.2.1 The clay pipes provide the only dating evidence. All three partial bowls are from spurred pipes. The most complete (one of the two from 1050) is dated c. 1690–1710 (Oswald 1975, fig. 4,G, 19), and the other two, as well as a bowl fragment from 1050, are likely to date similarly.

6.3 Metalwork

6.3.1 An iron blade fragment was recovered from the turf/topsoil layer (1001). It was identified as possibly being from a spade-shoe, hoe or other agricultural implement and could not be dated.

6.3.2 A copper disc, probably a button was recovered from unstratified material. It was of post-medieval type, with a possible rear loop attachment but is not further datable.

6.4 Slag

6.4.1 One piece of iron smithing slag was recovered from 1050. It was not further analysed.

6.5 Animal bone

6.5.1 Two small fragments of burnt animal bone were recovered from 1050 but were not identified.

6.6 Further potential

6.6.1 This is a very small finds assemblage, and its potential for further research is extremely limited. All datable objects are post-medieval, and there are no objects of intrinsic interest.

6.6.2 The whole finds assemblage has been recorded to a sufficient level for archive purposes, and no further work is required. Given the lack of further potential, the assemblage as a whole is not recommended for retention for long-term curation.

7 ENVIRONMENTAL EVIDENCE

7.1 Introduction

7.1.1 Several types of samples were taken for the recovery of palaeoenvironmental evidence. The sampling strategy was designed after consultation with specialists from the environmental department. Twenty-eight bulk samples (Table 2) were taken from a range of deposits and were processed for the assessment of macroremains. Three samples of macroremains were submitted for radiocarbon dating (Table 4). The sequences in four monolith samples were described and subsampled for pollen analysis when appropriate (Table 2). Five pollen subsamples (Table 3) from two of the monoliths were analysed.

Table 2 Bulk Sample Provenance Summary

No. of samples	Volume (litres)	Feature types
2	17	Wheel ruts
9	61	Ditches
16	123.5	Hearths
1	8	Buried soil
28	**209.5**	

Table 3 Monolith sample provenance summary

Sample	Feature	Action
3	Rampart of Roman marching camp	Sediment description unnecessary, recommendations made for palaeoenvironmental analysis
5	Outer ditch of rampart, slot [1013]	Described, interpreted and recommendations made for palaeoenvironmental analysis
10	Outer ditch of rampart, slot [1029]	Described, interpreted and recommendations made for palaeoenvironmental analysis
11	Drainage ditch, 20th century	No further work recommended

Table 4 Samples submitted for radiocarbon dating.

Context	Sample ID	Material
Burning deposit	117950__(1050) <32>	Charred plant remain
Base of outer ditch	117950__(1030) <33>	Wood charcoal (juvenile)
Base of outer ditch	117950__(1014) <7>	Wood charcoal (juvenile)

7.2 Aims and methods

7.2.1 The samples were assessed with the purpose of determining the archaeological and palaeoenvironmental potential of the samples to address the wider project Aims, both in terms of sedimentary and palaeoenvironmental material. Following the assessment, the analysis of suitable pollen samples was undertaken. Following radiocarbon dating of charred plant macroremains, these were not taken for further analysis.

7.2.2 The sampling strategy was designed to investigate past plant use on site, as well as to assess the potential for paleoenvironmental reconstruction. The features sampled were:

- A rampart of stacked turf blocks and the potential buried soil underneath was sampled with a monolith (<3>).
- Monolith samples and accompanying bulk samples were taken from the depositional sequences of the ditches (<5> and <10>).
- The heat affected areas (possible hearths) were sampled (<13>, <18>, <23> and <28>) in quadrants to identify any spatial variation in the artefacts and environmental evidence which could help in the interpretation of their use or significance.

Plant macroremains

7.2.3 The size of the samples varied between 3 and 10 litres, and on average was around 7.5. The bulk samples were processed by standard flotation methods; the flot retained on a 0.25 mm mesh, residues fractionated into 5.6 mm and 1 mm fractions. The coarse fractions (>5.6 mm) were sorted, weighed and discarded. The flots were subsampled by the grid/spoon method (Steiner et al. 2017) to a quantity of 100 ml for the assessment of the environmental evidence. The flot subsamples were scanned using a stereo incident light microscopy at magnifications of up to x40 using a Leica MS5 microscope for the identification of environmental remains. The preservation and nature of the charred plant and wood charcoal remains, as well as the presence of other environmental remains such as molluscs, animal bone and insects was recorded. Preliminary identifications of dominant or important plant taxa are noted below, following the nomenclature of Stace (1997) for wild plants, and traditional nomenclature, as provided by Zohary and Hopf (2000, Tables 3, page 28 and 5, page 65), for cereals. Abundance of remains is qualitatively quantified (A*** = exceptional, A** = 100+, A* = 30-99, A = >10, B = 9-5, C = <5) as an estimation of the minimum number of individuals and not the number of remains per taxa.

Sediments

7.2.4 The monoliths were cleaned prior to recording and standard descriptions were used (following Hodgson 1997), including Munsell colour, texture, structure and nature of boundaries.

Pollen

7.2.5 Five sub-samples were sent to Quaternary Scientific, University of Reading (QUEST) for pollen extraction, two from monolith 3 and three from monoliths 10, with the following aims:

- Produce data on the vegetation environment of the Site;
- Determine on the basis of the pollen whether the deposits in monoliths 3 and 10 are derived from similar habitats;

7.2.6 The pollen was extracted as follows; 1) sampling a standard volume of sediment (1ml); adding two lycopodium tablets of the exotic clubmoss Lycopodium clavatum to provide a measure of pollen concentration in each sample; 3) deflocculation of the sample in 1% Sodium pyrophosphate; 4) sieving of the sample to remove coarse mineral and organic fractions (>125µ); (5) acetolysis; (6) removal of finer minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm3); (7) mounting of the sample in glycerol jelly. Each stage of the procedure was preceded and followed by thorough sample cleaning in filtered distilled water.

7.2.7 Pollen counting was undertaken at a magnification of x400 using a Nikon Eclipse E400 transmitted light microscope. Analysis involved the counting of a minimum of 500 pollen grains of terrestrial species in addition to aquatics and fern spores. Pollen and spores were identified to the lowest possible taxonomic level. Plant nomenclature followed Stace (1997) and Bennett et al (1994).

7.2.8 Pollen sums were based on total land pollen (TLP) excluding aquatics and fern spores which are calculated as a percentage of TLP plus the sum of the component taxa within the respective category.

7.2.9 Identification of indeterminable grains was according to Cushing (1967). Pollen diagrams were produced using Tilia v.2.0.41 (Grimm, 2015); diagrams were not zoned due to the small number of samples analysed from each monolith.

Radiocarbon dating

7.2.10 Radiocarbon dating was not recommended for the rampart sequences since it is mostly the result of redeposited material. Although the outer ditch was originally presumed to be Roman and the calibration curve is not precise for that period, a radiocarbon date on short-lived plant remains from the primary fill on two different slots would allow to confirm its chronology. Radiocarbon dating was advisable on charred plant macroremains from the heat-affected areas, as both Roman and post-medieval activity was identified on The Site. The samples for radiocarbon dating were submitted to 14Chrono, Queen's University, Belfast. The dates have been calculated using the IntCal13 calibration curve (Reimer et al. 2013) and the computer program OxCal (v4.2.3) (Bronk Ramsey and Lee 2013) and cited at 95% confidence. The degree of reliability of the radiocarbon date is assessed following Waterbolk (1971) and Pelling et al. (2015).

