



Carlisle Northern Development Route

Cumbria

Post-excavation Assessment



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SUMMARY

Cumbria County Council has constructed a new road, referred to as the Carlisle Northern Development Route (CNDR), around the western edge of Carlisle. The route extends for 8.5km around the western and northern sides of the city, from Greymoorhill North bridge (NY 3945 5990), in the north, to Newby West (NY 3731 5365), in the south, and covers an area of approximately 30ha. The construction of the road was let as a PFI Design and Build-type concession.

As there are significant archaeological remains along the route, including the World Heritage Site of Frontiers of the Roman Empire: Hadrian's Wall, which is statutorily protected as a Scheduled Monument (in this location, SM 26110), a brief (contained within Annex 14 Part 2B of Schedule 4 of the *Construction Contract; Connect CNDR 2009*) was prepared by Cumbria County Council's Historic Environment Service (CCCHES), acting in concert with English Heritage (EH), setting out the archaeological requirements for the main contractor (Birse Civils Ltd) in advance of and during construction works associated with the building of the road.

Birse Civils Ltd contracted Oxford Archaeology North (OA North) to undertake the archaeological investigations required by the brief. This work comprised archaeological trench evaluation, strip and record and open-area excavation, at several locations along the scheme, as well as a watching brief maintained during construction, where this resulted in a below-ground impact. This work was undertaken between May 2008 and April 2011. This document presents the results of the fieldwork programme, following an archaeological assessment of the results of the fieldwork and its archive. It should be noted that the results of fieldwork undertaken at Parcel 27, Stainton West, where significant prehistoric remains were discovered, have been excluded from this document, and are instead presented in a companion report (OA North 2011).

The results of the fieldwork and assessment programmes demonstrate that the archaeological sites investigated during the construction of the road are, variously, of national and regional importance, and that a programme of further analysis, and the dissemination of the results of this, is required. New information has been obtained pertaining to Hadrian's Wall (both the Stone and Turf Walls) and the Vallum ditch and mounds associated with it. Additionally, evidence for the settlement and management of this rural landscape has been obtained for the prehistoric to the post-medieval periods, including the discovery of an early medieval settlement, the first known in the immediate vicinity of Carlisle.

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Oxford Archaeology North (OA North) would like to thank Birse Civils Ltd for commissioning the archaeological work. In particular, we wish to thank the following Birse Civils Ltd staff who worked closely with OA North throughout the project: Dave Curry, Steve Bullass, Andy Moore, Chris Smart, Wayne Foster, Bob Gibson, Dave Holding, Peter Barker, John Greensmith, Mark Wilkinson, Wendy Thompson, Chris Scurr, John Melia, Barry Holiday, Nick Fox, Rob Gerrard, (Father) John Melia, John Hart and Mike Holt-Bains. Connect Roads: CNDR administered the PFI concession, and Malcolm Findlay, Philip Bent and Nigel Blackbee provided advice and support for the archaeological programme. Martin Hardman, Kevin Walsh and Yvonne Craig, of Capita Symonds, have helped to integrate archaeological works with the rest of the project, solve problems as they arose, and ensured that there were no impediments to the archaeological programme. Geoff Holden of Cumbria County Council is thanked for his interest in the archaeological process and tolerance of the complications that occasionally arose from it. Mark Brennand and Richard Newman (Cumbria County Council Historic Environment Service) and Mike Collins (English Heritage) monitored the work and provided archaeological advice, and their 'hands-on' approach was much valued. Sue Stallibrass and Jacqui Huntley (both English Heritage), as Regional Science Advisors, provided support to the project and have enhanced the results with their insights. Story Construction Ltd are thanked for the provision of plant and for their skilled and helpful operators.

The fieldwork was undertaken by Paul Clark, Marc Storey, Sean McPhillips, Chris Wild, Caroline Bulcock, Andrew Frudd, Antony Haskins, Christina Robinson, Becky Wegiel, Ailsa Westgarth, Gary Baddeley, Dave Bonner, Ric Buckle, Pete Burge, Clare Burke, Ged Callaghan, Katy Chalmers, Tim Christian, Paul Dunn, John Griffiths, Katherine Hamilton, Vickie Jamieson, Nate Jepson, Gemma Jones, Dave Maron, Des O'Leary, Sam Oates, Aidan Parker, Carl Savage, Dave Shaw, Rachel Stebbings, Steve Tamburello and Julian Thorley. Aidan Pratt undertook fieldwork on site as a volunteer.

The palaeoenvironmental samples from all the archaeological work were processed by Rachel Fosberry, Ross Lilley, Graeme Clarke, James Fairbairn, Stephen Morgan and Helen Stocks, and assessed by Sandra Bonsall, Denise Druce, Mairead Rutherford and Elizabeth Huckerby. Seren Griffiths provided advice on the selection and interpretation of the radiocarbon samples assayed. The animal bone was examined by Andy Bates; the flint by Antony Dickson and Ann Clarke; the prehistoric pottery by Blaise Vyner; and the Romano-British, medieval and post-medieval pottery by Christine Howard-Davis, who also assessed the remainder of the finds. This report was illustrated by Mark Tidmarsh; it was written, compiled and edited by Paul Clark and Fraser Brown (who managed the project); and Rachel Newman provided quality assurance.

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Animal Bone
Palaeoenvironmental Material
Radiocarbon Dating
Soil Micromorphology

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1 INTRODUCTION

1.1 STRUCTURE OF THIS REPORT

1.1.1 This report details the results from the evaluation, strip and record and open-area excavation sites along the Carlisle Northern Development Route (CNDR) scheme, and any significant archaeology identified whilst monitoring construction work during the watching brief. It also reports on the finds and palaeoenvironmental assemblages, and provides recommendations for post-excavation analysis. It comprises an introductory section (*Section 1*); an account of the excavation methodology employed (*Section 2*); the results of the archaeological fieldwork (*Section 3*); the results of the assessment (*Section 4*); a statement on the significance of the archaeology and its potential for further research (*Section 5*); updated research aims and objectives (*Section 6*); and a method statement detailing how these aims will be delivered (*Section 7*). It should be noted that the results of the archaeological investigations of significant prehistoric remains at Parcel 27, Stainton West, have been excluded from this report and are instead presented in a companion document (OA North 2011).

1.2 CIRCUMSTANCES OF THE PROJECT

1.2.1 Cumbria County Council has constructed a new road, referred to as the CNDR, around the western edge of Carlisle. The route extends for 8.5km around the western and northern sides of the city, from Greymoorthill North bridge (NY 3945 5990), in the north, to Newby West (NY 3731 5365), in the south, and covers an area of approximately 30ha.

1.2.2 Cumbria County Council let the construction of the road as a PFI Design and Build-type concession. As there are significant archaeological remains along the proposed route, including the World Heritage Site of Frontiers of the Roman Empire: Hadrian's Wall, which is statutorily protected as a Scheduled Monument (in this location, SM 26110), a brief (contained within Annex 14 to Part 2B of Schedule 4 Archaeology of the *Construction Contract*; Connect CNDR 2009) was prepared by Cumbria County Council's Historic Environment Service (CCCHES), acting in concert with English Heritage (EH), setting out the archaeological requirements for the main contractor (Birse Civils Ltd) in advance of and during construction works associated with building the road. Birse Civils Ltd contracted Oxford Archaeology North (OA North) to undertake the archaeological investigations required by this brief.

1.3 SITE LOCATION, TOPOGRAPHY AND GEOLOGY

1.3.1 The River Eden bisects the proposed route. North of the river, the road crosses the low-lying flood plain and river terraces immediately west of Stainton, before rising steeply towards Kingmoor House. On both sides of the river, but particularly to the south, the topography consists of relatively uniform, undulating terrain, in use today predominantly as pasture and arable fields enclosed by substantial hedgerows.

1.3.2 The underlying drift geology consists of Stanwix shales overlain by drift deposits of boulder clay; adjacent to the River Eden, these deposits are also covered with alluvium

(British Geological Survey 1982). The local soils are attributed to the Wick Association, coarse well-drained brown earths, which extend westwards to Burgh-by-Sands and Kirkbampton (Countryside Commission 1998).

1.4 ARCHAEOLOGICAL BACKGROUND

- 1.4.1 Given the nature of much of the land crossed by the proposed route, few traces of archaeological earthworks or other above-ground remains survive today, except for those relating to the Vallum of Hadrian's Wall (EH 2010). However, aerial photographs of the route, and in particular of the river terraces west and north of Stainton, have revealed cropmarks suggestive of potential prehistoric or later activity (*ibid*; Section 1.4.2-3). Traces of earthworks associated with the dismantled Carlisle to Silloth railway line, opened in 1854 (Ramshaw 1997, 136-7) and its precursor, the Carlisle Navigation Canal, which operated from 1823 to 1853 (*op cit*, 25, 136-7), are also visible on aerial photographs, on the south bank of the River Eden. It is, therefore, clear that the relatively undisturbed, 'greenfield' sections of the proposed route have significant potential for the survival of important archaeological remains, including elements of possible prehistoric and/or later monuments; the remains of Hadrian's Wall and its associated features; and features of later historical periods.
- 1.4.2 **Prehistoric period:** evidence for prehistoric settlement in the Carlisle area has increased considerably in recent years (McCarthy 2002, 33-50), but remains fairly sparse. Whilst this may, to a degree, genuinely reflect a comparatively low density of settlement, it is probably due principally to the difficulties inherent in identifying prehistoric sites in a region that is largely under pasture (which is generally far less conducive to aerial photography than most types of arable agriculture), and where prehistoric cultures appear to have produced relatively few artefacts durable enough to have survived to the present day. In the Iron Age, for example, the region appears to have been almost entirely aceramic (Hodgson and Brennand 2006, 56), vessels and containers presumably being fashioned from perishable materials such as wood, leather and horn.
- 1.4.3 The presence of Grinsdale Camp (HER 399), a fairly large, multivallate enclosure of presumed prehistoric (most probably Iron Age) date, at Cargo on the north bank of the Eden, to the north of the proposed road (McCarthy 2002, 46-7), provides a strong indication that this part of the route at least was settled in prehistory. Whilst no direct evidence for prehistoric occupation was known from the line of road itself, aerial photography of the area west and north of Stainton, on the north side of the River Eden, has revealed a quite extensive complex of rectilinear and curvilinear cropmarks, including a number of apparently circular and semi-circular features (Section 3.9.1; EH 2010). These can neither be dated nor characterised with certainty on photographic evidence alone, but are likely to be of prehistoric date, and may represent the remains of ploughed-out burial mounds (barrows) or ceremonial monuments such as henges or henge-like (hengiform) enclosures; possible examples of the latter are known from aerial photography on the Cumbrian coast (Hodgson and Brennand 2006, 39), and discoveries elsewhere in the North West suggest this class of monument may be more widespread than previously believed (Hodgson and Brennand 2007, 42). The precise significance of the linear and rectilinear features visible on the aerial photographs is not known; some have the appearance of rectangular ditched enclosures, whilst others may be the remains of trackways and field

systems. Such remains would not be out of place in a prehistoric or Romano-British context, and are likely to have been associated with a small rural settlement or farmstead, although a later date for some or all of these features cannot be ruled out. The likely presence of prehistoric remains in the Stainton area is consistent with evidence from other parts of Britain, where river terraces were often favoured for prehistoric settlement due to the presence of fertile, and relatively easily-cultivated, alluvial soils overlying well-drained river gravels (Evans 1975, 62).

- 1.4.4 **Roman period:** whilst some of the rectilinear features traced by aerial photography in the Stainton area could conceivably be of Roman date (*Section 1.4.3*), the archaeology of the Roman period within the study area is dominated by Hadrian's Wall, which at this point ran on a roughly north-west to south-east alignment, on the steep escarpment forming the south bank of the Eden. The developmental history of the Hadrian's Wall frontier system is complex (Breeze 2006, 50-3), particularly so in its western sector, west of the River Irthing, where it was initially constructed of turf (why is still a matter for debate (*op cit*, 58-9)) and rebuilt in stone (often on a slightly different line) some time later. Furthermore, the Wall itself was only one element (albeit the most significant) of the frontier system; north of the Wall (in most areas at least) was a ditch (*op cit*, 62-3), whilst to the south, situated at widely varying distances from the Wall, lay the Vallum, a substantial but enigmatic earthwork comprising a flat-bottomed ditch flanked by mounds, the purpose of which also continues to excite debate (*op cit*, 86-7). Another linear element of the frontier system was a road, known as the Military Way, added at some point, probably in the later second century (*op cit*, 89). In many areas this was built on top of the north mound of the Vallum, but west of the Irthing it frequently lay between the Wall and Vallum (*op cit*, 89). The Wall itself incorporated small fortlets, or rather fortified gateways giving access through the curtain wall, at intervals of one Roman mile (consequently known as milecastles), and a series of towers (known as turrets) spaced at intervals of one-third of a mile (two between each pair of milecastles). The milecastles and towers, but not the curtain wall, were continued beyond the western end of the Wall at Bowness down the Cumbrian coast for at least 32km (*op cit*, 51).
- 1.4.5 Work probably commenced on the Wall in AD 122–3 (Breeze and Dobson 2000, 66), although it is possible that the Turf Wall was begun slightly earlier (Shotter 2004, 75-9). In the original scheme, the only troop accommodation on the Wall itself was provided by the milecastles and turrets (Breeze and Dobson 2000, 39–40), the intention presumably being to retain the garrisons of a number of pre-existing forts (including Carlisle) situated in the Tyne-Solway corridor, a short distance south of the Wall, which would have provided the troops needed to patrol the new frontier line. During the construction programme, however, possibly in AD 124 (*op cit*, 74), the decision was made to place forts on the Wall itself, situated approximately half a day's march (some ten Roman miles) apart. The forts closest to the proposed route were those at Stanwix to the east and Burgh-by-Sands to the west, although the latter does not seem to have been built until the early third century AD (Austen 1994, 52–3), perhaps replacing an early fort some distance to the south of the Wall (Breeze 2006, 353-4). With the exception of a break of no more than 20 years, when the northern frontier of the province of *Britannia* was advanced to the Forth-Clyde isthmus during the reign of Antoninus Pius (AD 138-61), Hadrian's Wall remained in commission to the end of the Roman period. It would seem that the western sector of the Turf Wall,

including the section that lies within the road corridor, was not rebuilt in stone until the return from Scotland (*op cit*, 60), which probably occurred in the AD 150s according to current theories (Bidwell 1999, 23). However, a reconstruction date as late as the reign of the emperor Septimius Severus (AD 193-211) has also been suggested (Breeze 2006, 60).

- 1.4.6 When excavated elsewhere, the Turf Wall has been found to be *c* 6m wide at the base and built of cut turves laid in courses (Breeze 2006, 58). In some places the rampart was placed on a cobble foundation up to 5.8m wide (*op cit*, 60), although this feature does not seem to have been provided everywhere. There is also evidence that in boggy ground the Wall rested on a piled foundation (*ibid*).
- 1.4.7 The line of the Turf Wall in the study area was not confirmed prior to the excavations for the CNDR, although it was presumed to lie somewhere in the vicinity of the Stone Wall, the remains of which were found in 2005, atop the steep bank or escarpment forming the river's southern bank (CFA 2005a). There, only the basal (foundation) course of the Wall had survived, to a maximum width of 2.72m (*ibid*). It had a rubble core faced by flags on its inner (southern edge); the northern edge had been destroyed by river erosion of the escarpment. What may have been either construction deposits or the remains of an associated track were recorded in places to the south of the Wall.
- 1.4.8 East of the study area, the Stone Wall has been seen at Willow Holme, well to the east of the road corridor, in 1854, during the construction of a sewer (Ferguson 1888, 168; Simpson 1932, 149), and was exposed again in two places in 1886, close to the first site, in the angle formed by the main railway line from Carlisle to Glasgow and the branch line to Port Carlisle (*op cit*, 171-2). There, the Wall had been reduced almost to its foundation, which rested on river gravels, but enough survived to demonstrate that it had been 2.36m wide above foundation level. The remains of the Wall at this point were buried beneath 2.44m of alluvial silt (*ibid*). In 1932, a further stretch of the Stone Wall several metres in length was found close to the site of the original (1854) exposure during the construction of a new sewer (Simpson 1932). There, the foundation was 2.69m wide and comprised a layer of rough sandstone flags, *c* 100mm thick, bedded in clay and laid directly upon the natural gravel subsoil. Above foundation level, only two of the northern facing stones remained, offset by *c* 163mm from the outer face of the foundation (*op cit*, 150). If the south face, nothing of which remained, had been similarly offset, the Wall would have been 2.36m wide, precisely the same width as recorded in 1886. A published photograph (*op cit*, fig 3) indicates that the Wall lay beneath a thick deposit of alluvium.
- 1.4.9 On the evidence of spacing (EH 2010), Milecastle 67 (Stainton) should lie approximately 1km east of the road corridor, close to the south end of the Waverley Viaduct (now long disused) that once carried the Carlisle to Edinburgh railway line across the Eden. Whilst no trace of this structure has been found, Roman coins were unearthed west of the viaduct in 1861 and a gold necklace of probable second-century date was found a short distance further west in 1860, on the site of the former canal engine shed (OS 1865; Breeze 2006, 347). West of Milecastle 67, the Wall ran along the steep bluff of Davidson's Banks, where its line is crossed by the development route. It probably lay very close to the edge of the bluff above the river, so close in fact that the Wall ditch may have been dispensed with at this point (*ibid*).