7.3 Results

Plant macroremains

7.3.1 The flots of the bulk samples were generally large (Appendix 5). A large amount vegetative plant material was preserved by waterlogging, most of which belonged to roots. Seeds and fruits of wetland taxa and ruderal vegetation such as rushes (Juncus spp.), cinquefoil (Potentilla sp.), sedges (Cyperaceae), docks (Polygonaceae), possible naiad (Najas sp.?) nettle (Urtica sp.) and composites (Asteraceae, Centaurea sp.) were recovered.

7.3.2 Charred material in the subsamples was very rare and generally restricted to a few fragments of mature wood charcoal. The presence of a barley (Hordeum vulgare) grain and a plantain (Plantago sp.) seed in one of the subsamples from the heat affected deposits or possible hearths suggest their possible use in some sort of crop-processing activity.

Sediments

7.3.3 Monolith sample <3> shows the sequence through the rampart (Appendix 2). This sample was not selected for detailed geoarchaeological description, as interpretation was clear from site records and photographs. The section shows distinct dark bands interleaved with thicker pale grey material with an ashy appearance - this is entirely typical of thickly-cut turves from the upper horizons of a podzol; a soil formed in freely draining acidic geology in a high rainfall environment. The dark bands are the turf itself (A or O horizon), whilst the pale grey material is the E horizon, from which humic material and sesquioxides are leached over time and deposited down-profile. The A horizons may provide a picture of local and regional vegetation via pollen analysis, should preservation be sufficiently good.

7.3.4 Monolith sample <5>, ditch slot (1013) taken from the outer ditch of the rampart shows a sequence (Appendix 2) typical of mobile geology and a wet environment, which has contributed to the rapid filling of a ditch by side collapse due to undercutting from standing water, combined with rain wash of freshly exposed sides. A humic peaty layer (either a stabilisation period or as redeposited turve) overlies a sequence of probable inwashes caused by rainwater from the surface and material from the sides deposited by undercutting. Iron staining is present at the bottom, which may be either a relic of the podzolic sequence through which the ditch is cut, or a consequence of redox conditions caused by its presence.

7.3.5 Monolith sample <10>, ditch slot (1029) taken from the outer ditch of the rampart, similar to monolith sample <5>, shows a sequence (Appendix 2) typical of mobile geology and a wet environment contributing to the fairly rapid filling of a ditch by side collapse due to undercutting from standing water, and rain wash of exposed sides. However, the podsolization process is much clearer here, with well-defined leached horizons and darker layers of redeposited turves with some iron staining towards the base.

Pollen

7.3.6 The analysis of pollen subsamples from monolith sample <3> demonstrates that pollen is moderately-preserved and present in significant concentrations (Appendix 3). The basal sample (0.44 m) is dominated by pollen of Calluna vulgaris (heathers) (77.8%), declining to 38.1% in the top sample (0.05 m). Arboreal pollen accounts for 39.1% of the pollen assemblage at 0.05 m, largely comprising Betula (birch) (21.3%), Corylus avellana type (hazel) (9.3%) and Alnus glutinosa (alder) (6.9%), with arboreal pollen accounting for only 2.5% of the assemblage at 0.44 m. Several herbaceous taxa are recorded from both samples in small quantities (typically < 0.5%), including Ranunculaceae (buttercups), Rosaceae (rose family), Plantago lanceolata (ribwort plantain) and Anthemis type (chamomiles).

7.3.7 The three samples (0.17, 0.21 and 0.36 m) from monolith sample <10> contain well-preserved pollen present in significant concentrations (Appendix 4). All three samples are characterised by significant quantities of pollen of Calluna vulgaris (39.3–57.5%), along with Poaceae (grass family), reaching a maximum of 39.1% at 0.21 m. Herbaceous pollen taxa otherwise occur in small quantities (< 0.5%), but with values of 1–1.5% recorded for Potentilla (cinquefoils) and Plantago lanceolata. Single cereal type pollen grains of the Hordeum group (barley) are recorded in all three samples. Arboreal pollen values are highest in the basal sample (0.36 m) (31.7%), declining to 16.1% (0.21 m) with higher values at 0.17 m (22.8%). Arboreal pollen largely comprises Betula, Corylus avellana type and Alnus glutinosa. High values for fern spores are recorded from the basal sample (21.6%), declining rapidly to 6.3% (0.21 m) and 1.3% (0.17 m).

Radiocarbon dating

7.3.8 The three samples submitted for radiocarbon dating were successfully measured, providing results of modern date for the charred environmental evidence on the features on the surface of The Site and Late Iron Age to Late Roman for the environmental evidence preserved at the bottom fills of the slots in the outer ditch (Table 5).

Table 5 Results of the radiocarbon dating measurements

Lab. Ref	Sample ID (Site code, context and sample number)	Material	Date BP	calibration (2 sig. 95.4%)
UBA-36460	117950__(1050) <32>	Charred plant remain: Barley grain	80±33	cal. AD 1690-1927
UBA-36461	117950__(1030) <33>	Wood charcoal (juvenile): Charred roundwood fragments	2085±34	200-0 cal. BC
UBA-36462	117950__(1014) <7>	Wood charcoal (juvenile): Charred roundwood fragments	1612±43	cal. AD 350-547

7.4 Discussion of environmental evidence

7.4.1 Regarding the economic use of plant resources, although there is a long tradition of study of military sites in the North of England, little has been done beyond Hadrian's wall and particularly little on temporary/marching camps (Young et al. 2017). As a consequence, there is very little information and virtually none from the Otterburn area (Hall and Huntley 2007), where the little sampling carried out so far has produced very sparse evidence (Archaeological Services 2005a,2005b). To the South of Hadrian's wall grain storage facilities in military sites are almost ubiquitous (Philpott 2006) and cereals are often recovered. The crops were possibly traded with the farmers in the environs, as suggested by the tablets of Vindolanda (Philpott 2006), although the linking evidence between the military sites and the farmsteads (Chadwick 2009, Hall and Huntley 2007, Young et al. 2017) is still missing, and it is not known exactly where the cereals were grown and processed (Philpott 2006).

7.4.2 The palaeoenvironmental data from the Northumberland National Park has been synthesised by Young et al. (2010) as part of the archaeological research framework

for the park, set in the context of palynological studies from the wider landscape. Significant palynological work was undertaken as part of doctoral research by Moores (1998) on the Holocene palaoenvironments of the Tyne Valley, including key upland bogs and lowland valley sites within a c. 10-15 km radius of Otterburn. These included several palaeochannel sequences from the floodplain of the River Rede at Brownchester (1 km south of Otterburn) and upland bog studies at Bloody Moss (10 km NE) and Drowning Moss (15 km NW). Dumayne (1992, 1994) also undertook a number of palynological studies to the south at sites along the line of Hadrian's Wall, contributing to the debate on the impact of Roman rule on the landscape of Britain; the results produced evidence for clearance both preceding and associated with the construction of the wall (Dumayne 1994).

7.4.3 Palynological work on upland moorland sites at Bloody Moss and Drowning Moss indicated peat formation occurred around 6000 and 5000 cal. BP respectively, with heath pollen in the base of the sequences taken to suggest that peat growth was probably linked with anthropogenic clearance of woodland (Moores 1998). There is a gradual expansion in heathland vegetation from the late Neolithic with a marked expansion during the Bronze Age, apparent from Bloody Moss, Drowning Flow and other pollen sites within and surrounding the Northumberland National Park, along with evidence for cereal cultivation. Pollen studies from palaeochannels within the floodplain of the River Rede at Brownchester suggested that the valley floor had been cleared prior to the Iron Age (Moores 1998).

7.4.4 Topping (1989) has suggested that the region saw an increasing population and intensification in land-use during the Iron Age, such that the landscape is likely to have been largely cleared of woodland by the time the Romans arrived. However, pollen diagrams suggest a degree of spatial variation in vegetation history, with some sites suggesting a largely cleared landscape during the pre-Roman Iron Age with others showing little evidence for clearance (see Dark 2000; Rippon et al. 2015). Dumayne (1994) and Dumayne and Barber (1994) had suggested increased forest clearance in the Roman period was linked to the requirement for wood for fort building, although this hypothesis has been criticized on the basis of the poor radiocarbon chronologies associated with pollen diagram that made such a link difficult to substantiate (see Manning et al 1997).

Plant macroremains

7.4.5 The assemblages of plant macrofossils preserved by waterlogging require no further analysis. They could merely represent the natural vegetation growing in the immediate environment of the features or represent the deposition of site waste, such as horse manure (Hall and Kenward 1990 apud Hall and Huntley 2007) or a mixture of the two. The assemblages of charred plant remains from heat-affected deposits have economic significance and could contribute essential information to understanding the nature of marching camps and the relationship between the Roman army and the local populations beyond Hadrian's wall. However, due to the presence of post-medieval burning within the environs of the Site (Welfare and Swan 1995) intrusion was deemed (and proved by radiocarbon dating) a possible issue which could obliterate the relevance of the charred evidence from these features.

Sediments

7.4.6 Monolith sample <3>, through the turf-built rampart of camp 1, has essentially captured several layers of contemporary turves. This had been already observed in camp 2 (St. Joseph, 1935 apud Young et al. 2017) and similar turf ramparts have been identified in Cawthorn Camps, North Yorkshire (Usai 2000) and other sites in the region (Hall and Huntley 2007, Philpott 2006, Young et al. 2017). Monolith samples <5> and <10> from the outer ditch, preserved humic peaty layers which may be further turves from side collapse, or possibly periods of stabilisation. Monolith sample <11>, which was taken through a drainage ditch still in use today, has no valuable environmental potential.

Pollen

7.4.7 The pollen assemblages from the subsamples from both monolith samples <3> and <10> are dominated by taxa that produce large quantities of pollen (particularly heather, birch and hazel) that are widely dispersed by the wind, and therefore likely to derive from a large source area reflecting the local to extra-local/regional vegetation surrounding the site. Moreover, in addition to their wide source area, these wind-pollinated taxa are likely to be over-represented in pollen assemblages relative to their local physical presence, whilst insect-pollinated taxa produce smaller quantities of pollen and are likely to be under-represented.

7.4.8 The two subsamples from monolith sample <3> come from stacked turves hypothesised to derive from the local soil surrounding the marching camp. The pollen suggests a predominantly open landscape within both lowland and upland settings. Although arboreal pollen contributes up to almost 40% at 0.05 m, and 13.7% at 0.44 m, these values are considered to reflect an open, patchy woodland canopy, including hazel scrub and stands of birch, with alder most likely growing on wetter soils (e.g. alongside rivers and streams). Birch in particular requires relatively open conditions with limited species competition, and as a pioneer species, typically expands in situations where more shade tolerant woodland cover has been removed. This is aided by the production of large quantities of pollen and lightweight buoyant seeds that are dispersed widely and grow fast. Moreover, the high pollen productivity and potential for wide dispersal of birch and hazel pollen suggest that although they were consistent components of the wider vegetation environment, they are likely to have formed more fragmented and isolated stands. In addition to heathland the pollen includes indicators of both dry and wet grassland, suggested by small quantities of pollen of cinquefoil, ribwort plantain and devil's-bit scabious (Succisa pratensis).

7.4.9 The pollen from the outer ditch (monolith <10>) is broadly similar to that from the rampart (Monolith <3>) in indicating heathland with patchy hazel scrub and birch. The similarity in pollen between monoliths <3> and <10>, and from Iron Age to Medieval fills of palaeochannels within the floodplain River Rede at Brownchester, suggest the Otterburn pollen is of a broadly contemporaneous age. Higher percentages for grass pollen are likely to reflect a range of open habitats in the immediate and surrounding landscape, both as a component of heathland, cleared land surrounding the marching camp and also plants growing within the ditch. There are single cereal type pollen grains of the Hordeum group in all three samples from the ditch, perhaps suggesting nearby arable activity. Fern spores are more numerous within monolith sample <10>,

and have a habitat preference for woodland as well as the ability to colonise drainage ditches where the bare ditch banks providing new habitat opportunities (Page, 1988).

Radiocarbon dating

7.4.10 The results from the radiocarbon measurements on the short-lived samples have provided satisfactory results, as they have allowed to confirm the chronology of some of the features and deposits. The date on charred plant macroremains from the heat-affected areas has confirmed the existence of intrusive material from a modern chronology, which is not unexpected since both Roman and post-medieval activity was identified on the Site and charred plant remains are often intrusive (Pelling et al. 2015). Although this result has obliterated the need for further work on the macroremains samples, the radiocarbon measurement was essential: should the charred macrofossil evidence had been of Roman chronology, it would have been unique in its value. The dates on the samples from the basal fills of the ditches, although imprecise and inconsistent between themselves, allow to prove that the ditches were open in the Roman period and rule out the possibility of their post-medieval or modern origin. The dates are imprecise, despite having been obtained on short-lived plant remains, due to the nature of the calibration curve which is unfortunately imprecise for that time period. The inconsistency of the dates is explained due to the nature of the features and deposits themselves (Waterbolk 1971): a date from the fill of a feature will never be able to provide a precise date for the construction of the feature, unless it is proven that the feature was immediately filled and that the fill was not formed of redeposited material. In this case, we can hypothesise that the older date is redeposited material percolated while the ditch was maintained open and possibly originating from the construction of the rampart and that the younger date is the result of accumulated silting from the time in which The Site was abandoned and the ditch was left to infill.

7.5 Further potential

7.5.1 Since no further analysis is recommended on the bulk samples, the processed flots and residues do no warrant further retention. No further subsampling or pollen analysis is required and the monolith samples are recommended for discard.

8 DISCUSSION

8.1 Summary

8.1.1 Excavations of the bank and outer ditch confirm that these were open during the Romano-British period and would indeed appear to be the rampart and outer defensive ditch of a Roman marching camp. Although no Romano-British material was recovered from either the rampart or ditch sufficient organic material was recovered from bulk samples of the outer ditch to allow for radiocarbon dating of this feature. The organic samples tested from the outer provided a date range of between 200 BC to AD 547. The rampart itself was constructed of stacked layers of turf with evidence of a central structure against which the layers of turfs were stacked. The most likely explanations for this feature are these deposits demarcate the remains of some form of defensive palisade or that the central deposit of redeposited natural reflects a central dump of material to demarcate the construction route of the rampart. The outer ditch, whilst not especially deep, at c. 0.5 m showed evidence of having been waterlogged and would have formed a modest barrier to attacking forces.

8.1.2 Upon removal of the turf around the suspected entranceway to the marching camp a metalled stone surface was identified leading from the exterior of the marching camp. This stone surface sealed the upper fills of the outer ditch and was sat above layers containing post-medieval clay pipe. The stratigraphic relationship and dating evidence would appear to confirm that the 'entranceway' to the Roman camp was in fact a post-medieval alteration, presumably to provide a more solid footing for transport and management of livestock. A rough cobbled surface continued along the eastern edge of the ramparts and sealed the outer ditch. This cobble surface eventually slumping into the soft upper fills of the outer ditch.

8.1.3 An internal ditch associated with the rampart was also confirmed to be post-medieval in date. This drainage ditch truncated the western side of the bank, with the turves being placed on top of the internal side of the older ramparts, possibly completed by a ditch cutting machine during the late 19th or early 20th century.