- 1.4.10 At the measured position of Milecastle 68 (Boomby Gill), *c* 270m north-west of the road line, traces of an antiquarian excavation were visible in 1972, which appear to have represented an attempt to locate the north-west angle of the milecastle (Royal Commission on Historic Monuments (England; RCHME) 1996, 374). This investigation had no recorded success, although many undressed stones were visible in the spoil generated by the work. No trace of the excavation is now visible. On the evidence of spacing, the position of the two turrets between Milecastles 67 and 68 (Turret 67a on the east and Turret 67b to the west) can also be calculated, though only approximately; it is estimated that 67b lies *c* 225m east of the road corridor, whilst 67a should be a further one-third of a Roman mile (*c* 493m) east of 67b, although neither turret has been located by excavation.
- 1.4.11 South of the Wall, traces of the Vallum are visible east of Knockupworth Gill, east of the road line. There, on the bluff above the river, the Vallum lies only a short distance behind the Wall. Traces of the ditch survive as a shallow depression, whilst the North Mound is sufficiently well preserved for four or five gaps, situated at intervals of *c* 41m (some 140 Roman feet), to be visible (Breeze 2006, 347; EH 2010). Such features are found in many other places along the line of the Wall, and seem to represent a deliberate attempt to slight the Vallum earthworks in order to facilitate access across it (the corresponding sections of the Vallum ditch were also infilled; Breeze 2006, 87). It has been suggested that this occurred in the AD 140s, when Hadrian's Wall was abandoned as a consequence of the Antonine reoccupation of southern Scotland and the construction of a new frontier barrier, known as the Antonine Wall, across the Forth-Clyde isthmus (*ibid*).
- 1.4.12 To the west of Davidson's Banks, the visible remains of the Vallum disappear on the steep eastern side of Knockupworth Gill, but traces are visible further west. Evaluation in this area in 2005 (CFA 2005a) demonstrated that the Vallum's North Mound survived to at least 6.59m wide and 0.52m high, whilst the South Mound was up to 12.5m wide and 0.69m high, although the width of the latter may have included material eroded or otherwise spread from the mound proper. On the berm between the Vallum ditch and the north mound was an area of metalling, interpreted as a possible patrol track (*ibid*). The Vallum ditch was not excavated, but was estimated to be *c* 8.5m wide at one point. Several augured cores up to 1m deep were taken through the upper fills of the ditch, which demonstrated that these deposits were waterlogged and had considerable palaeoenvironmental potential (*ibid*).
- 1.4.13 Between Knockupworth Gill and Boomby Gill, the line of the Vallum is crossed in two places by the infilled Carlisle Navigation Canal, which is itself overlain by the remains of the disused railway line. Beyond Knockupworth, the Wall and Vallum once more diverge, the Vallum, which is visible in places as a much-denuded earthwork, continuing in a straight line north-westwards towards Kirkandrews, the Wall itself keeping to the riverbank as far as Grinsdale (Breeze 2006, 347). At Boomby Gill, a watching brief, undertaken by OA North in association with the construction of the Hadrian's Wall Path National Trail, identified a ditch at this location (R Newman *pers comm*), though whether this was the Wall ditch or that for the Vallum was not established. The course of the Military Way within the study area is entirely unknown; west of the Irthing, however, the road often runs between the Wall and the Vallum, although elsewhere it lies on top of the Vallum's North Mound (Breeze and Dobson 2000).

- 1.4.14 At Boomby Lane, between the Wall and Vallum, aerial photography has revealed two temporary camps, one overlying the other, neither of which is visible on the ground (Breeze 2006, 347), and other camps are also visible from the air south of the Vallum in the vicinity of Knockupworth. None of these features has been excavated and their date is unknown, but some at least are potentially pre-Hadrianic in date.
- 1.4.15 **Post-Roman period:** several post-Roman features of archaeological and historical significance lie within or close to the line of the road scheme. On Davidson's Banks, some distance to the east of the new road, a red sandstone block of unknown date is recorded on the line of Hadrian's Wall (RCHM(E) 1996). This stands 1m high, above a haunched base, and a cross is incised on its eastern side.
- 1.4.16 The line of the former Carlisle Navigation Canal, completed in 1823 (Ramshaw 1997, 25), is crossed by the road scheme at a point north-east of Knockupworth Cottage, where the canal crosses the line of the Vallum. In the 1850s, the now dismantled Carlisle and Silloth railway was built along the line of the disused canal (*op cit*, 136-7). Earthworks relating to both the canal and the railway can, however, be confused on the ground with those relating to the Vallum.
- 1.4.17 In the immediate vicinity of Kingmoor House, the road impinges on the former site of formal eighteenth-century gardens associated with the house, as shown on the 1750 Map of Kingmoor Racecourse and the 1787 plan of Thomas Pattinson's Estate. North of Stainton and west of Kingmoor, the route crosses both the former Carlisle to Edinburgh branch of the North British Railway, and the West Coast main line, (the Carlisle to Glasgow line (Awdry 1990), opened in 1847). The former ran from Canal Station on Caldewgate (which was also the terminus of the Carlisle to Silloth railway and formerly the site of the Carlisle Navigation Canal basin), crossed the Eden via the Waverley Viaduct and continued to the east of Stainton before bifurcating; the road scheme crosses the western branch just to the north of this point.

1.5 PREVIOUS WORK ON THE ROUTE

- 1.5.1 An archaeological assessment of the CNDR was undertaken by OA North in 1996, in its former guise as the Lancaster University Archaeological Unit (LUAU), as part of a Stage 2 Environmental Impact Assessment (LUAU 1996a); this work included a desk-based survey of available cartographic and documentary sources and a walk-over survey of the different route options. The report concluded that further field evaluation was necessary to determine the full potential of the archaeology along the route. In the same year, the Carlisle Archaeological Unit (CAU) undertook an evaluation at Kingmoor, which covered part of the CNDR route to the north of Stainton. Limited evidence for cross-ploughing of presumed prehistoric or Roman date was found (information from CAU archive).
- 1.5.2 The following year, a limited programme of trial trenching was undertaken at Knockupworth Farm by CAU to determine the effect the proposed road scheme would have on Hadrian's Wall and its Vallum at the point where the route crosses the River Eden (McCarthy *et al* 1997a). Excavation of 12 evaluation trenches in a field south of the projected line of the Vallum, and outside the boundaries of the Scheduled Monument (SM 26110), found sparsely distributed archaeological features, mostly small ditches/gullies,

possible postholes and depressions, which suggested low-level activity at some time in the past, perhaps associated with a complex of undated cropmarks visible from the air further up the hill to the west. With the exception of a single sherd of probable Bronze Age pottery, the features produced no datable material. However, the evaluation included only one trench located within the area of the Scheduled Monument, which proved insufficient for the purposes of evaluating the potential impact of the CNDR scheme on Hadrian's Wall and its associated features. It did, however, demonstrate that the north mound of the Vallum survived as an upstanding earthwork sealed by *c* 0.3m of modern topsoil (*op cit*, 15-16; fig 5). Although the mound was not excavated, enough was seen to demonstrate that it comprised interleaving layers of redeposited gravelly clay, turf and earth, and survived to at least 0.3m in height (*ibid*). At the north-eastern end of the trench, adjacent to the steep bluff forming the south bank of the River Eden, a dense concentration of undressed sandstone fragments was interpreted as possible tumble from the stone phase of Hadrian's Wall (*ibid*; fig 6). It was thought likely that the remains of the Wall itself had been destroyed by river erosion at this point (*op cit*, 17-18). Further evaluation work within the Scheduled area was requested, for whilst it was considered that the Wall itself may not survive well in this area, the north mound of the Vallum had appeared to be well preserved and the Vallum ditch, which had not been fully evaluated, was clearly visible as an earthwork within the boundaries of the road corridor.

- 1.5.3 A subsequent evaluation along much of the route by CFA Archaeology in 2002-3 also excluded the area of the Scheduled Monument (CFA 2003). Not all the parcels of land within the proposed road corridor were available for evaluation at that date, and a further phase of evaluation was undertaken by CFA on Parcels 21 North, 41 North and 27 North in 2005 (CFA 2005a; 2005b); CFA was still unable to get access to evaluate Parcels 5, 36 and 39, however. The evaluations revealed a number of sites and/or areas of archaeological significance, including Parcel 9 (Hen Moss Farm), Parcels 21 North and 21 South in the Knockupworth area, Parcel 27 North, Parcel 32 (River Eden floodplain to the west of Stainton), Parcel 41 North, and Parcel 42 (north of the floodplain).
- 1.5.4 The evaluation of the site of Hadrian's Wall, at Knockupworth (CFA 2005a), revealed evidence for both the north and south Vallum mounds (Trenches 1 and 8) and an area of metalling on the berm between the North Mound and the Vallum ditch (*Section 1.4.12*). The ditch, identified within Trenches 1, 5 and 8, appeared to be wider than is commonly the case, being in excess of 11m in width (CFA 2005a). The upper fills of the ditch contained fairly recent material, but auguring revealed that it survived to a depth of at least 1m and contained waterlogged deposits with high potential for organic preservation (*ibid*). No evidence was identified that might have indicated the presence of the Turf Wall, but the foundations of the stone phase of the Wall survived *in situ* within four evaluation trenches (2, 4, 15 and 19), and traces of the Wall were found in other trenches (*ibid*). Where the Wall survived, the foundations were one course thick, comprising flat slabs and a rubble core; the outer edge (north face) seemed to have been lost to erosion (*ibid*).
- 1.5.5 Work in the Hen Moss Farm area revealed a probable hearth, two spreads of sooty material, an isolated posthole and a cruciform feature which may have been the intersection of two intercutting ditches. The date and significance of these features is currently unknown. Evaluation in the area of Knockupworth Farm by CFA (*ibid*), together

with the previous work undertaken in this area by CAU (McCarthy *et al* 1997a), revealed a significant spread of archaeological features and deposits along the route of the proposed road between the presumed line of Hadrian's Wall on the north-east to the present Burgh-by-Sands road on the south-west. These were thought to relate to settlement activity of prehistoric and/or Roman date.

- 1.5.6 North of the River Eden, evaluation of Parcel 27 North indicated that it did not contain any significant archaeological features, but a prehistoric lithic scatter was dispersed in the topsoil over the site. In Parcel 32, to the west of Stainton, pits, postholes, ditches and an unusual annular feature were identified. Although a sherd of medieval glazed pottery was recovered from one of the ditches, many of these features are thought to relate to prehistoric activity. North of the Eden's floodplain, where the land rises steeply, Parcel 41 contained a pit and ditches containing fire-cracked stones, associated with a relict palaeochannel. In Parcel 42 (west and south), a double ditch enclosing a small circle of postholes was identified. This has subsequently been identified as a roundhouse (**42034**) and dated (by association with two other adjacent roundhouses) to the Early to Middle Bronze Age (*Section 4.13*).

2 METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 In accordance with Annex 14 to Part 2B of Schedule 4 Archaeology (CCCHES and EH 2009) of the *Construction Contract* (Connect CNDR 2009), a series of archaeological project designs was produced, outlining methodologies designed to mitigate the impact on archaeological remains arising from the construction of the road or ancillary works. These methodologies, in all instances, complied with the stipulations of the brief (*ibid*). *Design 001* (OA North 2008) comprised a generic design establishing an investigatory framework for the CNDR as a whole, which drew heavily on the existing *Regional Research Agenda* for the North West (Brennand 2007) and the then draft *Research Agenda* for Hadrian's Wall (Symonds and Mason 2009a). The other site-specific designs and interim statements were respectively produced in advance of and following the completion of each phase of archaeological investigation at a particular site. These were ultimately submitted to CCCHES as part of the project certification process, and all works undertaken complied with the terms of the relevant design. The designs and interim statements are not referenced in the bibliography at the end of this report, but will be referred to in the text, where appropriate, and are included in the site archive.

2.1.2 The overall aim of the mitigating works was to provide an appropriate, specialist response to known or newly discovered archaeological remains during the course of the construction of the road or ancillary works, in order to assist the client with its planning and construction. Specific objectives were as follows:

- to undertake all on-site archaeological works in accordance with current Health and Safety legislation and relevant guidelines;
- to gather sufficient information to establish the extent, condition, character and date, as far as circumstances permit, of any archaeological features and deposits within the areas of investigation;
- to locate, sample excavate and record any archaeological remains revealed;
- to locate, recover, identify, and conserve, as appropriate, any archaeological artefacts revealed;
- to locate, recover, assess and analyse, as appropriate, any palaeoenvironmental, palaeoeconomic and organic remains revealed;
- to date scientifically such remains by optimal means, including artefact typology, radiocarbon assay, or other appropriate dating methods;
- to recommend measures for preservation *in situ* of archaeological, palaeoenvironmental, palaeoeconomic and organic remains, where revealed, wherever feasible and desirable;
- to test the results of the previous evaluations (*Section 1.5*);
- to compile an appropriate report/publication; and

- to produce a paper and digital archive to professional standards, for deposition in the appropriate repositories.

2.2 FIELDWORK METHODOLOGY

- 2.2.1 The prerequisite for any below-ground archaeological work, including the watching brief, was a topsoil strip to formation depth or the uppermost significant archaeological horizon, monitored by an archaeologist. During the watching brief (*Section 3.15*), the strip was observed in all areas where there was a below-ground impact.
- 2.2.2 In any areas where there was presumed to be good potential for the survival of archaeological remains (those sites identified for evaluation, strip and record or open-area excavation; *Sections 3.2-13*), the normal working methodology for the topsoil strip involved the removal of overburden, using back-acting, tracked excavators fitted with smooth-faced ditching buckets. The strip was to the level of the uppermost significant archaeological horizon or to undisturbed natural deposits, if these were encountered first (alluvium or colluvium was also removed if it had the potential to seal archaeological features or deposits). During the watching brief, a variety of methods were used to remove the overburden; on occasion, this was achieved by employing back-acting, tracked excavators fitted with smooth-faced ditching buckets, but more often, bulldozers or toothed-buckets were used. The strip may not, necessarily, have revealed any archaeology that was present, if it occurred below the level of road formation. Therefore, where undisturbed natural deposits or an archaeological horizon was not encountered, an apparent absence of archaeological features or deposits cannot be interpreted as evidence of actual absence.
- 2.2.3 Where mitigation by archaeological excavation was required, the detailed strategy for this was determined in consultation with CCCHES. In the case of trench evaluations, not less than 5%, by area, of the identified archaeological site within the footprint of the new road was sampled by trenching, and the sample was not less than 2%, by area, of the entire identified archaeological site. Examination of features concentrated on recovering the plan and any structural sequences. A sampling policy was instigated, with the phasing and interpretation of the site being the principal objective. All features were percentage-sampled by hand-excavation in accordance with the stipulations of the brief (CCCHES and EH 2009). The precise proportion sampled of each particular feature depended on its interpretation and morphology, and whether it was investigated during a watching brief, trench evaluation, strip and record or open-area excavation; in the case of each site, its sampling strategy was specified in the pertinent project design.
- 2.2.4 At Hadrian's Wall, Knockupworth, excavation proceeded in accordance with the stipulations of the Scheduled Monument Consent (Amended Version), issued on 10th April 2006 to Capita Symonds, acting on behalf of Cumbria County Council. The excavation strategy closely followed the requirements of the brief (CCCHES and EH 2009) and the scheme of investigations set out in OA North's *Design 004*. The methodology specified that, subsequent to the mechanical removal of topsoil and overburden, all excavation was to be undertaken by hand. The fragmentary remains of Hadrian's Wall and the Vallum were excavated in their entirety, where there would be a construction impact; otherwise, they were preserved *in situ*.

- 2.2.5 All artefacts were retained for processing and analysis. Samples for environmental analysis and scientific dating were taken where suitable material was encountered.
- 2.2.6 Recording took place according to the normal principles of stratigraphic excavation. The stratigraphy was always recorded, even when no archaeological deposits were identified.
- 2.2.7 Context sheets approved by CCCHES were used for written field records; these were in a format acceptable to the *Institute for Archaeologists* (IfA; 2002). A unique alpha-numeric project code was applied to all records. All archaeological features were accurately located by instrument survey and recorded on an appropriately scaled site plan, also by photographs, scale drawings and written descriptions, sufficient to permit the preparation of a detailed archive and report on the material. The trench location, as excavated, was accurately surveyed, tied into the WGS84 GPS co-ordinates datum and located on an up-to-date 1:1250 OS map base.
- 2.2.8 Where significant archaeological discoveries were made during the course of a trench evaluation, strip and record exercise or watching brief, following consultation with CCCHES, a programme of further archaeological works could result. In such cases, the scheme of work was detailed within a new project design, and actioned only once this had been approved by the authority through a certification procedure.

2.3 REPORTING

- 2.3.1 The brief (CCCHES and EH 2009) has specified that the results of the archaeological fieldwork, following a *MAP 2* assessment (EH 1991, 2-3), which was also *MoRPHE* compliant (EH 2006), should be presented within an interim report; this document constitutes such a report. As required, this report includes, '...an initial finds and environmental assessment and review of site data. It will identify the scope of the post-archaeological fieldwork analysis and result in a revised project specification and detailed timetable for the analysis. An interim site narrative shall also be provided...' (CCCHES and EH 2009; *Section 3.3.1*). More specifically, it includes the following requisite elements:
- a site location plan, related to the national grid;
 - a front cover/frontispiece which includes the national grid reference of the site;
 - the dates on which the work was undertaken;
 - a concise, non-technical summary of the results set in the context of the known development of the historic environment of the Carlisle district;
 - an explanation of any agreed variations to the brief, including justification for any work not undertaken;
 - a description of the methodology employed, work undertaken and the results obtained;
 - maps and other illustrations at an appropriate scale;
 - a list of, and spot dates for, any finds recovered;
 - a description of any environmental or other specialist work undertaken and outline of the results obtained;

- revised project specification for post-archaeological fieldwork analysis justified against research priorities (reference will need to be made to both the developing research agendas for the North West and Hadrian's Wall).

2.3.2 The last item in the above list (*Section 2.3.1*) anticipates a subsequent phase of analysis and dissemination. A detailed methodology for delivering this is presented in *Section 7* below.

2.4 ARCHIVE

- 2.4.1 A full archive, produced to professional standards, will be prepared, in accordance with current English Heritage guidelines (EH 1991, 2–3) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (Walker 1990) upon completion of the project. The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IfA in that organisation's code of conduct (IfA 2002). The archive for the archaeological work undertaken at the site will be deposited with the nearest museum (Tullie House Museum and Art Gallery, Carlisle), which meets the Museums and Galleries Commission's criteria for the long-term storage of archaeological material (MGC 1992). This archive can be provided in the format recommended by English Heritage's former Centre for Archaeology, both as a printed document and on computer disks as ASCII files (as appropriate). Except for items subject to the Treasure Act (1996) and subject to landowner consent, all artefacts found during the course of the project will be donated to the receiving museum.
- 2.4.2 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Cumbria County Council Historic Environment Record (CCCHER). A copy of the index to the archive will also be available for deposition in the National Monument Record in Swindon.
- 2.4.3 CCCHER is taking part in the pilot study for the Online Access to Index of Archaeological Investigations (OASIS) project. The online OASIS form, at <http://ads.ahds.ac.uk/project/oasis>, will, therefore, also be completed as part of the archaeological work.

3 SUMMARY OF RESULTS

3.1 INTRODUCTION

3.1.1 The following section provides details of the results of all those sites and excavations investigated by OA North prior to and during the construction of the CNDR. This includes all the open-area excavations, evaluation trenches and watching brief sites, where the outcomes of the fieldwork and post-excavation assessments have shown a level of significance warranting analysis. The sites are described in order, from south to north (Fig 1; Table 1).

Site	Archaeological Requirement
Parcel 5	Trench evaluation/open-area excavation
Parcel 9	Open-area excavation
Parcel 20	Strip and record
Parcel 21 North and South	Open-area excavation
Hadrian's Wall, Knockupworth	Open-area excavation
Parcel 27 North	Strip and Record
Parcel 36	Trench evaluation
Parcel 32	Open-area excavation
Parcel 39	Trench evaluation
Parcel 41 North	Strip and record
Parcel 42	Open-area excavation
Parcels 46 and 46a	Trench evaluation
Parcels 47 and 47a	Trench evaluation
Whole scheme	Watching brief during all operations with below-ground impact

Table 1: CNDR sites and archaeological requirement

3.2 PARCEL 5

3.2.1 Parcel 5 (NY 3652 5451; Fig 1), covering 0.274ha, is located in the southern part of the CNDR in the angle formed by the junction of C2051 Orton Road and the U1124 road to Little Orton. In accordance with the brief (CCCHES and EH 2009), it was originally investigated by a series of ten evaluation trenches (*Design 012; Parcel 5 Evaluation: Interim Report; Parcel 5 Excavation: Interim Report*). On the basis of the results of the evaluation, an open-area excavation, in the area of Trenches 2, 3, 5 and 6, was requested by CCCHES (*Design 023*), both the extent of the excavation and the position of the evaluation trenches being shown on Figure 2. This excavation was designed to characterise better an L-shaped enclosure ditch (**5105**) revealed by these trenches, which is depicted on the First Edition OS map of 1874, but had been recut on many occasions and was thus considered to

have some longevity. All the finds recovered from the site (*Section 4.2*) dated to the post-medieval period, and cannot be used to demonstrate that the enclosure ditch is any older than this.

3.2.2 **Results:** a listing of the archive of material and data collected from the excavation of Parcel 5 appears in Table 2. The overburden was topsoil, which was stripped by machine, sealing a natural silty sand. A single phase of post-medieval activity was investigated by two consecutive phases of archaeological investigation.

Contexts by Context Type	
Deposits	144
Cuts	80
Groups	4
Structures	1
Total	229
Contexts by Feature Type	
Ditches	62
Drains	2
Gullies	7
Natural features	3
Pits	1
Pits/ditches	1
Pipe trenches	1
Plough furrows	1
Postholes	2
Finds	Post-medieval pottery; post-medieval clay tobacco pipe
Environmental Samples	23 (bulk)
Graphic Archive	
Digital photographs	119 (219MB)
Number of colour slide films and approximate number of images	4/144
Number of black-and-white films and approximate number of images	5/170
Number of plans	29
Number of sections	31

Table 2: Quantification of the archive for Parcel 5

- 3.2.3 **TRENCH EVALUATION:** six of the evaluation trenches (Trenches 1, 3, 7, 8, 9, and 10) contained only land drains, plough scars, services or natural features, with no archaeologically significant remains being identified; these are not illustrated on Figure 2. Trench 2 contained a possible ditch (**5007**; Fig 2), although this appeared to be recent in date and contained the only finds recovered from the evaluation: two sherds of late post-medieval pottery. Trench 6 contained a north-west/south-east-orientated boundary ditch (**5274**). This was cut by another north-west/south-east-orientated boundary ditch (**5105**), which returned to the south-west within the trench to form an L-shape, and had been recut on more than one occasion. Cutting ditch **5105**, and orientated on a similar north-west/south-east alignment, were furrow **5104** and drain **5103**. Trenches 4 and 5 sampled the north-westerly continuation of ditch **5105**.
- 3.2.4 **EXCAVATION:** uncertainty concerning the form, extent and date of the enclosure revealed by the evaluation led to an instruction to expand the site into an open-area excavation. This identified a range of features (land drains, furrows, postholes, natural features and a pit) of similar character to those sampled by the evaluation trenches, which were dated to the post-medieval period, where they contained finds. None of these features were deemed to be of archaeological significance.
- 3.2.5 The L-shaped enclosure (ditches **5105** and **5274**; Fig 2), detected by the evaluation, was revealed to a greater extent within the excavation area. A similar sequence of successive recutting was noted along the length of the exposed ditch. The earliest pottery in this feature dated from the eighteenth century onwards, and there was nineteenth-century pottery in the later recuts. No dating evidence was found within the earliest ditch (**5274**), and it is possible that the enclosure was originally established at a time earlier than the earliest finds.
- 3.2.6 **Archaeological potential:** given the late date of the site and the paucity of archaeological evidence, there is little potential for further archaeological analysis, beyond that required to prepare a final report.
- 3.3 **PARCEL 9**
- 3.3.1 This area of open-area excavation occupied 1.1ha, within three modern fields, situated well to the south of the River Eden, west of the modern western suburbs of Carlisle (NY 3640 5524; Fig 1). The site was aligned roughly north to south, between Sandsfield Road on the east and Hen Moss Farm on the west, and was bounded on the north by Prior Rigg Lane. To the south, it extended c190m beyond the access road leading to Hen Moss Farm from Sandsfield Road.
- 3.3.2 An archaeological evaluation, comprising ten trenches, had previously been undertaken (CFA 2003). This had revealed some evidence for field boundaries and some occasional scattered discrete features, causing the brief (CCCHES and EH 2009) to call for an open-area excavation (*Design 08; Parcel 9 Excavation: Interim Report*).
- 3.3.3 The excavation revealed several ditches, hedgerows, possible planting beds, postholes and stakeholes, in addition to ceramic land drains. Most of the stratigraphic, and all of the material, evidence dates to the post-medieval period, although two roundhouses may be

interpreted as the site of an Early to Middle Bronze Age settlement, following radiocarbon dating (*Section 4.13*).

- 3.3.4 **Results:** a listing of the archive of material and data collected from the excavation of Parcel 9 appears in Table 3. The overburden was topsoil, which was stripped by machine, sealing a natural silty sand. Two broad phases of archaeological activity were identified dating to the prehistoric and the post-medieval periods.

Contexts by Context Type	
Deposits	77
Cuts	72
Groups	6
Total	155
Contexts by Feature Type	
Ditches/linear features	3
Fencelines	1
Layers	2
Modern drainage features	2
Pits	5
Postholes	27
Stakeholes	7
Finds	Post-medieval and recent pottery, ceramic building material (CBM), glass and an iron nail
Environmental Samples	39 (bulk)
Graphic Archive	
Digital photographs	79 (123MB)
Number of colour slide films and approximate number of images	7/252
Number of black-and-white films and approximate number of images	7/252
Number of plans	39
Number of sections	39

Table 3: Quantification of the archive for Parcel 9

- 3.3.5 **PREHISTORIC PHASE:** at the far south of the site, the remains of two roundhouses were identified, formed by rings of postholes (**9039** (Plate 1) and **9059**; Fig 3), c7m in diameter. Nearby, and probably associated with the structures, were two pits (**9057** and **9065**). No artefacts were recovered from these features, but charred plant remains (CPR) and charcoal

from both roundhouses could be dated to the Early to Middle Bronze Age by radiocarbon assay (*Section 4.13*). The CPR from some of the structural postholes and pit **9065** provides evidence for cereal cultivation or, at least, consumption (*Section 4.11.7*).

- 3.3.6 **POST-MEDIEVAL PHASE:** seven parallel, north/south-orientated linear features (**9123**; Fig 4) were observed in the central part of Parcel 9, towards its western boundary, and are probably planting beds or furrows. They contained recent and post-medieval pottery, green glass, and an undated handmade iron nail (*Section 4.2*), so are most likely very late in date. The only other feature dating to this phase was an isolated posthole (**9153**), which contained a handmade iron nail.
- 3.3.7 **FEATURES NOT CLOSELY DATED:** at the far north of Parcel 9 were two intersecting ditches (**9089** and **9090**; Fig 4). The latter of these was orientated north/south, parallel to Sandsfield Road, to the east, and to other extant field boundaries; as such, it may be a defunct boundary that was once a part of this system of land allotment. Former ditch **9089** was aligned approximately south-west/north-east, and curved slightly. This feature is more difficult to interpret as it did not obviously accord with any features in the modern landscape. The relationship between the ditches could not be determined, as a result of the inadvertent placement of an earlier evaluation trench (CFA 2003) directly over the intersection, which had been removed without record.
- 3.3.8 Towards the south of the site, a north/south-orientated fenceline (**9060**; Fig 3), comprising ten postholes, lay to the north-east of the former location of the two roundhouses (*Section 3.3.5*). No significant finds or palaeoenvironmental remains were recovered from the postholes.
- 3.3.9 Additionally, several natural features, as well as pits and postholes, were distributed over the site, but formed no recognisable pattern. No finds or significant palaeoenvironmental remains were recovered from any of the features of this phase.
- 3.3.10 **Archaeological Potential:** the only features of archaeological potential within Parcel 9 were those belonging to the prehistoric period. Early to Middle Bronze Age roundhouses and other settlement features are rare in the regional record (Hodgson and Brennand 2006), especially in lowland contexts, and are, therefore, highly significant. The association of these features with well-dated palaeobotanical assemblages makes them particularly interesting.

3.4 **PARCEL 20**

- 3.4.1 An archaeological strip and record exercise was carried out in Parcel 20, located to the east of Cornhill Farm, and bordered on the south by the B5307 Moorhouse Road (Fig 1). The site centred on NY 3660 5628, and, in total, 0.53ha was investigated (Fig 5). Originally, the brief (CCCHES and EH 2009) had identified a larger (1.79ha) area for investigation, but CCCHES took the decision to cease the strip and record, as it was proving unproductive, so resources could be more usefully allocated elsewhere.
- 3.4.2 An archaeological evaluation consisting of six trenches was undertaken prior to excavation (CFA 2003), which detected relict hedgelines and land drains. During the strip and record

investigation undertaken by OA North (*Design 009; Parcel 20 Strip and Record: Interim Report*), several putative archaeological features were identified, and all were excavated. The vast majority of these were natural features, mostly formed by root action, and did not warrant full recording. One probably segmented hedgerow, two pits, two postholes and two tree-throws were excavated and recorded. One sherd of post-medieval pottery was found within a root-hole.

3.4.3 **Results:** a listing of the archive of material and data collected from the evaluation of Parcel 20 appears in Table 4. The overburden was topsoil, over sandy silty subsoil, overlying natural clay.

Contexts by Context Type	
Deposits	12
Cuts	9
Groups	1
Total	22
Contexts by Feature Type	
Layers	3
Linear features/hedgerows	1
Natural features	2
Pits	2
Postholes	2
Finds	Post-medieval pottery
Environmental Samples	None
Graphic Archive	
Digital photographs	13 (37.7MB)
Number of colour slide films and approximate number of images	2/41
Number of black-and-white films and approximate number of images	2/65
Number of plans	1
Number of sections	9

Table 4: Quantification of the archive for Parcel 20

3.4.4 **POST-MEDIEVAL PHASE:** the strip revealed 16 parallel land drains, aligned broadly north-north-east/south-south-west, and six further land drains on different alignments (Fig 5). These were all test-excavated and shown to contain ceramic pipes of post-medieval date.