8.1.4 At the southern limit of the rampart the remains of a stone built hearth were identified on top if the bank. A charred cereal grain, recovered from the associated spread of heat affected silts, was radiocarbon dated to *c.* 1690-1927. Animal bone and a small piece of slag were recovered from this spread, perhaps indicating use for both cooking and small scale cottage industry.

8.1.5 Pollen samples recovered from the outer ditch and rampart are indicative of heathland, cleared land surrounding the marching camp and also plants growing within the ditch. Small volumes of cereal type pollen grains of the Hordeum group within the ditch, perhaps suggesting nearby arable activity.

8.2 Conclusions

8.2.1 The excavation has been largely successful in achieving its aims. Whilst the radiocarbon dating has not produced a tight chronology for the opening and silting of the outer ditch or the construction of the ramparts the broad date range confirms that these features were in use throughout the Romano-British period.

8.2.2 The excavation has demonstrate that the terminus of the rampart was a later post-medieval alteration to the earthworks, being contemporary with the construction of a metalled surface, presumably to allow for easier movement of animals within the boggy ground around the outer ditch. The inner ditch associated with the rampart is also a later post-medieval alteration, the construction of which also truncated the western edge of the rampart.

8.2.3 The excavation was successful in engaging with local volunteer groups with participants from North of the Wall Tynedale Archaeology, Altogether Archaeology, Coquetdale Archaeology, as well as staff from Landmarc Support Services. As well as training in excavation techniques and recording, additional survey training was provided and demonstrations in photogrammetry. A small open day was also undertaken in which volunteers were given a talk on Roman archaeology, with finds from recent Romano-British excavations being brought to Site.

9 STORAGE AND CURATION

9.1 Museum

9.1.1 As the small number of finds were allocated for discard following assessment, there are no storage requirements for finds at the Great North Museum, Newcastle.

9.2 Archive

9.2.1 The complete Site archive, which will include paper records, photographic records, graphics, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by the Great North Museum, and in general following nationally recommended guidelines (SMA 1995; Brown 2011; ADS 2013; CIfA 2014c).

9.2.2 All archive elements will be marked with the appropriate Accession Number issued by the recipient museum.

9.2.3 The site archive will be prepared for long-term storage in accordance with current guidelines (e.g. Walker 2001; MGC 1994 etc.). Provision has been made for the cost of long term storage in the post-fieldwork costs.

9.2.4 Until final deposition with the museum the archive will be stored at the offices of WA Edinburgh or WA Sheffield.

9.3 Discard policy

9.3.1 WA follows the guidelines set out in *Selection, Retention and Dispersal of Archaeological Collections* (SMA 1993), which allows for the discard of selected artefact and ecofact categories which are not considered to warrant any future analysis. Any discard of artefacts will be fully documented in the project archive.

9.3.2 The discard of environmental remains and samples follows nationally recommended guidelines (SMA 1993 and 1995; EH 2011).

9.4 Copyright

9.4.1 The full copyright of the written/illustrative archive relating to the site will be retained by WA Ltd under the *Copyright, Designs and Patents Act* 1988 with all rights reserved. The Museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use shall be non-profitmaking, and conforms to the *Copyright and Related Rights Regulations* 2003.

9.5 Security Copy

9.5.1 In line with current best practice (*e.g.* Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

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APPENDICES

Appendix 1: Context descriptions

Excavation Area 1	Excavation area measuring 20 m by 8 m.		
Context	**Type**	**Description**	**Depth (m)**
1001	Layer	Tposoil/Turf	0.10 – 0.25m
1002	Layer	Natural geology – mottled yellow grey sandy clay	0.25m+
1003	Deposit	Stacked turfs of Romano British rampart	0.10– 0.55m
1004	Cut	Post-medieval drainage ditch	0.25 – 0.5 m
1005	Fill	Peaty fill of ditch 1004	0.25 – 0.5 m
1006	Cut	Outer ditch of Romano-British marching camp	0.25 -0.75m
1007	-	Void	-
1008	Fill	Fill of 1009	0.25m+
1009	Cut	Post-medieval wheel rut	0.25m+
1010	Structure	Post-medieval metalled stone surface.	0.15m+
1011	Cut	Post-medieval wheel rut	0.25m+
1012	Fill	Fill of 1011	0.25m+
1013	Cut	Outer ditch of Romano-British marching camp	0.25 -0.75m
1014	Fill	Primary fill of 1013	-
1015	Fill	Secondary fill of 1013	-
1016	Fill	Tertiary fill of 1013	-
1017	Cut	Post-medieval drainage ditch	0.25m+
1018	Fill	Fill of 1017	-
1019	Cut	Post-medieval drainage ditch	0.25m+
1020	Fill	Fill of 1019	-
1021	Cut	Post-medieval wheel rut	0.15m+
1022	Fill	Fill of 1021	-
1023	Cut	Post-medieval drainage ditch	0.15m+
1024	Structure	Cast iron pipe within drainage ditch 1023	0.15m+
1025	Cut	Irregular discrete feature	0.25-0.35m
1026	Fill	Fill of 1025	-
1027	Cut	Post-medieval wheel rut	0.25m+
1028	Fill	Fill of 1027	-
1029	Cut	Outer ditch of Romano-British marching camp. Same as 1006	0.25 -0.75m
1030	Fill	Primary fill of 1029	-
1031	Fill	Secondary fill of 1029	-
1032	Cut	Same as 1004	-
1033	Fill	Same as 1005	-
1034	Deposit	Turf line of extant ground surface on which the rampart was constructed	0.55m
1035	Deposit	Stacked turfs of Romano British rampart	0.10– 0.55m
1036	Group	Group number for rampart	0.10-0.55m
1037	Fill	Primary fill of 1004	-
1038	Cut	Same as 1008	0.25m+
1039	Fill	Same as 1009	0.25m+
1040	Fill	Fill of 1004	0.25m+
1041	Group	Group number for outer ditch of Romano-British marching camp	0.25 -0.75m
1042	Group	Group number for post-medieval drainage ditch	0.25 – 0.5 m
1043	Cut	Outer ditch of Romano-British marching camp	0.25 -0.75m
1044	Fill	Primary fill of ditch 1043	-
1045	Fill	Secondary fill of ditch 1043	-
1046	Fill	Tertiary fill of ditch 1043	-
1047	Layer	Spread of heat affected silts	0.15m+

1048	Layer	Spread of heat affected silts	0.15m+
1049	Layer	Spread of heat affected silts	0.15m+
1050	Layer	Spread of heat affected silts	0.15m+
1051	Cut	Post-medieval drainage ditch	0.25m+
1052	Fill	Fill of 1051	
1053	Layer	Spread of silty clay containing post-medieval button	0.2m
1054	Layer	Spread of black clay beneath 1050	0.17m+
1055	Deposit	Stacked turfs of Romano British rampart	0.10– 0.55m
1056	Structure	Post-medieval stone hearth	0.10m+
1057	Group	Group number for metalled stone surface to east of rampart	0.10m+
1058	Structure	Spread of cobbles. Part of 1057	-
1059	Deposit	Stacked turfs of Romano British rampart	0.10– 0.55m
1060	Fill	Fill of 1063	-
1061	Fill	Fill of 1063	-
1062	Fill	Fill of 1063	-
1063	Cut	Outer ditch of Romano-British marching camp	0.25 -0.75m

Appendix 2: Description of the sediments in the monolith samples and pollen subsampling

Monolith:	<3>	**Comments: 117950 – Otterburn Monolith through ditch slot [1029], outer ditch of rampart**
Drawing:		
Pollen subsamples (depth)	**Sediment description**	**Interpretation**
0.05m	Organic	Stacked turves
0.44m	Organic	

Monolith:	<5>	**Comments: 117950 – Otterburn Monolith through ditch slot [1013], outer ditch of rampart**
Drawing:	4	