- 3.4.5 **FEATURES NOT CLOSELY DATED:** a probable truncated roadside ditch, or hedgerow, surviving in two segments, **20015** and **20017** (Fig 5), was identified at the southern end of site. This feature was aligned east-south-east/west-north-west, parallel to the B5307 Moorhouse Road, and may be a boundary or drainage following the line of the road. Two isolated pits (**20012** and **20014**), two postholes (**20019** and **20021**) and two probable tree-throws (**20004** and **20006**) were also excavated, but contained no dating evidence or palaeoenvironmental material suitable for sampling.
- 3.4.6 **Archaeological Potential:** given the small number of isolated features on this site and the lack of finds and environmental evidence, this site has no potential for further study.
- 3.5 **PARCELS 21 NORTH AND SOUTH**
- 3.5.1 Originally identified as two discrete items of work, Parcels 21 North and South are discussed together in this report. Parcel 21 South is centred on NY 3671 5652, located between Burgh Road to the north and B5307 Moorhouse Road to the south (Fig 1), and approximately 0.4ha was excavated (Fig 6). Parcel 21 North (NY 3656 5625) is located to the north-east of Burgh Road, adjacent to Knockupworth Cottage, immediately to the south of the Vallum associated with the Scheduled Monument of Hadrian's Wall (SM 26110), and covers approximately 1.05ha (Fig 1). Originally, the brief (CCCHES and EH 2009) had identified a larger (0.65ha) area for investigation at Parcel 21 South, but CCCHES took the decision to cease the excavation, as it was proving unproductive, so resources could be allocated to Parcel 21 North, which had greater archaeological potential (Fig 7).
- 3.5.2 Previous evaluations, undertaken at both Parcels 21 South (CFA 2003) and North (McCarthy *et al* 1997; CFA 2005a) had demonstrated some archaeological potential. The OA North excavation at Parcel 21 South (*Design 007; Parcel 21 South Excavation: Interim Report*) revealed two parallel linear features of nineteenth-century date and a number of discrete features, which proved to be of natural origin. Parcel 21 North was initially investigated by strip and record (*Design 024; Parcel 21 North Strip and Record: Interim Report*), which revealed several ditches and pits or postholes. Consequently, CCCHES requested an open-area excavation (*Designs 025 and 028; Parcel 21 North Excavation: Interim Report; Parcel 21 North Haul Road Excavation: Interim Report*), which recovered finds and palaeoenvironmental remains that variously dated the features to the prehistoric and post-medieval periods (*Sections 4.2, 4.11 and 4.13*).
- 3.5.3 **Results:** a listing of the archive of material and data collected from the evaluation of Parcels 21 North and South appears in Table 5. The overburden was topsoil, over sandy silty subsoil, overlying natural clay.

Contexts by Context Type	
Deposits	274
Cuts	163
Groups	27
Total	464
Contexts by Feature Type	
Ditches	75
Drains	2
Furrows	2
Gullies	5
Hedgerows	8
Modern disturbances	4
Natural features	14
Pits	28
Postholes	42
Posthole groups	2
Quarries	4
Stakeholes	1
Uncertain	3
Finds	Worked flint and stone, prehistoric pottery, post-medieval pottery and ferrous objects, copper-alloy coin
Environmental Samples	39 (bulk)
Graphic Archive	
Digital photographs	259 (440MB)
Number of colour slide films and approximate number of images	16/576
Number of black-and-white films and approximate number of images	16/576
Number of plans	121
Number of sections	136

Table 5: Quantification of the archive for Parcels 21 North and South

3.5.4 **PREHISTORIC PHASE:** at the north-eastern end of Parcel 21 North, two intersecting ditches (**21095** and **21096**; Fig 7) were identified, the former cutting the latter. Ditch **21096** was broadly aligned south-west/north-east, and was probably a continuation of ditch **50081**,

observed beneath the north mound of the Vallum at Hadrian's Wall, at Knockupworth (Section 3.6.5). The only dating evidence recovered from **21096** was a piece of worked flint (Section 4.3). Ditch **21095** was slightly curving and, although broadly orientated south-west/north-east, tended to a different alignment than **21096**; it contained sherds of prehistoric pottery (Section 4.4) and worked flint (Section 4.3). Both **21095** and **21096** were possibly boundary or enclosure features associated with the activity detected in the CAU evaluation (McCarthy *et al* 1997) to the north (Section 1.5.2). An isolated pit, **21099**, to the south-west of the ditches, contained carbonised cereal grains (Section 4.11.8), that have been radiocarbon-dated to the Middle Bronze Age (Section 4.13).

- 3.5.5 **POST-MEDIEVAL PHASE:** at the north-eastern end of Parcel 21 South, and at both ends and the centre of Parcel 21 North, were groups of parallel, south-east/north-west-orientated, linear features, one of which (**21115**; Fig 7) cut prehistoric ditch **21095** (Section 3.5.4). These probably correspond to the location of defunct field boundaries. Indeed, the former boundary represented by the central group in Parcel 21 North is depicted on the Ordnance Survey 1874 First Edition map. On either side of this boundary were clusters of large pits (eg **21209**, **21308**, **21318** and **21232**), intentionally backfilled with deposits containing post-medieval finds (Section 4.2) and, in one case, butchered animal bone (Section 4.10). The underlying natural geology in this area is sand and gravel, so it is possible that the pits were quarries. Many of these boundary ditches (eg **21008** (Fig 6), **21034** and **21039** (Fig 7)) also produced material of post-medieval date, and a possible Roman coin was recovered from post-medieval ditch **21273**.
- 3.5.6 **FEATURES NOT CLOSELY DATED:** a group of postholes (**21377**; Fig 7), from which it is possible to construe a structure that is reminiscent of the Bronze Age roundhouses found elsewhere on the CNDR (Sections 3.3.5 and 3.12.4), contained cereal grains and other roundwood charcoal (Sections 4.11.8). No finds were recovered, which may point to an early date for the structure, although, presently, it has not been closely dated. Several pits and depressions, scattered widely across Parcels 21 North and South, contained no datable material, but, on the basis of the finds retrieved from other features, they probably date to either the prehistoric or post-medieval period. Posthole **21327** contained oak charcoal (*Quercus* sp; Section 4.11.8), which may be evidence that the post had burnt *in situ*. This was part of a south-west/north-east-orientated line of posts that possibly continued the line ditch **21096** (Section 3.5.4).
- 3.5.7 **Archaeological Potential:** the post-medieval features at both Parcels 21 North and South have little potential for further study. Of more interest are the dated Bronze Age pit and the other putative prehistoric features. These are particularly interesting, as they are associated with palaeoenvironmental assemblages, a situation which is regionally rare for this period (Hall and Huntley 2007), and every effort should be made to obtain radiocarbon dates where possible. If Roman, the coin is possibly significant, so further work should be undertaken to classify it.
- 3.6 **HADRIAN'S WALL, KNOCKUPWORTH**
- 3.6.1 The Scheduled Monuments of *Hadrian's Wall between the east end of Davidson's Banks and the road to Grinsdale and the Vallum between Davidson's Banks and the dismantled railway, in Wall miles 67 and 68* (SM 26110) and *Hadrian's Wall Vallum between the*

dismantled railway north of Knockupworth Cottage and the dismantled railway south of Boomby Gill, in Wall mile 67 (SM 26111), an associated earthwork to the south, are crossed by the route of the CNDR immediately to the south-west of the River Eden, north-east of Knockupworth Farm, at NY 3720 5688 (Fig 1). The route intersects the line of the monument at the point where the Vallum is crossed by the now dismantled Carlisle and Silloth railway, which had itself been built on the line of the former Carlisle to Port Carlisle Canal, known as the Carlisle Navigation Canal (*Section 1.4.16*). The brief (CCCHES and EH 2009) required that an area of approximately 0.31ha of the monument was investigated within the footprint of the road and a cutting for an underpass, and 0.16ha by drainage works within an easement to the south of the road (Fig 8). The construction design allowed the *in situ* preservation of most of the surviving Vallum deposits within the footprint of the road, with just two narrow trenches requiring excavation. The depth of the drainage works, however, meant that a full sequence across the Vallum was excavated, approximately 95m to the south of the road.

- 3.6.2 Previous archaeological work consisted of two phases of evaluation trenching (McCarthy *et al* 1997a; CFA 2005a), which demonstrated the survival of the foundation course of the stone phase of Hadrian's Wall (Bidwell and Hill 2009), and identified the north and south mounds of the Vallum (Wilmott 2009a).
- 3.6.3 The excavations undertaken by OA North (*Designs 002, 004 and 027*) revealed the remains of both the Turf Wall (Wilmott 2009b) and the stone-built phase of Hadrian's Wall, the north and south mounds of the Vallum and the Vallum ditch (Wilmott 2009a). A few discrete features were also identified, as well as a ditch that pre-dated the north mound of the Vallum and was incorporated into the build of the Turf Wall. Small assemblages of Romano-British (*Section 4.5*) and post-medieval pottery (*Section 4.6*) were recovered from the excavations, alongside a single struck flint (*Section 4.3*). Palaeoenvironmental evidence, comprising CPR and WPR (*Section 4.11*) from the Vallum ditch, and pollen (*Section 4.12*), predominantly from deposits relating to the Vallum, was also recovered.
- 3.6.4 **Results:** a listing of the archive of material and data collected from the excavation of Hadrian's Wall, at Knockupworth appears in Table 6. A summary table of the contexts issued, and the finds recovered from them, appears in *Appendix 1*. The overburden was topsoil, which was stripped by machine.

Contexts by context type	
Deposit	159
Cut	42
Group	5
Total	206
Contexts by feature type	
Ditch	13
Drain	8
Irregular feature	1
Modern Disturbance	11
Natural feature	5
Pit	1
Posthole	1
Uncertain	2
Finds	
	Struck flint, Romano-British and post-medieval pottery
Samples	
Bulk	35
Monolith	42
Total Samples	77
Graphic Archive	
Digital Photographs	1417/4.09GB
Colour Slide (Films/Frames)	8/216
Black and White (Films/Frames)	8/228
Number of Plans	12
Number of Sections	25
Matrix	3

Table 6: Quantification of the archive for Hadrian's Wall, Knockupworth

- 3.6.5 **PREHISTORIC PERIOD:** ditch **50081** (Fig 8) was aligned north-east/south-west and was later sealed by the north mound of the Vallum and incorporated into the Turf Wall. It appears to have been the continuation of ditch **21096**, identified in Parcel 21 North (*Section 3.5.4*) and is probably a pre-Roman boundary or enclosure feature. A monolith through the fills of this ditch recovered a pollen assemblage that suggested a landscape of alder and mixed woodland (*Section 4.12.4*).
- 3.6.6 A putative palaeochannel (**51057**; Fig 9), identified in the southern end of the drainage run,

is the earliest feature in the sequence at this point; however, it is not readily clear whether it relates to any later archaeological deposits or not. Sealing the palaeochannel, a possible remnant of a buried soil (**51056**) survived, sealed under deposits that probably relate to the south mound of the Vallum or a marginal mound (*Section 3.6.12*). Other remnants of buried soils (**50058**, **50063** (Fig 10) and **50072** (Fig 11) similarly survived beneath the north mound or deposits derived from it (*Section 3.6.11*) in the road footprint and the underpass cutting. Although not yet closely dated, all these soils may have begun to form during the prehistoric period. A pit (**50060**), was also identified, which appears to sit stratigraphically between soils **50058** and **50063** (Fig 10). Pollen monoliths recovered from these features and deposits suggest an open grassy landscape (*Section 4.12.4*).

- 3.6.7 **ROMAN PERIOD:** TWO principal sub-phases were identified relating to the archaeological remains associated with Hadrian's Wall, which are discussed together, in sequence, below. The first phase comprised the Turf Wall and the Vallum ditch and mounds, the second, the stone curtain wall and a recut of the Vallum ditch. No evidence of trackways, metal surfacing or suchlike was detected, although the excavations were carefully monitored in the event that this survived.
- 3.6.8 The putative remains of the Turf Wall were observed towards the north-eastern end of site, comprising a linear deposit of material (**50082**; Fig 8), aligned broadly north-west/south-east, surviving to a maximum width of 3.45m and truncated to the north-east by the stone-phase of the Wall (Plate 2). The deposit contained both Romano-British pottery (*Section 4.5.2*) and a single struck flint (*Section 4.3.1*). A monolith sample (50025) was taken through the turf deposit to assess pollen survival (*Section 4.12.7*), but this did not occur in significant quantities. Ditch **50081** (*Section 3.6.5*) was lined with stone at this time, although only in the immediate vicinity of the Turf Wall, suggesting that it had been reused as a drain (presumably originally culverted) beneath the Wall.
- 3.6.9 The Vallum (ditch and north mound) was sampled in two places, where it would have been destroyed by the construction of the road and a drain (Fig 8). The south mound was only encountered and sampled at the second location, and it was only there that the depth of construction necessitated excavation of the complete profile of the ditch and sequence of deposits within it.
- 3.6.10 Where sampled, by a stepped intervention (measuring between 1m wide at the base and 5m at the top) within the drainage run, the original Vallum ditch (**51050**; Fig 9; Plate 3), seemingly, had a wide, flat, U-shaped profile, and appears to have been approximately 5.8m wide and 2.7m deep, although it had been recut on the south side (*Section 3.6.15*), meaning its full original width cannot be determined. The ditch was cut through a substrate of glacial till, of ostensibly similar composition throughout, and upcast material from the excavation of this ditch presumably went to form the attendant north and south mounds, which were constituted from similar material to the till. Within the footprint of the road, the north mound was preserved *in situ* and there was no requirement, at the depth of construction, to excavate more than the uppermost part of the Vallum ditch profile, the remainder being preserved *in situ*. The ditch there had an apparent maximum width of 11.1m, which seems wide compared to that seen in the excavations of the drainage run, and may mean that its true width was not established at this depth. Deposits that were possibly

very late (post-medieval or recent) fills of the Vallum ditch were excavated in a small, 1m deep, drainage trench immediately north of the road. Once again, the width of the Vallum ditch could not be determined at this depth, as deposits associated with the Carlisle and Silloth railway and the Carlisle Navigation Canal (*Section 3.6.17*) obscured its northern extent.

- 3.6.11 The sections excavated through the north mound produced widely contrasting results, which appear to reflect the level of damage it has suffered. The base of the mound, comprising a deposit of redeposited glacial till with gravel and cobbles, was positively identified within both the drainage run and the footprint of the underpass (Fig 8). In the drainage run, the mound deposit was 5.25m wide and was located 9.25m north of the Vallum ditch, whereas in the road footprint and underpass excavation, the edges of the mound were far more diffuse, making the deposit more difficult to define confidently. It appears, though, that the mound was located 6.4m north of the ditch and was 11.4m wide, although this may indicate some spreading of the material by ploughing or other means.
- 3.6.12 What could be the vestiges of the south mound or a marginal mound (Wilmott 2009a) was also detected within the drainage run. A deposit of redeposited glacial till, possibly sealing a buried land surface (Fig 9; *Section 3.6.6*), was identified immediately to the south of the Vallum ditch and was truncated by its recut. This deposit survived to a maximum width of 8m, but, being very similar to those deposits of the north mound identified in the underpass excavation, proved difficult to define. It seems likely that this too has suffered significant displacement since its original deposition, but whether this was due to deliberate slighting, erosion or ploughing remains uncertain.
- 3.6.13 Denoting the end of this phase, the Vallum seems to have been deliberately decommissioned; this is possibly demonstrated by the levelling of the mounds (although in some places this may have happened more recently), and by the backfilling of the Vallum ditch. Where sampled, the latter seems to have been kept scrupulously clean throughout its use, despite there being some evidence that it contained standing water (*Section 4.11.9*), and no silts (*per se*) were detected in it. The lowest deposits in the ditch sequence (consecutively **51044**, **51043** and **51024**) tipped steeply in from the south side (Fig 9), comprising largely sterile and oxidised redeposited glacial tills. The composition and attitude of these deposits suggest that this material was dumped into the ditch – possibly by the slighting of a marginal mound and/or the south mound. Subsequently, and only shortly afterwards, a large coherent deposit of organic material (**51026**; Plate 4), within which turf-like structures were apparent, was dumped as a single load into the ditch from the north-side, the material becoming embedded within the soft, waterlogged, previously dumped deposit (**51024**). As might be expected given its nature, **51026** contained abundant WPR (*Section 4.11.9*) and pollen (*Section 4.12.6*), although the original provenance, integrity and taphonomy of these are presently uncertain. The WPR included material representative of plant communities that thrive in standing water and also, conversely, drier grassland. It is suggested that **51026** constitutes redeposited material, derived from the Turf Wall, presumably transported by cart and tipped into the semi-backfilled Vallum ditch, probably to form a causeway at this point (see further discussion within *Section 5.5*).
- 3.6.14 The second sub-phase of activity is represented by the construction of the Stone Wall

(**50110**: Fig 12), which truncated and was superimposed upon the slighted Turf Wall. This survived to a maximum of two courses (0.35m) high. The foundation course consisted of flat, irregular slabs, faced to the south-west, enclosing a clay-bonded rubble core (Plate 2). Three adjacent blocks, on the Wall's south-western face, comprised the only remains of the second course of stonework. The wall survived in two distinct lengths, 2.2m apart. The longest emerged from the southern extent of the site and was 9.8m long, whilst the shorter was 2.75m long. The wall survived to a maximum width of 2.7m, with none of the north-eastern face surviving; this has probably eroded over time into the Eden, given the position of the Wall at the top of a steep cliff down to the river.

- 3.6.15 Possibly at the same time as the stone phase of Wall was constructed (although no evidence can be adduced to establish this unequivocally), the Vallum ditch was recut by ditch **51051** to the south of the original ditch (**51050**; *Sections 3.6.10* and *3.6.13*; Fig 9). The recut of the ditch was at least 4.1m wide, with a U-shaped profile, and of similar depth to the original ditch. At its top, it was, however, much wider (7.6m), as it also incorporated the unsilted portion of the original ditch. On its southern side, **51051** also cut the dispersed deposits of the south mound and/or a marginal mound (*Section 3.6.12*). Following a period of natural silting, represented by **51048**, the recut ditch also appears to have been deliberately backfilled, with a highly mixed deposit of organic material and clay-silt (**51041=51042**). This deposit contained a single sherd of pottery, dating to the second century (*Section 4.5.2*), although this only provides a *terminus post quem* for this phase of activity.
- 3.6.16 After the episode of backfilling, a period of gradual natural silting followed, represented by a complex sequence of numerous, interleaving deposits. CPR were recovered from two of these deposits, **51020** and **51022** (*Section 4.11.9*), with the former also producing good pollen evidence (*Section 4.12.6*). A further deposit (**51025**) contained abundant WPR (*Section 4.11.9*). This prolonged phase of slow accumulation, once the Vallum ditch was not being curated, is not presently closely dated and could stretch into the early medieval period or beyond; this remains to be tested by scientific dating.
- 3.6.17 **POST-MEDIEVAL PERIOD:** within the road footprint, and truncating the south mound and ditch of the Vallum, the remains of the Carlisle and Silloth railway and the Carlisle Navigation Canal were identified as a substantial, infilled cutting (Fig 8). Only the uppermost backfills of the cutting were excavated, due to a relatively shallow construction impact in this area, and these comprised dumps of mixed building debris; no coherent structural remains of either the canal or the railway were observed. Post-medieval pottery (*Section 4.6.1*) was recovered from one these deposits (**50032**; Fig 11).
- 3.6.18 **Archaeological Potential:** the probable prehistoric ditch draining the Turf Wall and sealed by the Vallum mound is highly significant, as it provides evidence of land division prior to the construction of Hadrian's Wall and has the potential to yield valuable evidence of the environment at this time. The same is true for the buried land surfaces beneath the Vallum mounds and, in all instances, there is the potential to undertake further pollen analysis combined with radiocarbon dating.
- 3.6.19 The excavation of a complete section of the Hadrian's Wall frontier works has been identified as a major research objective (Symonds and Mason 2009a) and the results of the

excavations, being highly significant, will be of interest to a wide and diverse audience. The significance of the Romano-British archaeology at Knockupworth is the main subject of the discussion of principal potential for this period in *Section 5.5*; in summary, there is great stratigraphical and palaeoenvironmental potential for the analysis of the site, which will merit full and detailed publication.

- 3.6.20 The site also has the potential to provide information on the early medieval landscape, providing the silts in the Vallum ditch were still accumulating during this period. Further analysis should aim to maximise the information that might be retrieved by studying any palaeoenvironmental remains of this date.

3.7 STANTON WEST

- 3.7.1 Stainton West (Parcel 27 North), was located at NY 337594 557137, on the floodplain north of Hadrian's Wall and the River Eden, south of Holme Lane and to the west of the village of Stainton (Fig 1). This site covered an area of 0.65ha and was identified by the brief (CCCHES and EH 2009) as an area for strip and record (*Design 10*). This phase of works was duly undertaken by OA North and resulted in a major prehistoric find, the significance of which was unforeseeable at the start of the project. Several phases of further archaeological works followed, the results of which are reported in a separate companion document (OA North 2011) to this report.

3.8 PARCEL 36

- 3.8.1 OA North undertook a trench evaluation at Parcel 36 (Fig 1; *Design 013; Parcel 36 Evaluation: Interim Report*) because it had been omitted from the original evaluations of the proposed CNDR (McCarthy *et al* 1997a; CFA 2003; 2005a; 2005b). This parcel lies in land between Holme Lane, Greystone Lane and Powlees Lane, to the north of the River Eden, and centres on NY 3652 5451. The evaluated area totalled 183m², comprising four trenches (two of 30 x 2m and one of 14 x 2m). No archaeological features were observed in any of the trenches.
- 3.8.2 **Results:** a listing of the archive of material and data collected from the evaluation of Parcel 36 appears in Table 7. The overburden was topsoil, which was stripped by machine. The location of the trenches within Parcel 36 is shown on Figure 13. No archaeological finds or features were identified in any of the trenches.

Contexts by Context Type	
Deposits	12
Cuts	None
Groups	None
Total	12
Contexts by Feature Type	
Layers	12
Finds	None
Environmental Samples	None
Graphic Archive	
Digital photographs	11 (20MB)
Number of colour slide films and approximate number of images	1/21
Number of black-and-white films and approximate number of images	1/21
Number of plans	4
Number of sections	4

Table 7: Quantification of the archive for Parcel 36

3.8.3 **Archaeological Potential:** as there were no archaeological finds or features within the evaluation trenches, CCCHES did not request any further archaeological work at this site beyond a watching brief of the topsoil strip (*Section 3.15*). As such, there is no potential for further study.

3.9 PARCEL 32

3.9.1 Parcel 32 is aligned roughly north to south and occupies parts of two modern fields situated between Powlees Lane to the west, Greystone Lane on the east, Holme Lane to the south, and further fields adjacent to the Pow Beck on the north (NY 3793 5746; Fig 1). The site was identified as a source of archaeological interest by a trench evaluation that detected several ditches, pits, postholes and anomalous rectangular and annular features; additionally, medieval pottery was recovered (CFA 2003). Large numbers of cropmark features are recorded in the fields surrounding this site (EH 2010; Fig 13). As a result of the evaluation, the brief (CCCHES and EH 2009) requested a 0.77ha open-area excavation (*Design 006; Parcel 32 Excavation: Interim Report*).

3.9.2 The excavation largely confirmed the results of the trench evaluation. Clusters of pits and postholes, enclosure ditches, furrows and land drains were revealed, and assemblages of animal bone (*Section 4.10.3*) and prehistoric, Romano-British and medieval pottery

(Section 4.2) were recovered from these features. The annular and rectangular features, noted during the evaluation, seemed to be two of a number of natural features at the site. Carbonised plant remains (Section 4.11.3) were present in several samples, and pollen was present in significant quantities in a monolith through the fills of one of the ditches (Section 4.12.9). Radiocarbon assay of CPR from a pit (32004) and a ditch (32014) has dated the former to the Middle to Late Bronze Age and the latter to the early medieval period (Section 4.13).

3.9.3 **Results:** a listing of the archive of material and data collected from the evaluation of Parcel 32 appears in Table 8. The overburden was topsoil, which was stripped by machine.

Contexts by Context Type	
Deposits	135
Cuts	106
Groups	5
Structure	1
Total	247
Contexts by Feature Type	
Ditches	33
Natural features	1
Pits	13
Plough furrows	5
Postholes	52
Finds	Prehistoric pottery, Romano-British pottery, medieval pottery/animal bone
Environmental Samples	53 bulk, 1 monolith
Graphic Archive	
Digital photographs	176 (278MB)
Number of colour slide films and approximate number of images	10
Number of black-and-white films and approximate number of images	9
Number of plans	107
Number of sections	99

Table 8: Quantification of the archive for Parcel 32

3.9.4 **PREHISTORIC PHASE:** towards the northern end of Parcel 32, a large cluster of small pits and postholes was identified. These features do not seem to form any clear pattern or structure,

although several possibly significant alignments may be discerned. Pottery recovered from the pits and postholes (**32004**, **32047**, **32042** and **32093**; Fig 14; *Section 4.4*) is of prehistoric date and, with the presence of calcined animal bone (*Section 4.10.3*) and charred cereal grain (*Section 4.11.10*), suggests a settlement or some other activity focus at this location. A radiocarbon determination, from pit **32004**, provided a Middle to Late Bronze Age date (*Section 4.13*). Approximately 20m further to the south-west was a square four-post structure (**32084**; Fig 14; Plate 5), c 1.5m in length and width. No dating evidence was recovered from the structure, but it is most probably contemporary with the pits and other postholes.

- 3.9.5 **ROMANO-BRITISH PHASE:** sherds of badly degraded Romano-British pottery (*Section 4.5*) were recovered from the secondary silts of ditch **32154** (Fig 15) and another abraded sherd came from a primary fill (**32185**) of ditch **32014** (Fig 14). Radiocarbon assay of CPR from fill **32032**, an equivalent of the latter deposit where it occurred in another intervention, yielded a much later date (*Section 4.13*), which, when the abraded nature of the pottery is also considered, suggests it is a residue of earlier activity and does not date the ditches. Ditch **32179** (Fig 15), which was not closely dated within the confines of Parcel 32, appeared to be the continuation of ditch **200023**, identified to the south during the watching brief (*Section 3.15.5*), which produced Romano-British pottery from its upper fill. This ditch may be associated with a cropmark enclosure (Fig 13; EH 2010) to the north, perhaps being part of a droveway that fed into a livestock pound. The presence of Romano-British pottery at this location is of some significance, even though much of it appears to be residual, possibly indicating activity in the vicinity during this period.
- 3.9.6 **EARLY MEDIEVAL /MEDIEVAL PHASE:** three ditches (**32154**, **32131** (Fig 15) and **32014** (Fig 14)) correspond to features found by the evaluation trenches. Ditches **32154** and **32014** were on parallel south-east/north-west orientations, and **32131**, seemingly, was on a perpendicular alignment between them. These ditches were part of a greater system of land allotment, indicated by cropmarks in the surrounding fields (Fig 13; EH 2010), probably associated with a potential settlement, lying c 150m south-east of Parcel 32, also evidenced by the cropmarks. A radiocarbon determination from CPR in the basal fill of ditch **32014** (*Section 4.13*), suggests that the fields were established by the ninth- to twelfth-centuries AD, which is further supported by sherds of medieval pottery (of probable twelfth- to fourteenth-century date) in the secondary fills and a possible recut of the same ditch (*Section 4.6*). Evidence provided by a pollen monolith, sampling the fills of **32131**, is consistent with the stratigraphic evidence, suggesting a cleared agricultural landscape under meadow/pasture or, possibly, cultivation (*Section 4.12.9*).
- 3.9.7 **Archaeological potential:** the archaeology of both the Bronze Age and early medieval/medieval phases of activity is of regional significance, particularly as the features are well dated and associated with finds and palaeoenvironmental remains. As such, Parcel 32 has good potential for further analysis. The Romano-British pottery is noteworthy, but, beyond this, is not suitable for further study.
- 3.10 **PARCEL 39**
- 3.10.1 OA North undertook a trench evaluation at Parcel 39 (*Design 014; Parcel 39 Evaluation: Interim Report*) because it had been omitted from the original evaluations of the proposed

CNDR (McCarthy *et al* 1997a; CFA 2003; 2005a; 2005b). This parcel lies in land between Greystone Lane to the east and Powlees Lane to the west, to the north of the River Eden, and centres on NY 3800 5765 (Fig 1). The evaluated area totalled 280m², comprising five trenches (three of 30 x 2m, one of 26 x 2m and one of 24 x 2m). No archaeological features were observed in any of the trenches, although natural features were identified.

- 3.10.2 **Results:** a listing of the archive of material and data collected from the evaluation of Parcel 39 appears in Table 9. The overburden was topsoil, which was stripped by machine. The location of the trenches within Parcel 39 is shown on Figure 16. No archaeological finds or features were identified in any of the trenches.

Contexts by Context Type	
Deposits	12
Cuts	12
Groups	None
Total	24
Contexts by Feature Type	
Natural Features	13
Finds	None
Environmental Samples	None
Graphic Archive	
Digital photographs	11 (20MB)
Number of colour slide films and approximate number of images	3/44
Number of black-and-white films and approximate number of images	3/44
Number of plans	1
Number of sections	6

Table 9: Quantification of the archive for Parcel 39

- 3.10.3 **Archaeological Potential:** as there were no archaeological finds or features within the evaluation trenches, CCCHES did not request any further archaeological work at this site beyond a watching brief of the topsoil strip (*Section 3.15*). As such, there is no potential for further study.

3.11 PARCEL 41 NORTH

- 3.11.1 In accordance with the brief (CCCHES and EH 2009), an archaeological strip and record exercise was carried out in Parcel 41 North (*Design 011; Parcel 41 North Strip and Record: Interim Report*). This site lies to the east of Powlees Lane, centred on NY 3801

5784 (Fig 1) and covers an area of 0.64ha. Previously, evaluations at the site (CFA 2003; 2005b) had apparently demonstrated the presence of archaeological features, although no datable material was recovered. During the strip and record exercise, large numbers of natural features were exposed and excavated, but, excluding recent drains, only two anthropogenic features, a pit and a short length of segmented ditch, were identified.

- 3.11.2 **Results:** a listing of the archive of material and data collected from the strip and record exercise at Parcel 41 North appears in Table 10. The overburden was topsoil over sandy silty subsoil, revealing natural sandy clay.

Contexts by Context Type	
Deposits	9
Cuts	5
Groups	2
Total	16
Contexts by Feature Type	
Ditches	2
Layers	3
Modern (drainage) features	5
Pits	1
Finds	None
Environmental Samples	3
Graphic Archive	
Digital photographs	6 (10.8MB)
Number of colour slide films and approximate number of images	1/16
Number of black-and-white films and approximate number of images	1/16
Number of plans	5
Number of sections	5

Table 10: Quantification of the archive for Parcel 41 North

- 3.11.3 **PREHISTORIC PHASE:** a short length of segmented ditch (**41003/41009**; Fig 17) extended through the centre of the site on a north-west/south-east orientation. Approximately 27m further to the south-east, just off the line of the ditch, was a sub-rectangular pit (**41014**). Neither the pit nor the ditch contained any finds, but the termini of the ditch and the pit all contained dumps of fire-cracked stones and charcoal (*Section 4.11.11*). A radiocarbon determination from charred roundwood in ditch terminus **41004** returned a Middle Bronze Age date

(Section 4.13), suggesting that the ditch and pit belong to this period.

3.11.4 **Archaeological Potential:** the presence of Bronze Age features at this site is of some significance and contributes to the understanding of the habitation of the landscape at this time. The association of the features with a datable palaeobotanical assemblage means that there is some limited potential for further study.

3.12 **PARCEL 42**

3.12.1 Parcel 42 centres on NY 3798 5814, and occupies parts of three modern fields between Powlees Lane on the south-west, the former water treatment works to the south, the Stainton to Kingmoor road on the east and north-east, and the Kingmoor to Rockcliffe road to the north (Fig 1). It is roughly aligned north/south. An evaluation (CFA 2003) revealed the presence of a curving double ditch and a ring of postholes, although no dating evidence was recovered. Consequently, the brief (CCCHES and EH 2009) requested an open-area excavation, undertaken by OA North, of an area covering 1ha (*Design 005; Parcel 42 Excavation: Interim Report*).

3.12.2 This site spans the crest of a hilltop, sloping away to both the north and south. Situated on the brow of the hill was a group of three roundhouses, forming a small Bronze Age settlement. Downslope, to the north of the roundhouses, was a shallow palaeochannel filled with a grey silty material, beyond which was a concentration of postholes forming five early medieval rectangular structures and several associated pits. On the southern slopes of the hill, three ditches ran north-east/south-west through the site, and are of probable post-medieval date.

3.12.3 **Results:** a listing of the archive of material and data collected from the open-area excavation of Parcel 42 appears in Table 11. The overburden was topsoil, which was stripped by machine.