Depth	**Context**	**Pollen Subsamples (depth)**	**Sediment description**	**Interpretation**	
0.00-0.20	(1016)		10YR 2/1 black sandy silt loam, crumbly and slightly peaty. Common roots and sub rounded pieces of sandstone throughout. Layer of large cobbles (<10cm) at sharp lower boundary	Topsoil/subsoil and stone from remains of track in ditch. (as recorded on context sheet)	Topsoil / subsoil
0.20-0.29	(1015)	0.23 0.29	10YR 2/1 black silt loam peat, very humic and compact with occasional roots. Sharp 'U' shaped boundary.	Secondary fill of ditch formed by redeposited turves from the rampart. Probable podsolization caused by leaching out of minerals in mobile geology with wet conditions.	Mobile geology causing filling of ditch by side collapse due to undercutting from standing water, and rain wash of exposed sides, with redeposited turves from rampart.
0.29-0.32	(1015) (1014)		10YR 3/2 very dark greyish brown silt loam. Compact, homogenous with no visible roots. Clear boundary		
0.32-0.36	(1014)	0.34	10YR 3/2 very dark greyish brown sandy silt loam. Compact, homogenous with no visible roots. Clear boundary.		
0.36-0.40	(1014)		10YR 5/2 greyish brown silty sand becoming heavily iron stained (10YR 5/6 yellowish brown) and less sandy with depth (almost a silty clay). Compact with sub angular lumps of degraded sandstone at the base.	Primary fill of ditch caused by mobile geology. With wetting and drying as indicated by iron staining.	

Monolith:			**<10>**	**Comments: 117950 – Otterburn** **Monolith through ditch slot [1029], outer ditch of rampart**	
Drawing:			**9**		
Depth	**Context**	**Pollen subsamples (depth)**	**Sediment description**	**Interpretation**	
0.00-0.15	(1001)		10YR 2/1 black slightly sandy silt loam, quite crumbly and peaty with common roots throughout and a sub rounded patch (5cm) of 10YR 5/8 yellowish brown coarse sand at the top. Large stone from apparent trackway at boundary.	Topsoil/subsoil and stone from remains of track in ditch. (as recorded on context sheet)	Topsoil / subsoil
0.15-0.23	(1031)	0.17 0.21	10YR 2/1 black, humic slightly peaty sandy silt loam. Soft and a bit crumbly with occasional roots and faint horizontal banding. Sharp boundary.	Fills of ditch with redeposited turf material from rampart. Probable podsolization caused by leaching out of minerals in mobile geology with wet conditions.	Mobile geology causing filling of ditch by side collapse due to undercutting from standing water, and rain wash of exposed sides, with redeposited turves from rampart.
0.23-0.50	(1030)	0.36	10YR 3/2 very dark greyish brown silty sand becoming 10YR 5/3 brown sand with depth. Well defined, regular <1cm wide bands of 10YR 2/1 silty clay at 0.25, 0.28, 0.35-0.37 and 0.40m. 10YR 5/8 yellowish brown sub rounded mottles of iron staining at 0.42m.		

Appendix 3: Pollen analysis (%TLP) monolith <3>

Taxa	Depth (m)	
	0.05	0.44
Trees and shrubs		
Betula	21.3	4.9
Corylus avellana type	9.3	4.3
Ulmus	-	0.1
Quercus	1.6	0.9
Alnus glutinosa	6.9	3.1
Acer	-	0.1
Salix	-	0.1
Dwarf Shrubs		
Ericaceae	1	0.4
Calluna vulgaris	38.1	77.8
Ruderals		
Polygonum aviculare	-	0.1
Grassland and ecologically undefined		
Poaceae	20.7	5.2
Cyperaceae	-	0.4
Ranunculaceae	0.2	0.3
Rosaceae	0.2	0.3
Potentilla	0.2	-
Valeriana dioica	-	0.1
Plantago lanceolata	-	1
Rubiaceae	-	0.1
Succisa pratensis	0.2	-
Lactuceae	-	0.1
Cirsium	0.2	-
Anthemis	0.2	0.1
Fern Spores		
Pteropsida undiff.	0.2	0.3
Pteridium aquilinum	-	0.1
Polypodium vulgare	0.2	-
Sphagnum	1.4	2.5
Indeterminables	23.3	2.5
Summary		
Trees and shrubs	39.1	13.7
Dwarf Shrubs	39.1	78.2
Ruderals	-	0.1
Grassland and ecologically undefined	21.9	7.9
Fern Spores	0.4	0.4

Appendix 4: Pollen analysis (%TLP) monolith <10>

Taxa	Depth (m)		
	0.17	0.21	0.36
Trees and shrubs			
Betula	10.4	5.1	13.7
Pinus sylvestris	-	0.2	-
Corylus avellana type	7.6	5.9	12.5
Ulmus	0.2	-	0.2
Quercus	1.1	0.6	0.2
Alnus glutinosa	3.4	4.1	5.1
Salix	-	0.2	-
Dwarf shrubs			
Ericaceae	-	-	1
Calluna vulgaris	57.5	39.3	43.2
Cultivated			
Hordeum type	0.2	0.2	0.2
Ruderals			
Rumex acetosa/acetosella type	0.2	-	-
Chenopodiaceae	0.2	0.2	-
Brassicaceae	0.2	-	0.6
Grassland and ecologically undefined			
Poaceae	14.4	39.1	19.6
Cyperaceae	0.6	1	1
Ranunculaceae	-	0.2	-
Caryophyllaceae	-	-	0.2
Stellaria holostea	-	0.2	-
Rosaceae	0.2	0.4	0.6
Potentilla	1.1	-	0.2
Trifolium type	0.4	-	-
Apiaceae	-	0.6	-
Centaurea nigra	0.2	-	0.2
Plantago lanceolata	1.5	1.6	1.4
Rubiaceae	0.4	0.2	-
Succisa pratensis	0.2	0.8	0.2
Lactuceae	-	0.2	-
Aster type	0.2	-	-
Fern spores			
Pteropsida undiff.	1.1	6.1	21.2
Pteridium aquilinum	-	0.2	0.3
Polypodium vulgare	0.2	-	0.2
Sphagnum	0.9	2.1	4.8
Indeterminables	4.6	4.3	8.4

Summary			
Trees and shrubs	22.8	16.1	31.7
Dwarf shrubs	57.5	39.3	44.2
Cultivated	0.2	0.2	0.2
Ruderals	0.6	0.2	0.6
Grassland and ecologically undefined	19	44.2	23.3
Fern spores	1.3	6.3	21.6