Contexts by Context Type	
Deposits	271
Cuts	237
Groups	15
Total	523
Contexts by Feature Type	
Ditches	41
Gullies	2
Hearths	4
Modern disturbances	8
Natural features	10
Pits	11
Postholes	144
Posthole groups	5
Ring-gullies	15
Roundhouses	3
Stakeholes	9
Finds	Worked flint, prehistoric and post-medieval pottery, and clay tobacco pipe
Environmental Samples	204 (bulk)
Graphic Archive	
Digital photographs	173 (321MB)
Number of colour slide films and approximate number of images	12/432
Number of black-and-white films and approximate number of images	12/432
Number of plans	187
Number of sections	214

Table 11: Quantification of the archive for Parcel 42

3.12.4 **PREHISTORIC PHASE:** three roundhouses (**42033**, **42034** and **42168**; Fig 18) clustered closely together, on the brow of the hill, in the northern half of Parcel 42. The layout and morphology of the structures suggest that they were largely contemporaneous. All the houses comprised post-rings, between 6m and 7m in diameter, and the two westernmost houses were partially encircled by ring-gullies, both measuring 13m in diameter. Although it is slightly ambiguous, all three houses can be interpreted as having south or south-

eastern entrances, and two internal hearths (**42037** and **42163**) respectively lie at the centre of **42033**, in the west of the group, and **42168** in the east. A pit (**42141**), immediately adjacent and east of **42168**, contained fragments of Bronze Age pottery (*Section 4.4*), and another sherd of similar pottery was retrieved from a modern land drain. The only other prehistoric finds from the site comprise an undiagnostic piece of struck chert, from the gully of **42034**, and two pieces of struck flint, from **42508**, one of two pits (the other being **42506**), c 35m further to the north, and perhaps referencing a slight valley there. Charcoal and CPR from the aforementioned hearths has been dated by radiocarbon assay to the Early to Middle Bronze Age (*Section 4.13*), and the CPR includes evidence for cereal cultivation/consumption (*Section 4.11.12-4*).

- 3.12.5 **EARLY MEDIEVAL PHASE:** approximately 40m further to the north of the roundhouses (*Section 3.12.4*) was a shallow valley, which extended on a north-west/south-east alignment through the site (Fig 18). This was filled with a grey deposit that probably comprised a mixture of colluvium and alluvium, that in places sealed features associated with a small early medieval settlement sheltering in the lee of the hill. Within the excavation area, the settlement comprised a cluster of at least four rectangular buildings (**42544**, **42541**, **42282** and **42283** (Plate 6)) and another possible structure (**42281**), which respected each other and were on similar alignments, so probably constitute a single contemporaneous phase of activity. The first two of these structures were on a south-west/north-east alignment, and the latter three were arranged in a line, at a perpendicular to them, following the lie of the valley. No finds were retrieved from any of the settlement features, but the CPR assemblage included grains, providing evidence for cereal cultivation/consumption (*Section 4.11.14-7*). Radiocarbon dates from charred roundwood in two postholes (**42502** and **42427**), from building **42541**, suggest a seventh- to ninth-century AD date for the settlement (*Section 4.13*).
- 3.12.6 **POST-MEDIEVAL PHASE:** three ditches (**42002**, **42003** and **42215**; Fig 19) extended on a north-east/south-west alignment through the centre of the site. A piece of clay tobacco pipe from **42003** and a sherd of post-medieval pottery from **42215** suggest that these features are probably of post-medieval date. A ditch (**42542**; Fig 18) cut through the colluvium/alluvium sealing some of the features of the early medieval settlement in the north of the site (*Section 3.12.5*). This contained no datable material, but it was probably created in the post-medieval period to improve the drainage in this low-lying part of the site.
- 3.12.7 **Archaeological Potential:** the Bronze Age and early medieval settlements at this site are both extremely significant and are of regional importance. That these settlements are well-dated and associated with palaeobotanical and, in the case of the Bronze Age settlement, finds assemblages, means that they are particularly interesting. The post-medieval finds and features have little potential for further study.
- 3.13 **PARCEL 46 AND PARCEL 46A**
- 3.13.1 OA North undertook a trench evaluation at Parcels 46 and 46a (*Designs 015* and *016; Parcel 46 Evaluation: Interim Report*) because they had been omitted from the original evaluations of the proposed CNDR (McCarthy *et al* 1997a; CFA 2003; 2005a; 2005b). Both parcels lie within the former gardens of Kingmoor House and are located to the south

of the C1106 Cargo Road and to the east of the West Coast Main Line (Fig 1). Parcel 46a lies just to the south of Parcel 46, and both sites centre on NY 3831 5834. At Parcel 46, two 23 x 2m trenches (Trenches 46.2 and 46.3; Fig 20) were excavated, and at Parcel 46a, Trenches 46.1 and 46.4 (Fig 20) sampled an overall area of 40m².

3.13.2 Reference to the 1750 Map of Kingmoor Racecourse and the 1787 plan of Thomas Pattinson's Estate at Kingmoor reveals that the evaluation area once contained formal gardens, including four square *parterres* of moderate size, which could have been box-edging enclosing spaces filled with herbs, flowers and possibly vegetables. A second larger area of hedging, to the south-west, enclosed eight compartments on a plan mimicking the Union flag before the Act of Union with Ireland in 1801, which may possibly form a 'wilderness'. A gardener's house and a summerhouse are also shown on the maps. The trenches of the evaluation were positioned to identify any surviving garden features, but none was found (Fig 20).

3.13.3 **Results:** a listing of the archive of material and data collected from the evaluation of Parcels 46 and 46a appears in Table 12. The overburden was topsoil and sandy silty subsoil, which were stripped by machine, revealing natural sandy clay.

Contexts by Context Type	
Deposits	19
Cuts	9
Groups	None
Total	28
Contexts by Feature Type	
Layers	11
Modern Drainage features	4
Natural Features	5
Finds	Post-medieval pottery and clay tobacco pipe
Environmental Samples	None
Graphic Archive	
Digital photographs	9
Number of colour slide films and approximate number of images	2/25
Number of black-and-white films and approximate number of images	2/25
Number of plans	5
Number of sections	8

Table 12: Quantification of the archive for Parcels 46 and 46a

- 3.13.4 **POST-MEDIEVAL PHASE:** several shallow 'tree-throws' and areas of bioturbation may have been caused by the trees and shrubs that once grew in the garden, but none corresponded in any meaningful way to the known garden plan. A land drain in Trench 46.3 was on the same alignment as one of the paths in this part of the garden, and may have been installed when it was still in existence. A fragment from an eighteenth-century Staffordshire-type press-moulded plate (*Section 4.6*) from the topsoil (**46007**) in Trench 46.3 may relate to the use of the gardens. The only other find was a decorated clay-pipe bowl dating to the late nineteenth century (*Section 4.7*).
- 3.13.5 **Archaeological Potential:** the paucity of the evidence for the formal gardens is disappointing, and there are, as such, no grounds for further study.
- 3.14 **PARCEL 47 AND PARCEL 47A**
- 3.14.1 OA North undertook a trench evaluation at Parcels 47 and 47a (*Designs 017 and 018; Parcel 47 Evaluation: Interim Report*) because they had been omitted from the original evaluations of the proposed CNDR (McCarthy *et al* 1997a; CFA 2003; 2005a; 2005b). Both parcels lie within the former gardens of Kingmoor House and are located to the north of the C1106 Cargo Road and to the east of the West Coast Main Line (Fig 1). Parcel 47a lies just to the east of Parcel 47, and both sites centre on NY 3830 5841. Three trenches (47.1, 47.2 and 47.4; Fig 20) were placed within Parcel 47, and one trench (47.3; Fig 20) within Parcel 47a. In total, an area of 240m² was excavated.
- 3.14.2 Reference to the 1750 Map of Kingmoor Racecourse and the 1787 plan of Thomas Pattinson's Estate at Kingmoor reveals that the evaluation area once contained formal gardens, including four square *parterres* of moderate size, which could have been box-edging enclosing spaces filled with herbs, flowers and possibly vegetables. A second larger area of hedging, to the south-west, enclosed eight compartments on a plan mimicking the Union flag before the Act of Union with Ireland in 1801, which may possibly form a 'wilderness'. A gardener's house and a summerhouse are also shown on the maps. The trenches of the evaluation were positioned to identify any surviving garden features, but none was found (Fig 20).
- 3.14.3 **Results:** a listing of the archive of material and data collected from the evaluation of Parcels 47 and 47a appears in Table 13. The overburden was topsoil and sandy silty subsoil, which were stripped by machine, revealing natural geology.

Contexts by Context Type	
Deposits	24
Cuts	21
Groups	None
Total	45
Contexts by Feature Type	
Layers	11
Modern drainage features	10
Paths/linear features	2
Natural features	4
Pits	3
Uncertain features	1
Finds	Post-medieval pottery, sandstone statue fragment
Environmental Samples	None
Graphic Archive	
Digital photographs	19
Number of colour slide films and approximate number of images	2/55
Number of black-and-white films and approximate number of images	2/51
Number of plans	8
Number of sections	11

Table 13: Quantification of the archive for Parcels 47 and 47a

3.14.4 **POST-MEDIEVAL PHASE:** several shallow 'tree-throws' and areas of bioturbation may have been caused by the trees and shrubs that once grew in the garden, but none corresponded in any meaningful way to the known garden plan. Land drains were identified in all the trenches except Trench 47.1, and some of these were on the same alignment as the former garden paths, which they were near, and may have been installed when they were still in existence. A fragment of pale yellow sandstone statue (Plate 7), recovered from the topsoil (**47000**) in Trench 47.1 and representing a quiver full of arrows, may once have adorned a cupid or Eros, or some other such figure, used to decorate the formal garden. The only other finds were sherds of eighteenth-century pottery, from either the topsoil or various land drains, and which may relate to the use or laying-out of the garden.

3.14.5 **Archaeological Potential:** the paucity of the evidence for the formal gardens is

disappointing, and there are, as such, no grounds for further study.

3.15 WATCHING BRIEF

3.15.1 In accordance with the brief (CCCHES and EH 2009), a permanent presence archaeological watching brief was maintained on all areas that were subjected to below-ground construction impact, except those previously mitigated by open-area excavation. The areas observed during the watching brief, therefore, included most of the footprint of the new road, as well as areas of ancillary works (Fig 1).

3.15.2 **Results:** a listing of the archive of material and data collected from the Watching Brief appears in Table 14. Most of the watching briefs produced negative results, although some significant archaeological remains were recorded, and these are described below.

Contexts by Context Type	
Deposits	78
Cuts	10
Total	88
Contexts by Feature Type	
Ditches	4
Gullies	2
Natural features	1
Palaeochannels	2
Finds	Romano-British pottery, animal tooth
Environmental Samples	
Bulk	3
Monolith	3
Charcoal	2
Graphic Archive	
Digital photographs	830 (1.76 GB)
Number of colour slide films and approximate number of images	11/267
Number of black-and-white films and approximate number of images	11/274
Number of plans	6
Number of sections	13

Table 14: Quantification of the archive for the Watching Brief

- 3.15.3 **PREHISTORIC PHASE** : in the course of the removal of a hedge at NY 37696 57263 (Fig 1), a ditch (**200108**, Fig 13; Plate 8) was identified. This feature, which was 1.5m wide and 0.45m deep, contained two fills and was buried beneath an extremely (0.80m) thick subsoil (probably a buried soil, in turn sealed below the hedge-bank). A piece of *Prunus* sp charcoal from the lowest fill of the ditch has been dated by radiocarbon assay to the ninth millennium cal BC (*Section 4.13*). This is almost certainly residual material, which became included within the primary fills of the ditch after its excavation, and can only provide a *terminus post quem* for the monument. That burning was taking place on the terrace at this time is, however, highly significant if it indicates human activity, especially in light of the potentially early Mesolithic worked flint identified within the assemblage from nearby Stainton West (OA North 2011). Monolith samples from the ditch did not contain pollen in high concentrations, but that which was present derived from grass and herbs (*Section 4.12.10*).
- 3.15.4 The ditch appears to be the continuation of a pennanular cropmark, centred on NY 37688 57322 and 120m in diameter, identified in the field immediately to the north-east (Fig 13). This feature is recorded in the Cumbria HER (SMR 41815) as a probable Neolithic hengiform monument and is associated with a number of other circular monuments.
- 3.15.5 **ROMANO-BRITISH PHASE**: a ditch, **200023** (Fig 13), was identified between Parcels 32 and 36, centred on NY 37832 57308 (Fig 1). It contained a single sherd of second-century mortarium (*Section 4.5.2*) in its upper fill. It appears likely that this is the continuation of ditch **32179** (Fig 15), which was excavated within Parcel 32 (*Section 3.9.6*), and may form part of droveway to a cropmark enclosure to the north. If this is the case, then the mortarium possibly suggests a Roman or earlier date for the droveway and enclosure.
- 3.15.6 Immediately to the north of the River Eden, at NY 37410 57080, highly abraded Romano-British pottery (*Section 4.5.3*) and a cow's tooth (*Section 4.10*) were recovered from a layer of alluvial gravel (**200098**) where a meander of a palaeochannel (**200102**) cut into the gravel layer (Fig 21). The pottery suggests this gravel deposit was only laid down after the first to second century AD and that the palaeochannel is, relatively, a late feature of the floodplain. This palaeochannel is one of a number that had previously been identified by the analysis of LiDAR data (OA North 2011). The floodplain had also been further investigated by a series of boreholes which targeted the identified channels and the areas between them (*ibid*).
- 3.15.7 **POST-MEDIEVAL PHASE**: the remains of the foundations of the dismantled Edinburgh to Carlisle railway were identified within Kingmoor Park (Fig 1). These comprised a pair of linear, parallel deposits of stone and cinder (**200010**) containing large numbers of metal bolts.
- 3.15.8 **Archaeological Potential**: the excavation of what is possibly a Neolithic henge monument confirmed the validity of the cropmark and is, as such, highly significant, as such a monument is of regional and national importance. Analysis should seek to maximise the information returned from the pollen and CPR, in order to obtain a date for the monument and gain information of its immediate environment; this is especially important given the finds at Stainton West (OA North 2011). The buried soil sealing the monument is also of significance and, if dated, the pollen assemblage may merit further work.

- 3.15.9 Ditch **200023** extends the field system excavated in Parcel 32, helps date it and merits further consideration as part of that site. The finds from gravel layer **200098** provide dating evidence for an earlier channel of the Eden, which is potentially important for the interpretation of Stainton West (OA North 2011) and for helping determine the relationship of Hadrian's Wall and the river at this point. Although of passing interest, the remains of the dismantled Edinburgh to Carlisle railway have no potential for further study.

4 ASSESSMENT

4.1 SUMMARY OF STRATIGRAPHY

- 4.1.1 In total, excluding the watching brief, 15 archaeological sites (Table 15) were investigated and recorded during the course of road construction (*NB* – additionally, significant prehistoric remains at Parcel 27 are reported in a companion to this report; OA North 2011). Of these, seven sites were investigated by trench evaluation; three by strip and record; seven by open-area excavation (of which one developed as further archaeological work from a trench evaluation and, similarly, another from strip and record sites); additionally, four noteworthy sites identified within the watching brief were also investigated. The results of these investigations are reported in detail within *Section 3*, although the number of contexts, listed in Table 15, provides an approximate index to relative archaeological complexity (more comprehensive quantifications for each site are given in Tables 2-14, *Section 3*).
- 4.1.2 These sites are primarily characteristic of an agricultural landscape of probable Early to Middle Bronze Age to post-medieval date, comprising enclosures and systems of land allotment, associated with evidence for settlement and other activity. At Knockupworth, excavations of Hadrian's Wall provided further knowledge concerning the construction and form of this internationally important Roman military and administrative feature. Generally, the stratigraphy almost entirely comprises cut features (ditches, pits, structural ring gullies, posthole structures *etc*), the only significant positive features being the surviving mounds of the Vallum and the Turf and Stone Walls at Knockupworth (Hadrian's Wall). Nearly all of these features were truncated by later agricultural activity. The majority of these sites are of regional significance, both individually and collectively, as components of a greater landscape (see site-specific statements of potential within *Section 3* and the over-arching consideration set out in *Section 5*), whereas Hadrian's Wall, being a World Heritage Site, is of international importance.

Site	Method of Investigation	Date of Features	Number of Contexts
Parcel 5	Trench evaluation; open-area excavation	Post-medieval	229
Parcel 9	Open-area excavation	Early-Middle Bronze Age; post-medieval	155
Parcel 20	Strip and record	Post-medieval	22
Parcel 21 South/ Parcel 21 North	Open-area excavation/Strip and record; open-area excavation	Post-medieval/Iron Age; post-medieval	464
Hadrian's Wall, Knockupworth	Open-area excavation	Roman; post-medieval	206
Parcel 36	Trench evaluation	No features	12
Parcel 32	Open-area excavation	Middle-Late Bronze Age; medieval	247
Parcel 39	Trench evaluation	Not closely dated	24
Parcel 41 North	Strip and record	Middle Bronze Age	16
Parcel 42	Open-area excavation	Middle Bronze Age; early medieval; post-medieval	523
Parcel 46/ Parcel 46a	Trench evaluation	Post-medieval/Not closely dated	28
Parcel 47/ Parcel 47a	Trench evaluation	Post-medieval	45
Watching brief	Watching brief	Prehistoric; Roman; post-medieval	88

Table 15: Summary of stratigraphy

4.1.3 The only stratigraphic evidence for activity dating to the Palaeolithic, Mesolithic or Neolithic periods that has been identified by the assessment is a possible hengiform monument on a terrace of the River Eden adjacent to Parcel 27 (*Section 3.15.3*), although a sparse background scatter of struck lithics (*Section 4.3*) demonstrates that the landscape was, to some degree, inhabited, and significant earlier prehistoric remains were found within Parcel 27 (OA North 2011). The stratigraphic evidence for the medieval and post-medieval periods is largely restricted to agricultural features (ridge and furrow, land drains and field boundaries), accompanied by the occasional intrusive find in the top of earlier features, or residual finds within the ploughsoil (*Section 4.2*). However, at Knockupworth, both the Carlisle and Silloth railway and Carlisle Navigation Canal were identified (*Section 1.4.16*). Whilst this evidence is not without some significance, the vast majority of the archaeological features identified by the assessment as having research potential seemingly date to the Bronze Age, Roman and early medieval periods, which should form the focus of a future programme of analysis (*Sections 5 and 6*).

4.2 ARTEFACTS: INTRODUCTION

4.2.1 In total, 407 artefacts were recovered from the CNDR sites (excluding Parcel 27; OA North 2011), the majority being post-medieval pottery sherds. Other material consisted of worked flint, worked stone, prehistoric, Romano-British and medieval pottery, clay tobacco pipes, metalwork and glass (Table 16). In addition, a small and insignificant assemblage of animal bone, weighing 84g, and representing 18 individual specimens, was recovered. The artefactual assemblage has a broad date range, which reflects the wide-ranging age of the archaeological deposits from which it was gathered.

Type	Total
Struck lithics/worked stone	12/4
Prehistoric pottery	78
Romano-British pottery	30
Medieval/post-medieval pottery	7/234
Clay tobacco pipe	21
Metalwork	9
Glass	12
Total	407

Table 16: Artefact totals by type

4.3 STRUCK LITHICS AND WORKED STONE

4.3.1 **Quantification:** in total, 12 pieces of struck lithic material were recovered during these archaeological investigations. Five were recovered from Parcel 21 (*Section 3.5*); one from Parcel 32 (*Section 3.9*); five from Parcel 42 (*Section 3.12*); and one from Knockupworth (*Section 3.6*). There were, in addition, three other fragments of worked stone (not struck), from Parcel 21 (*Section 3.5*), and a carved stone quiver (part of a statue) from Parcel 47 (*Section 3.14*).

4.3.2 **Assessment:** The struck lithic artefacts comprised ten flakes and two blades. Three unmodified flakes (**21346/21027**; **21358/21028**; **21477/21030**) and a flake fragment (**21373/21029**) were recovered from ditch **21096** on Parcel 21, along with a second flake fragment (**21017/21012**) from the topsoil. A large blade fragment (**32049/32008**) came from pit **32050** in Parcel 32. Three flake fragments (**42136/42005**; **42507/42007**; **42507/42008**) came from roundhouse **42034** and pit **42508** in Parcel 42, along with a core trimming flake (**42483/42006**; a residual find within structure **42541**) and a blade (**42000/42000**) from the topsoil. A broad, squat flake (**50082/50000**), from the Turf Wall deposit at Knockupworth, was also probably residual.

4.3.3 All three site-specific assemblages comprise small, unremarkable collections of flakes and flake/blade fragments, being debitage associated with core reduction, but undiagnostic to any specific reduction technology. Thus, none of the material is closely datable and it could belong to any period from the Mesolithic to the Bronze Age.

4.3.4 Eleven of the lithic artefacts were made on good-quality flint and one on chert, also of very

good quality. Three flake fragments (*21373/21029*; *42507/42007*; *42507/42008*) were burnt, so little can be said of the provenance of their raw material. Of the others, two (*21358/21028*; *21477/21030*) were made on orange/brown raw material, probably pebble flint derived from secondary sources on the west coast of Cumbria (Cherry and Cherry 1983). The remainder were made on greyish-brown to brownish-grey flint and likely to come from the till deposits on the east coast of Yorkshire (Henson 1985), although it is possible that it comes from flint deposits in Antrim, on the north-eastern coast of Ireland (Cherry 2009). The single chert flake (*42136/42005*) is blackish-brown in colour and semi-translucent, and could have been procured from local sources in the limestone areas of Cumbria, or from further afield in the Pennines.

4.3.5 Apart from the flint and chert artefacts, two small fragments of a dark grey roofing slate came from a fill (*21054*) of ditch *21054*, but a water-worn cobble, from a fill (*21477*) of ditch *21095*, although bearing parallel scratches, is probably unworked. A fragment of yellow sandstone, carved to resemble a quiver full of arrows (Plate 7), was recovered from the topsoil (*47000*) within Trench 47.1, at Parcel 47. This was, presumably, part of a statue, perhaps a Cupid, Eros or similar figure, that once decorated the formal gardens of Kingmoor House.

4.3.6 **Potential:** the struck flint and chert assemblage is small, largely unstratified or residual, and undiagnostic of any specific prehistoric period. It, therefore, offers little potential for further analysis, although a brief summary should be included in any publication. The other worked stone objects likewise have no potential for further analysis, except, perhaps, for the stone quiver, which should be more closely identified if possible.

4.4 PREHISTORIC POTTERY

4.4.1 **Quantification:** 12 sherds (representing a minimum of one vessel per site) were recovered from Parcels 21 (one sherd; *Section 3.5*) and 42 (11 sherds; *Section 3.12*), and a further 66, including rim sherds from a minimum of two vessels, were found at Parcel 32 (*Section 3.9*). Although not in themselves chronologically diagnostic, most are associated with Bronze Age radiocarbon dates (*Section 4.13*).

4.4.2 **Assessment:** all the sherds appear to derive from medium-sized jars, and the fabric is characterised by numerous variously sized sedimentary quartz grits, a common tempering material used in much of Northern England during the Iron Age and possibly earlier (Chadwick in prep). One sherd has carbonised accretions, which may be sufficient for further radiocarbon assay.

4.4.3 With the exception of single sherds from a modern land drain at Parcel 42 and a ditch at Parcel 21 North, all of the pottery was recovered from settlement features, which can be associated with Bronze Age radiocarbon dates (*Section 4.13*). The fragment from Parcel 21, from the earliest fill (*21370*) of ditch *21095*, may well be Bronze Age or Iron Age in date, but the feature has yet to be dated by radiocarbon assay. At Parcel 32, pottery came from pit *32004* (12 sherds), posthole *32042* (five sherds), posthole *32047* (13 sherds), and posthole *32093* (36 sherds). At Parcel 42, in addition to a fragment from a modern land drain, pit *42141*, associated with roundhouse *42168*, produced ten sherds.

4.4.4 **Potential:** although the assemblage is small, it is of some significance, as well-dated Bronze Age pottery is generally rare in the region, and from stratified settlement features even more so (Hodgson and Brennand 2007, 49). The potential for good radiocarbon dating of the features from which it derives, and also from carbonised deposits on one of the sherds, offers a rare possibility to add significantly to the body of knowledge for the region.

4.5 ROMANO-BRITISH POTTERY

4.5.1 **Quantification:** in total, 30 fragments of Romano-British pottery were recovered during the project. These came from only four sites: Parcel 32 (*Section 3.9*), Hadrian's Wall, Knockupworth (*Section 3.6*), and two watching brief sites (between Parcels 32 and 36, and Parcel 27 South; *Section 3.15.5*). At Knockupworth, a further five very small fragments might be of Roman origin, but their size precludes confident identification. Two fragments from this group were recovered from the topsoil, and three were recovered from the backfill of evaluation trenches 16 and 19 (CFA 2005a).

4.5.2 **Assessment:** excluding material from the sites at Parcel 27 (*Section 3.15.5*; OA North 2011a), only one Romano-British fabric was noted from the sites along the scheme, a soft sandy orange oxidised fabric, which was likely to have been produced locally, perhaps in Carlisle. As the assemblage comprises only small abraded body sherds, no detailed characterisation of the fabric was possible. Sherds came from the primary fill (**32185**) of ditch **32014**, at Parcel 32, and the topsoil (**50000**), evaluation trench backfills, and **50082** (a layer comprising the remnants of the Turf Wall) at the Hadrian's Wall site, Knockupworth. A relatively large mortarium fragment (from the upper fill (**200051**) of ditch **200023**, on the watching brief) is probably a local product, perhaps from the Carlisle/Scalesceugh kilns (Hartley 1990), and likely to be of second-century date. The small fragment of Central Gaulish samian (from fill **51041**, of Vallum ditch **51050**, Knockupworth) is probably from Lezoux. It derives from a decorated vessel, most probably of form Dr 37, although the sherd is too small for complete confidence. It is again of second-century date, and likely to be from the main period of export, commencing *c* AD 120 (Webster 1996, 14).

4.5.3 A small group of 13 fragments of badly abraded pottery and ceramic building material was recovered from river gravels (**200098**) in a palaeochannel at Parcel 27 South. Both pottery and CBM were in a similar dark orange, oxidised fabric, resembling that from the military-controlled Brampton kilns, where pottery and tiles were in production from the later first century (AD 83-4) to *c* AD 140 (Swan *et al* 2009, 591). The surviving fragments seem most likely to derive from a single vessel, possibly a two-handled flagon, a type in use at the fort in Carlisle towards the end of the production period (see, for instance, Swan *et al* 2009, fig 313.252).

4.5.4 **Potential:** the Romano-British pottery collected during the project has no potential for further analysis. The spot-dating undertaken for this assessment will contribute to the overall dating of various elements of the project, but no further refinement of this will be required.

4.6 MEDIEVAL AND POST-MEDIEVAL POTTERY

4.6.1 **Quantification:** in total, there were seven small fragments of medieval pottery and 234

fragments of post-medieval and more recent pottery. The medieval pottery was all from Parcel 32 (*Section 3.9*), but the post-medieval pottery was widely dispersed, being from Parcels 5 (56 sherds; *Section 3.2*), 9 (three sherds; *Section 3.3*), 20 (one sherd; *Section 3.4*), 21 North (150 sherds; *Section 3.5*), 42 (one sherd; *Section 3.12*), 46 (six sherds; *Section 3.13*), 47 (14 sherds; *Section 3.14*) and Hadrian's Wall, Knockupworth (three sherds; *Section 3.6*).

- 4.6.2 **Assessment:** in the medieval pottery, three fabrics are represented, all in the Northern Gritty tradition. A sherd made from a gritty cream fabric (Carlisle fabrics 3-6, White/buff gritty wares; Bradley and Miller 2009) came from a recut (**32183**) of ditch **32014**, and a sherd, from a small rod handle in a White/buff gritty ware, came from a secondary fill (**32033**) of ditch **32014** (*Section 3.9*). Presuming the dating follows that in central Carlisle, these can probably be dated to the twelfth- to early thirteenth centuries (*op cit*, 663). Five sherds, from a single vessel, in a sandy, partially reduced variant, can probably be dated to the late twelfth- to fourteenth century. These were from another fill (**32017**) of the aforementioned ditch, and derive from a partly glazed jar with an everted rim.
- 4.6.3 Fragment size within the post-medieval pottery assemblage varied considerably, from a few millimetres to 100-150mm in maximum dimension. There is a relatively restricted range of fabrics present, which can be divided into two groups. The first comprises hand-thrown kitchen and storage vessels, which are (probably) locally made black- and brown-glazed redwares, some with a white internal slip. The second is made up from tablewares, such as plates, cups, and teapots in industrially produced fabrics such as creamware, pearl ware and other white-glazed earthenwares, including those with transfer-printed decoration (Cotter 2000). The latter span a period from the mid-late eighteenth century to the present day and many are heavily frost-spalled, a few having clearly been refired in a reducing atmosphere, probably in domestic fires (see, for example, a fragment from a quarry pit (**21232**) in Parcel 21 North. There are, in addition, a few fragments of Chinese and English porcelain; a few fragments of industrial slipwares, typical of the nineteenth century; and a few fragments of brown stoneware bottles, again typical of the nineteenth- and early twentieth centuries.
- 4.6.4 Perhaps the earliest fabric-type represented is a single fragment from a slip-decorated, press-moulded plate, probably an eighteenth-century Staffordshire product, from the Parcel 46 topsoil (**46007**); its presence might be explained by the former existence of gardens belonging to Kingmoor House (*Section 3.14*). There is, in addition, a small fragment of white salt-glazed stoneware (from land drain **47020**, in Parcel 47), a fabric popular in the mid-eighteenth century (Jennings 1981). Although it is not easy to assign a close date to most black-glazed storage vessels, a deep cylindrical vessel, from ditch **5105** at Parcel 5, is probably also of late eighteenth-century date (it is possible that a further 17 sherds, also from ditch **5105**, come from the same vessel). A small rim fragment from an industrial slipware jug, from a quarry pit (**21020**) in Parcel 21 North, is also of late eighteenth- to nineteenth-century date, as is a fragment of porcelain with blue-sprigged decoration from the same context. Part of a marbled slip-decorated creamware bowl from land drain **47020**, Parcel 47, is also probably of late eighteenth- to early nineteenth-century date. Fragments of a (probably) Chinese porcelain bowl, from ditch **5105**, have been over-painted in red and gilded, in the Imari style, and could be eighteenth-century in date, although poor-

quality Imari-style vessels were also exported from China in the late nineteenth century (Savage 1963, 111). The remainder of the material collected is of nineteenth- and twentieth-century date, for instance, fragments of two teapots, from ditch **21034** in Parcel 21 North, and requires no further discussion.

4.6.5 **Potential:** neither the medieval pottery nor post-medieval pottery has any potential for further analysis. The spot-dating undertaken for this assessment will contribute to the overall dating of various elements of the project, but no further refinement of this will be required.

4.7 CLAY TOBACCO PIPE

4.7.1 **Quantification:** only 21 fragments of clay tobacco pipe were recovered during the project, all stratified. They occurred within features at Parcels 5 (*Section 3.2*), 21 (*Section 3.5*), 42 (*Section 3.12*), 46 (*Section 3.13*) and 47 (*Section 3.14*).

4.7.2 **Assessment:** four of the group were fragments of bowls, the remainder being small lengths of unstamped stems, all of relatively narrow bore and thus eighteenth-century or more recent in date. None of the bowl fragments can be dated earlier than the mid-nineteenth century. A part of a small bowl, with leaf patterns along the seam (land drain **5115**, at Parcel 5), dates to c 1840-70. At Parcel 21, a plain bowl came from pit **21318**, and is probably a cutty pipe dating to c 1880 (Ayto 1994, 5), and a small fragment, probably from a similar pipe, also came from pit **21232**. Finally, a complete decorated bowl, from the topsoil (**46015**) at Parcel 46, can, again, be dated to the late nineteenth century.

4.7.3 **Potential:** the clay tobacco pipe collected during the project has no potential for further analysis. The spot-dating undertaken for this assessment will contribute to the overall dating of various elements of the project, but no further refinement will be required.

4.8 METALWORK

4.8.1 **Quantification:** eight fragments of ironwork and one of copper alloy (a coin) were recovered during the project. The iron objects occurred at Parcels 9 (*Section 3.3*) and 21 (*Section 3.5*), the coin also being from the latter site.

4.8.2 **Assessment:** none of the metallic items were subject to x-ray, but, although in poor condition, their form is sufficiently clear for confident identification to be made. At Parcel 9, two objects, from furrow **9123** and posthole **9153**, are nails, one adhering to a water-worn pebble. A third fragment of nail, from Parcel 21 (in hedgerow boundary ditch **21008**), clearly shows a square cross-section, and is most likely to be hand-forged. None of these can be dated with any precision, as hand-made nails are a long-lived form, current from at least the Roman period to the recent past. Six fragments, also from Parcel 21 (in pits **21209** and **21318**), are short fragments of strip, approximately 35-40mm in width. The exact profile of the cross-section is not clear, and they could derive either from barrel hoops, or from simple hinges. The single object of copper alloy (from hedgerow boundary ditch **21273**) is clearly a coin. As the result of heavy wear, it cannot be dated, but its size might suggest it to be Roman.

4.8.3 **Potential:** the ironwork has no potential for further analysis and no potential to contribute

towards the dating or further understanding of the site from which it derives. If identified, which may be possible, the coin could contribute to the dating of the site from which it derives.

4.9 GLASS

4.9.1 **Quantification:** 12 fragments of vessel and window glass were recovered during the project. These came from Parcels 9 (*Section 3.3*), 21 (*Section 3.5*) and 47 (*Section 3.14*).