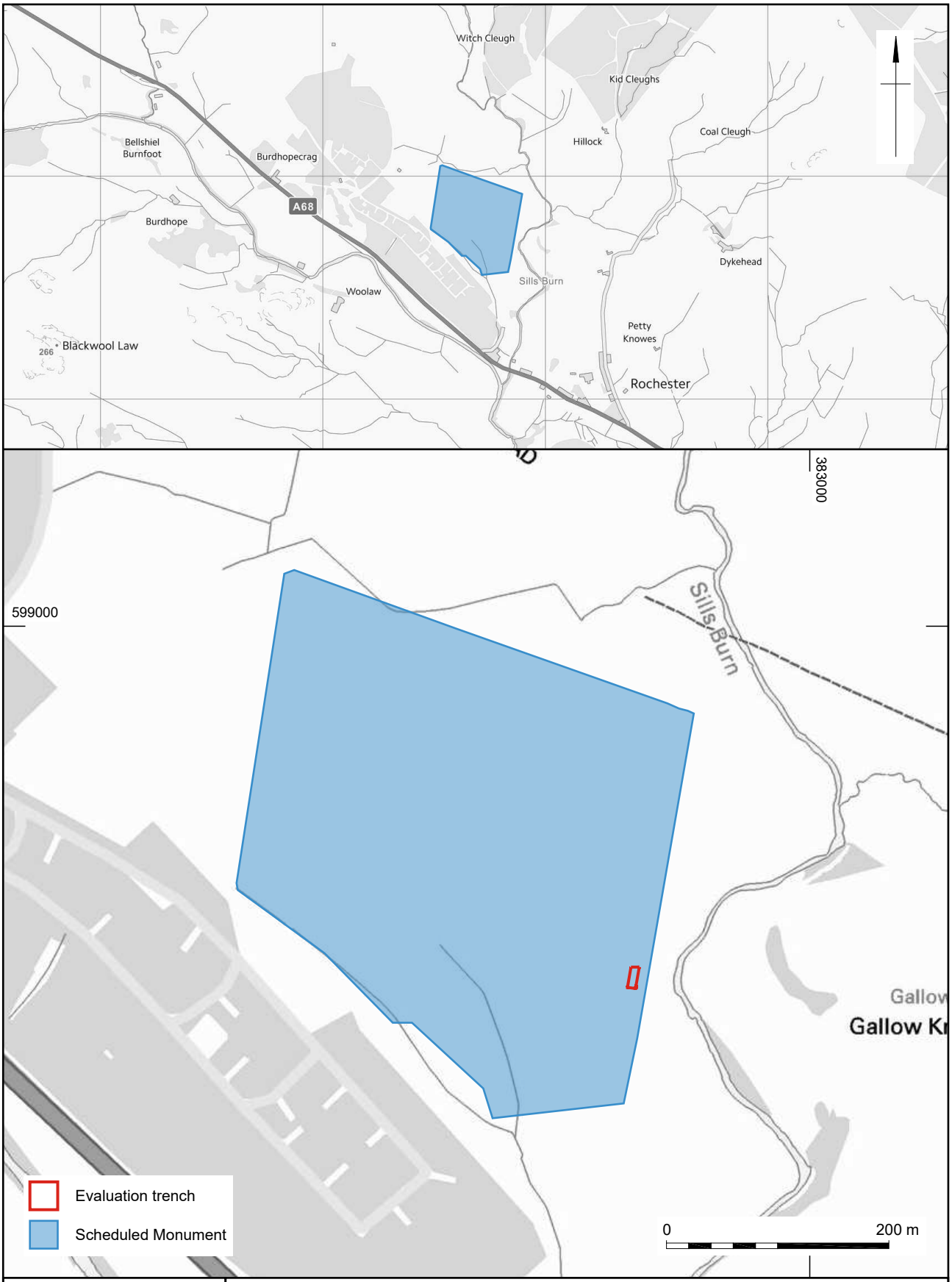
Appendix 5: Assessment of the macrofossils evidence from bulk samples

Feature	Context	Sample	Vol (L)	Flot (ml)	Bioturbation proxies	Grain	Cereal Notes	Charred Other	Charred Other Notes	Charcoal > 4/2mm	Other	Uncharred vegetative plant parts	Uncharred other	Insects
Wheel rut														
1011	1012	1	9	500	E, F	-	-	-	-	-	-	A*** (Large amount of roots)	A* - *Juncus* sp., *Potentilla* sp.	C
1013	1015	8	4	250	F, E	-	-	-	-	Trace	-	A*** (Moderate amount of roots)	A* - *Juncus* sp.	-
Ditch														
1017	1018	2	8	1750	E	-	-	-	-	-	-	A*** (large amount of roots)	A - *Juncus* sp., Cyperaceae, Asteraceae, Polygonaceae fruit.	C
1027	1028	4	8	1000	E	-	-	-	-	-	-	A*** (Large amount of roots)	A - *Juncus* sp.	C
1013	1014	7	3	175	F, E	-	-	-	-	-	-	A*** (Large amount of roots)	A** - *Juncus* sp.	-
1013	1016	9	10	500	F, E	-	-	-	-	Trace	-	A*** (Large amount of roots)	A - Cyperaceae, *Juncus* sp.	C
1029	1030	33	10	175	F, E	-	-	-	-	Trace	-	A*** (Large amount of roots)	A* - *Juncus* sp.	-
1029	1031	34	6	500	E, F	-	-	-	-	Trace	-	A*** (Moderate amount of roots)	C - Cyperaceae, *Juncus* sp., *Urtica* sp.	-

1043	1044	35	5	500	F, E	-	-	-	-	Trace	Coal frags	A*** (Moderate amount of roots)	A*** - *Juncus* sp.	-
1043	1045	36	5	750	F	-	-	-	-	Trace	Coal frags	A** (Moderate amount of roots)	A*** - *Juncus* sp.	-
1043	1046	37	10	500	F					Trace		A*** (Moderate amount of roots)	A*- *Juncus* sp.	
Hearths?														
	1047	14	3	750	F	-	-	-	-	3ml	Clinker/burnt material?	A*** (Moderate amount of roots)	C - Indet seed	-
	1047	15	4.5	1000	F	-	-	-	-	30ml	Clinker/burnt material?	A*** (Moderate amount of roots)	-	-
	1047	16	3	250	-	-	-	-	-	2ml	Clinker/burnt material?	A*** (Predominantly roots)	-	-
	1047	17	3	500	-	-	-	-	-	1ml	Clinker/burnt material?	A*** (Predominantly roots)	C - Indet seed	-
	1048	19	10	500	E, F	-	-	-	-	<1ml	Clinker/burnt material?	A*** (Moderate roots)	A* - *Juncus* spp., *Centaurea* sp.	C
	1048	20	10	500	-	-	-	-	-	Trace	-	A*** (Moderate roots)	-	-
	1048	21	7	750	F, E	-	-	-	-	Trace	-	A*** (Moderate roots)	A - *Juncus* spp., *Potentilla* sp.,	-
	1048	22	5	1500	F, E					Trace	-	A*** (Moderate roots)	A - *Juncus* spp.	

	1049	24	10	500	F	-	-	-	-	Trace	Clinker/burnt material?	A*** (Predominantly roots)	C - *Juncus* sp	C
	1049	25	10	500	F	-	-	-	-	Trace	Clinker/burnt material?, coal frags	A*** (Large amount of roots)	C - *Juncus* sp	-
	1049	26	10	500	F	-	-	-	-	Trace	Burnt material frags	A*** (Predominantly roots)	C - *Juncus* sp., *Potentilla* sp.	-
	1049	27	10	750	F	-	-	-	-	Trace	Clinker/burnt material?	A*** (Predominantly roots)	-	-
	1050	29	10	500	-	-	-	-	-	Trace	Clinker/burnt material, coal?	A*** (Predominantly roots)	C - Cyperaceae	-
	1050	30	10	500	-	-	-	-	-	Trace	Clinker/burnt material, coal?	A*** (Predominantly roots)	-	-
	1050	31	8	1000	F	-	-	-	-	Trace	Clinker/burnt material, coal?	A*** (Predominantly roots)	C - Cyperaceae	-
	1050	32	10	500	-	C	*Hordeum vulgare*	C	*Plantago* sp.	Trace	Clinker/burnt material? coal frags	A*** (Large amount of roots)	A* - Cyperaceae, *Juncus* spp., Polygonaceae, *Najas sp*?	-
Buried surface														
	1034	38	8	175	E, F	-	-	-	-	3ml	-	A*** (Large amount of roots)	-	-

Key: A*** = exceptional, A** = 100+, A* = 30-99, A = >10, B = 9-5, C = <5; Bioturbation proxies: F = mycorrhyzal fungi sclerotia, E = earthworm eggs



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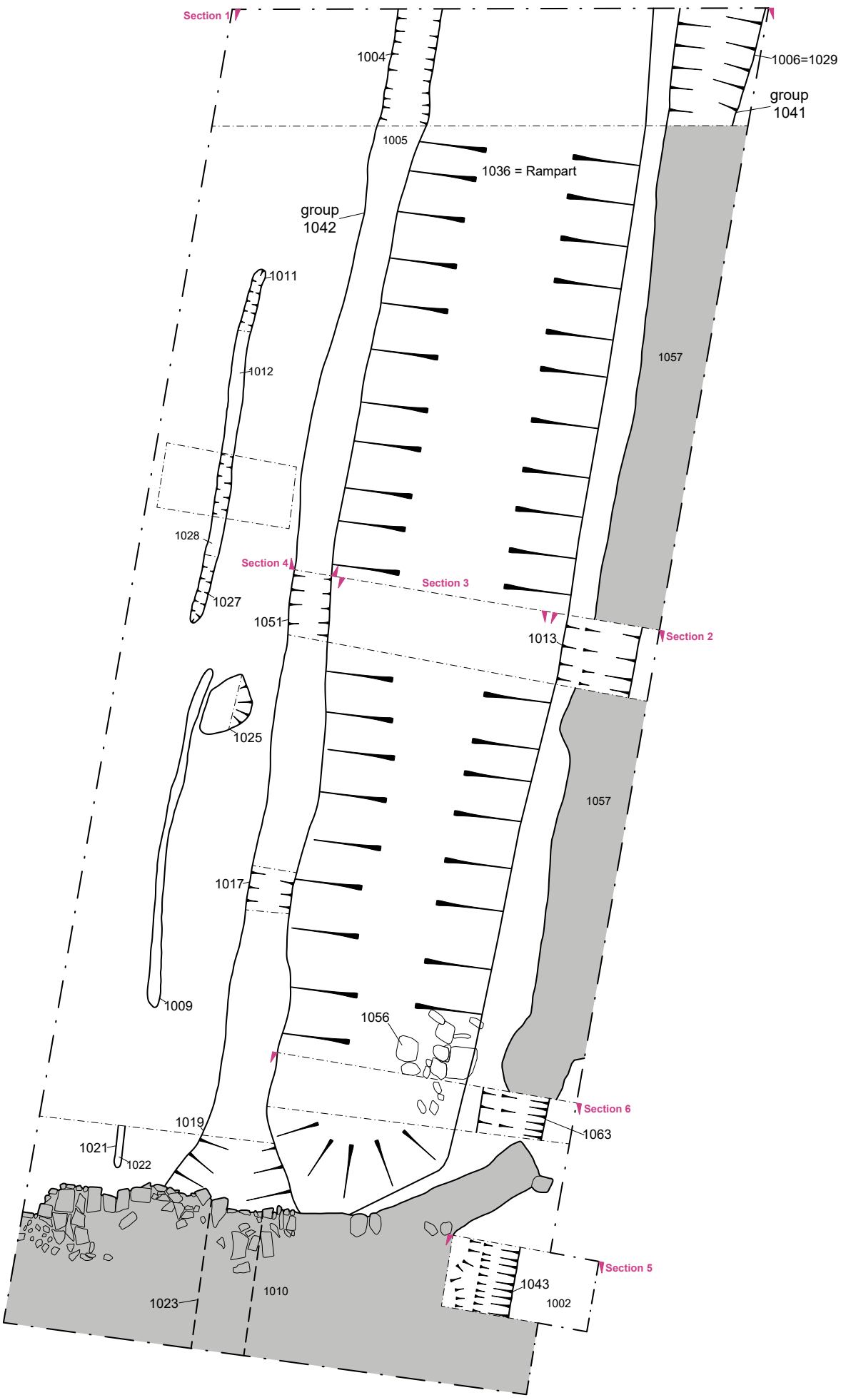
Site and excavation area location

Figure 1



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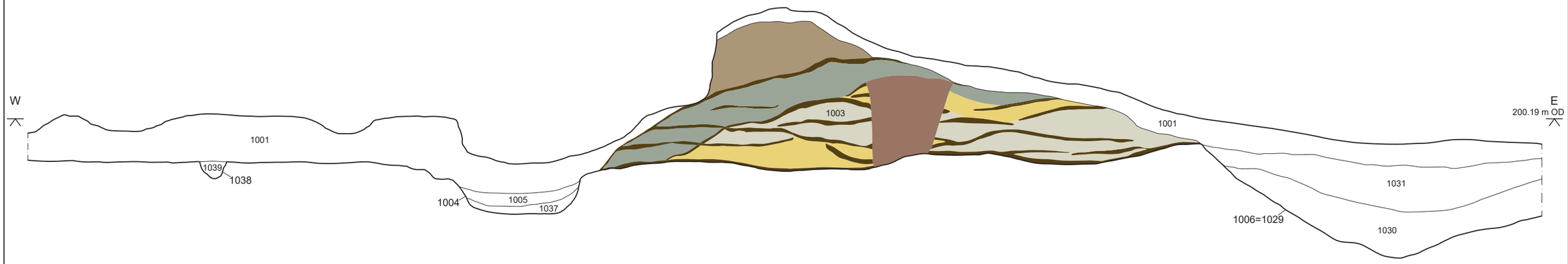
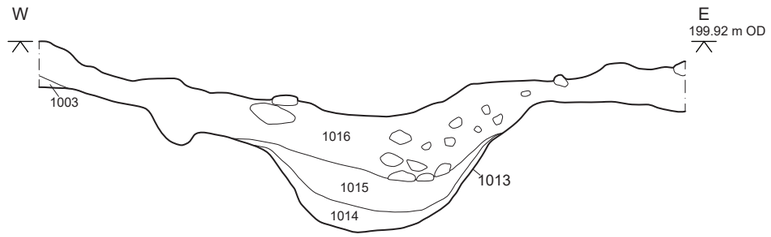
Post-excavation plan of the site

Figure 2

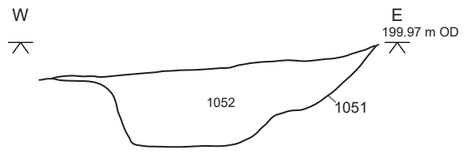
Section 1



Section 2



Section 4



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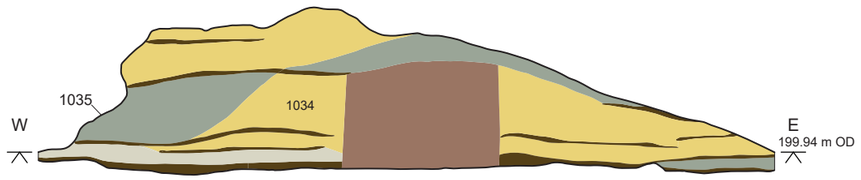

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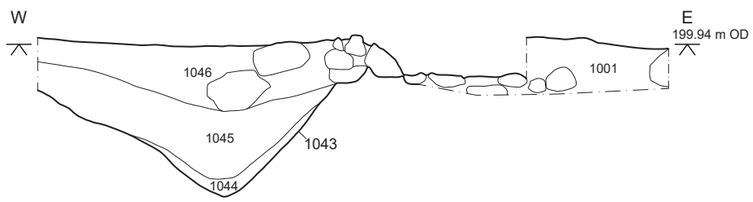

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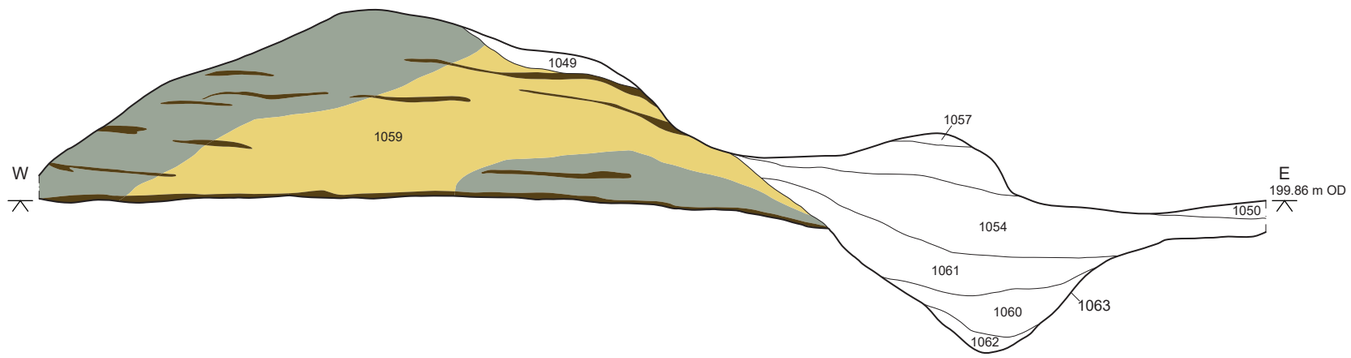

Possible palisade defences

Upcast from 1004

Lenses of loamy sand and turf making up bank

0 1 m

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Path:	S:\PROJECTS\117950\Graphics_Office\Rep figs\EVAL\2017_09_13		

Sections – 1-6

Figure 3

Plate 1: General shot of excavation area, facing north

Plate 2: Detail shot showing ditch 1063 beneath post-medieval stone

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Plate 3: Section through ditch 1006

Plate 4: Section through ditch slot 1013

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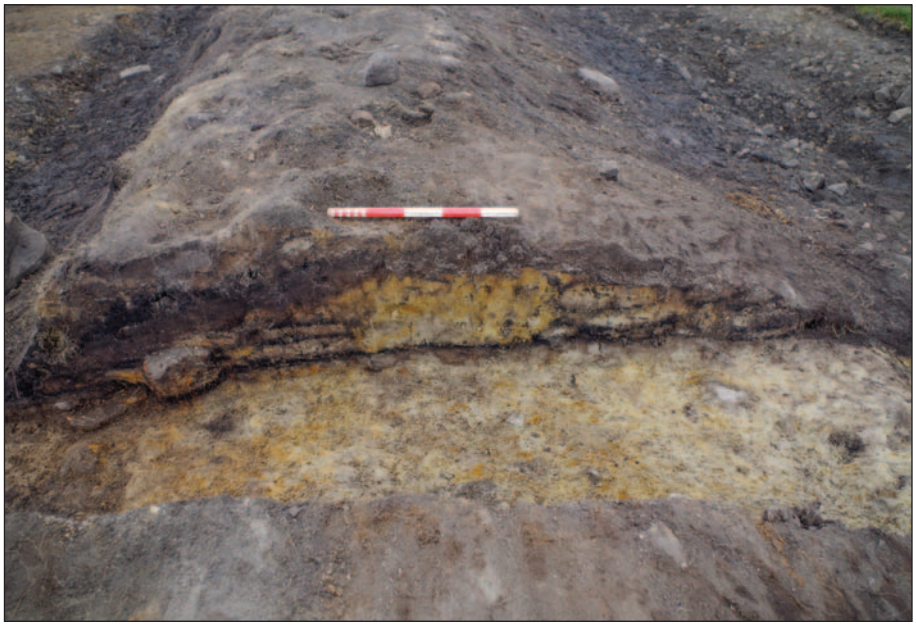

Plate 5: Section through rampart beside ditch cut 1013

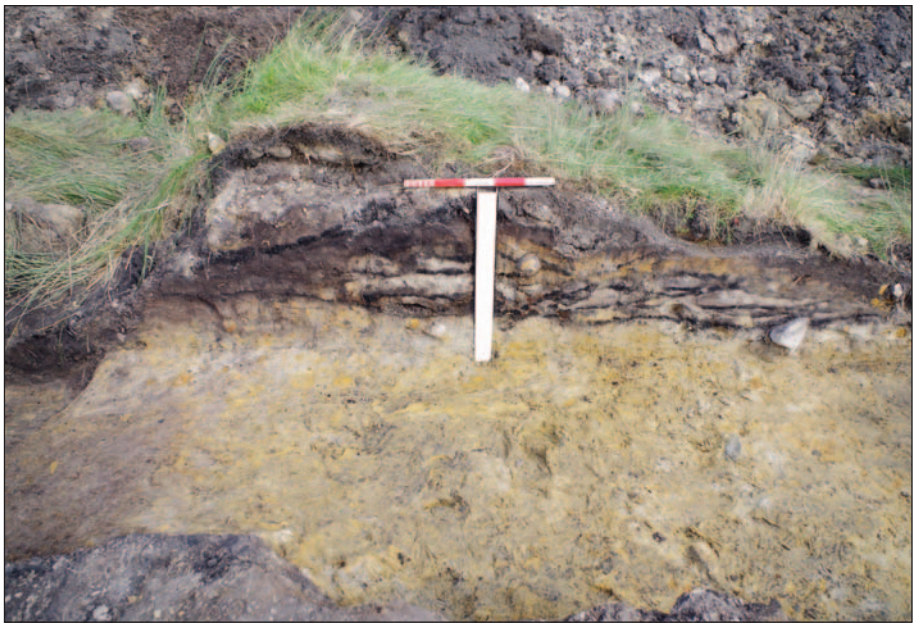

Plate 6: Section through rampart beside ditch slot 1006

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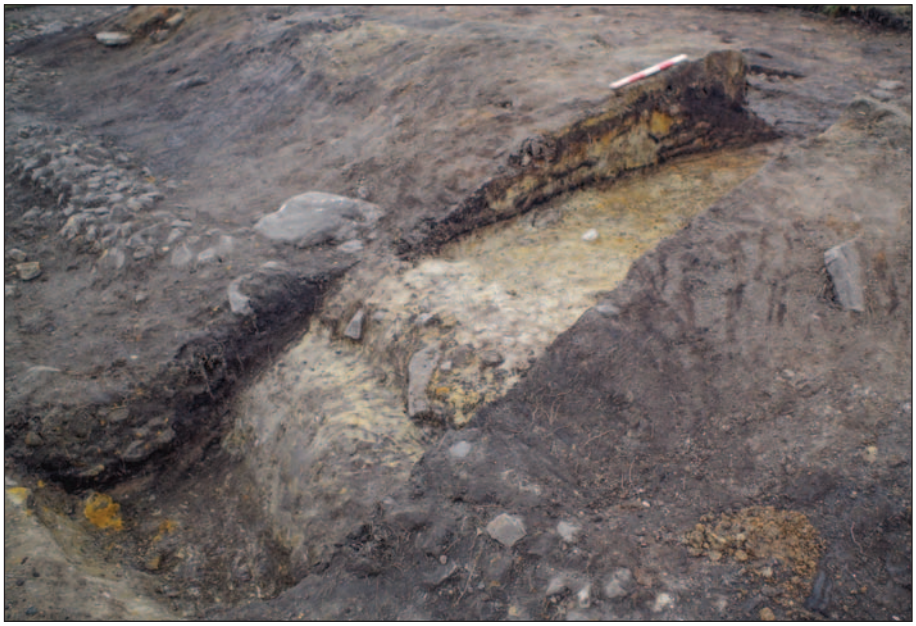

Plate 7: Section through rampart and ditch slot 1013

Plate 8: Detail shot of hearth 1056 and associated spread of burning

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Plate 9: Detail shot of post-medieval ditch 1104 with associated wheel rut 1011

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