4.9.2 **Assessment:** most are small and abraded fragments, typical of material from highly disturbed contexts, for instance agricultural soils. They provide very little close dating evidence: most of the group comprises dark olive green glass, introduced in the seventeenth century, and in common use thereafter for a range of bottles (Charleston 1975, 215). Dark green bases, from pit **21318** and topsoil **47040** (respectively at Parcels 21 and 47), suggest narrow cylindrical wine bottles of nineteenth-century date. There was, in addition, a very small fragment of modern window glass, from pit **21209** in Parcel 21.

4.9.3 **Potential:** the vessels and window glass have no potential for further analysis. The spot-dating undertaken for this assessment will contribute to the overall dating of various elements of the project, but no further refinement will be required.

4.10 ANIMAL BONE

4.10.1 **Quantification:** there were, in total, 18 identified fragments of animal bone and a single tooth (Number of Individual Specimens (NISP)) comprising one cow, seven medium mammal and 11 unidentified mammal. These came from three sites: Parcels 21 (*Section 3.5*) and 32 (*Section 3.9*), and from the watching brief near to the River Eden (*Section 3.15.6*).

4.10.2 **Assessment:** the animal bone was rapidly scanned to identify the species present, the condition of the bone, and to assess its potential for further analysis. At Parcel 21, there were, in total, three bone fragments weighing 77g, recovered from an undated pit, **21318**. One large mammal rib fragment, two unidentified large mammal fragments, and a sheep/goat humerus fragment were present. The large mammal fragments were in a good condition, with little to no erosion of the bone surface. The fragment of sheep/goat humerus was more fragile, with over 50% of its surface eroded. The rib and a large mammal fragment had saw marks upon them from the dismembering of the animal carcasses, and the character of these traits suggests a post-medieval date.

4.10.3 At Parcel 32, there were, in total, 44 calcined (burned white) bone fragments, weighing 7g, excavated from two prehistoric pits or postholes (**32004** and **32093**). Feature **32004** produced 43 bone fragments, and **32093** one bone fragment. In each feature, the bone was highly fragmented, of a very poor condition, and unidentifiable.

4.10.4 The tooth recovered from alluvial gravel **200098**, which was located in the meander of a palaeochannel, **200102**, adjacent to the current River Eden, was identified as cow.

4.10.5 **Potential:** the animal bone has no potential for further analysis beyond a brief mention of its presence in the features, although the calcined prehistoric bone could be suitable for

radiocarbon dating if desired.

4.11 CHARRED PLANT REMAINS, WATERLOGGED PLANT REMAINS AND CHARCOAL

- 4.11.1 **Quantification:** some 328 bulk samples, taken from the area excavations of Parcels 5 (Section 3.2), 9 (Section 3.3), 21 North (Section 3.5), Hadrian's Wall, Knockupworth (Section 3.6), Parcels 32 (Section 3.9), 41 (Section 3.11) and 42 (Section 3.12), and a hengiform monument, adjacent to Parcel 32, excavated as part of the watching brief (Section 3.15), were assessed for charred plant remains (CPR), waterlogged plant remains (WPR) and charcoal. The samples came from a range of features, including ditches, postholes, pits, tree-throws, gullies and hearths, as well as the Vallum ditch, and mounds. Those samples which have potential for further CPR/charcoal analysis are summarised in Appendix 2. The plant and charcoal remains can provide information on human activities, economic practices, the local agricultural environment, available resources, and patterns of change over time. Radiocarbon dating (Section 4.13) of the sites attests to activity from at least the Bronze Age to the early medieval periods, although the material evidence (Section 4.2) demonstrates that the landscape was occupied at both later and, probably, earlier times.
- 4.11.2 **Methodology:** in accordance with the advice of the English Heritage Regional Science Advisor, an on-site programme of systematic sampling of all securely stratified contexts was implemented to eliminate the biases inherent in a strategy based on judgement alone, and to ensure that significant contexts were more reliably identified. Where dating by artefacts was insecure and/or where dating was likely to be a significant issue for the interpretation of the site, samples were also taken to allow the use of scientific methods, such as radiocarbon dating.
- 4.11.3 To comply with accepted professional guidelines (EH 2002), bulk, 40-litre samples were taken, or the entirety of deposits, if these were less by volume than this. Ten to twenty litres of each sample from Parcels 5, 9, 21 North, 32, 41, and 42 were processed, initially, using a modified Siraf-type flotation tank. Given the importance of the Knockupworth site, 100% of each sample was processed. The flots were collected on a 300µm mesh, air-dried and examined under a binocular microscope. Any material still retained in the residue was also extracted and assessed. The contents of each flot, such as cereal grains, cereal chaff, weed seeds and molluscs, were quantified, as was material such as coal, heat-affected vesicular material (HAVM), bone, mortar, and ceramic building material (CBM). The presence of modern contaminants, such as roots, insect eggs and modern seeds, was noted and a catalogue prepared. The charred remains were quantified on a scale of 1–4, where 1 is rare (one to five items); 2 is frequent (less than 50 items); 3 is common (51–100 items); and 4 is abundant (greater than 100 items). The waterlogged remains (WPR) were also quantified on a scale of 1-5, where 1 is less than five items and 5 is more than 100 items.
- 4.11.4 Following the initial assessment, the remaining volume of all those samples was processed, where potential for CPR, charcoal analysis, and/or radiocarbon dating had been identified. The remainder of those samples in which finds had been identified was also processed at this stage.
- 4.11.5 Any charcoal fragments within the bulk samples were quantified and provisionally

identified where possible. In particular, for the purpose of providing suitable material for dating, the presence of any short-lived wood species, such as *Alnus glutinosa* (alder), *Corylus avellana* (hazel) or *Betula* sp (birch) (diffuse porous wood), was noted, as was the presence of other charred material, such as Poaceae (grass family) stems or tuber fragments. Charcoal fragments identified as *Prunus* sp (blackthorn-type in the text) include sloe/blackthorn, wild plum, wild cherry and bird cherry. Fragments identified as Maloideae, which includes hawthorn, whitebeam, apple and pear, is given as hawthorn-type in the text.

- 4.11.6 **Assessment: PARCEL 5:** the 21 bulk samples from this site produced no plant remains or charcoal.
- 4.11.7 **PARCEL 9:** 15 of the 35 bulk samples from this site contained CPR, and those from three postholes (part of roundhouse **9039**) and a pit (**9065**) contained more than just rare CPR. Additionally, nine features contained sufficient charcoal for analysis (in excess of 100 fragments), and, of these, seven are from postholes of roundhouses **9039** and **9059**. The CPR assemblage included charred cereal grains of *Hordeum vulgare* (barley), *Triticum* sp (wheat) and *Avena* sp (oat). The presence of *Triticum* sp chaff, in posthole fill **9032**, means that the wheat utilised may be identifiable to species level. Charred weed seeds, typically found as part of crop-processing waste, were recorded in one of the posthole fills (**9026**) and the pit fill. The charcoal from the postholes is dominated by *Quercus* sp, but the presence of several other taxa suggests that the material is likely to consist of floor debris fallen into the void left by the post or packing material, rather than representing the remains of the posts themselves. Charred material from posthole **9003** (part of **9039**), and posthole fill **9026** (part of another adjacent circular structure, **9059**) has been dated to the Early to Middle Bronze Age (*Section 4.13*), suggesting a date for the CPR assemblages.
- 4.11.8 **PARCEL 21:** some 36 bulk samples were taken during the excavations at this site, and, of these, six contained some charred material, of which three produced more than just rare CPR, and four contained sufficient charcoal for analysis. Two samples from an isolated pit, **21099**, contained abundant cereal grains of *Hordeum vulgare*, including the possible naked variety, *Hordeum vulgare* var *nudum* (radiocarbon-dated to the Early to Middle Bronze Age; *Section 4.13*), and a few *Triticum* sp grains. The charcoal from this feature was dominated by *Alnus glutinosa*/*Corylus avellana*. The other features have not been closely dated, but a sample, from posthole fill **21392** (part of possible structure **21377**), produced rare *Hordeum vulgare* grains and rare weed seeds, a pit (**21327**) contained *Quercus* sp, and a posthole fill **21402** (structure **21377**) was also dominated by *Alnus glutinosa*/*Corylus avellana*.
- 4.11.9 **HADRIAN'S WALL, KNOCKUPWORTH:** the 29 bulk samples taken during the excavation of Hadrian's Wall, the Vallum ditch and mound, a ditch and a palaeochannel were almost devoid of CPR. Fills **51020** and **51022**, both upper fills of the Vallum ditch recut, **51051**, contained rare weed seeds, tuber fragments and Poaceae stems, but the assemblages were not abundant enough to warrant further analyses. Most of the samples taken from the Vallum ditch, mound and palaeochannel did, however, contain rare to frequent charcoal fragments. The assemblages appeared to be quite similar in content, containing a mixture of *Quercus* sp (oak) and diffuse porous wood of *Prunus* sp/Maloideae (blackthorn/hawthorn-type) and

Alnus glutinosa/Corylus avellana. A late fill (51025) of recut 51051, and a dumped deposit (51026; possibly the slighted turf phase of Hadrian's Wall) in the original cut (51050) of the Vallum ditch, contained abundant WPR, including wood, bark, moss, and waterlogged seeds. Both contained a mixed weed seed assemblage of wet/damp-loving taxa, such as *Carex* sp (sedge), *Juncus* (rush), *Ranunculus flammula* (lesser spearwort), *Potentilla palustris* (marsh cinquefoil), and *Montia* sp (blinks), and taxa typical of waste/rough or cultivated land, such as *Prunella vulgaris* (selfheal), *Rumex acetosella* (sheep's sorrel), and *Persicaria lapathifolia* (pale persicaria). Fills 51024 and 51042, lower fills of, respectively, the original Vallum ditch and its recut, also contained organic material, including wood/bark fragments, moss and a few weed seeds. All the other samples, including those taken from the mound and palaeochannel deposits, were devoid of CPR and WPR.

- 4.11.10 **PARCEL 32:** some 12 of the 40 bulk samples from this site contained rare cereal grains and/or weed seeds of, primarily, Poaceae (grass), and six features contained abundant charcoal. Cereal grain, from posthole 32005, resembled a possible early variety of wheat, *Triticum* cf *dicoccum* (emmer wheat), and warrants further analysis. Two of the samples, from pit 32004 and ditch 32014, may potentially contain more than just rare cereal grains upon further investigation. Charred material from the pit was radiocarbon-dated to the Middle to Late Bronze Age, whereas material from the ditch gave an early medieval date (Section 4.13). All the charcoal samples came from the same cluster of pits and postholes, and were all similar in content. Three were from postholes 32005, 32038 and 32057, the former two of which contained mixed assemblages of *Quercus* sp, and *Alnus glutinosa/Corylus avellana* or *Fraxinus excelsior* (ash), the latter solely *Quercus* sp. The other three samples with abundant charcoal were from pits, and, similarly, contained predominantly *Quercus* sp (32004), or mixed assemblages of *Quercus* sp, *Alnus glutinosa/Corylus avellana* and other diffuse porous wood (32050 and 32056). Like the features from Parcel 9, much of the material is likely to represent general floor debris or settlement waste, and, therefore, is of limited interpretive value.
- 4.11.11 **PARCEL 41:** the bulk samples from this site, from two ditch termini (41004 and 41010) and a pit (41014), contained almost no CPR, but did contain charcoal assemblages, all dominated by *Alnus glutinosa/Corylus avellana*, with or without *Quercus* sp. Material from terminus 41004 has been radiocarbon-dated to the Middle Bronze Age (Section 4.13), and the other assemblages also probably date to this time.
- 4.11.12 **PARCEL 42:** some 47 of the 161 samples from Parcel 42 contained rare to abundant CPR, and 19 samples contained abundant charcoal. Material from two hearths (42037 and 42163), associated with three roundhouses, has been radiocarbon-dated to the Early to Middle Bronze Age (Section 4.13). A posthole in each of roundhouses 42033 and 42034, and one stakehole in roundhouse 42168, contained, or potentially contain, frequent to abundant CPR. The postholes produced a range of material, including cereal chaff and weed seeds, with or without cereal grains. The stakehole produced a possible *Triticum spelta* (spelt wheat) glume base, which may suggest that this variety of wheat was being cultivated.
- 4.11.13 In addition to these postholes, samples from a ring-gully (42111; in structure 42033) contained rare cereal grains of *Triticum* sp and *Hordeum vulgare*, and frequent weed seeds, which may prove useful in identifying the types of soils under cultivation. A sample from

hearth **42536**, adjacent to the roundhouses, contained rare Fabaceae seeds and may be worthy of further analysis, following the assessment of the remainder of the sample. This feature, like the other two hearths (**42037** and **42163**) associated with the roundhouses, contained charcoal from wood probably selected specifically for fuel, or may be the remains of possible bonfires, and, accordingly, they are fairly mixed assemblages. Hearth **42037** contained possible *Prunus* sp (blackthorn-type), and ring-gully **42111** contained *Maloideae* (hawthorn-type), both possibly evidence for hedgerows. The charcoal from the other Bronze Age features either comprises the remains of structural material or general floor debris/settlement waste. Generally, the charcoal either consists of *Quercus* sp or a mixture of *Alnus glutinosa/Corylus avellana* and *Quercus* sp.

- 4.11.14 Samples from postholes forming part of the rectangular structures (**42282** and **42541**) at the northern end of Parcel 42, or which were associated with them (**42444** and **42431**), contained rare to common CPR, including cereal grains and chaff and weed seeds. Additionally, posthole **42288** and slot **42274**, which may represent a single feature which is part of structure **42282**, contained a variety of charred material, including culm nodes, awn fragments, *Avena* sp grains, Poaceae stems and abundant Poaceae seeds, and therefore possibly represents waste material generated from activities other than crop-processing or handling, such as fodder, bedding or thatch. Charred material from two further postholes (**42427** and **42502**), part of structure **42541**, has been radiocarbon-dated to the early medieval period (*Section 4.13*). The charcoal from this phase, like that from the Bronze Age, comprises *Quercus* sp, or a mixture of *Alnus glutinosa/Corylus avellana* and *Quercus* sp.
- 4.11.15 Two pits (**42260** and **42371**), also associated with the sub-rectangular structures, produced rare to frequent CPR and are possibly worthy of further analysis. The first contained small (<4mm) Fabaceae (pea family) and Poaceae seeds, and the second, frequent *Hordeum vulgare* grains, and Poaceae seeds.
- 4.11.16 **WATCHING BRIEF, HENGIFORM DITCH 200108**: three bulk samples, from two ditch fills (**200106** (samples 250000 and 250001) and **200107** (sample 250002)), taken during the excavations of this site, contained very few CPR. All three, however, contained frequent to common charcoal fragments. Sample 250000 contained one large Poaceae (grass) seed and a fragment of *Corylus* nut, and 250001 contained two cereal grains of possible *Triticum* sp. The charcoal from these and, additionally, sample 250002 was dominated by *Quercus* sp, with one or two fragments of short-lived taxa, such as *Alnus/Corylus*, *Maloideae*, and *Prunus* sp. A radiocarbon determination from a sample of *Prunus* sp charcoal, from primary fill **200107**, returned a ninth millennium cal BC date (*Section 4.13*).
- 4.11.17 **Potential**: some 25 of the samples from the excavations contained frequent to abundant, or potentially informative, CPR (*Appendix 2*), which can provide information on local agrarian practices in an area that is still relatively poorly understood (Hall and Huntley 2007). Forty-one of the samples contained abundant, identifiable charcoal and, additionally, three samples from the hengiform monument adjacent to Parcel 32, if taken as a group, have some potential for further analysis. Given the lack of charcoal studies in the North West in general, a targeted programme of analysis has the potential to be very informative. Additionally, the two WPR-rich fills from the Vallum ditch at Knockupworth

are worthy of further analyses and, with the pollen evidence (*Section 4.12.13*), should provide information on the environment within and surrounding the ditch while it was filling.

- 4.11.18 The sites along the CNDR contain palaeobotanical evidence securely dated to several distinct periods (Bronze Age, Roman and early medieval), so the opportunity exists to study long-term changes in social practice, economy, environment, available resources and agricultural practices. Although, in some cases, very little material has survived, the occasional presence of cereal chaff or very well-preserved cereal grains makes positive identification possible. Fourteen of the 25 CPR samples are from post/stakeholes, at a variety of locations, that are either part of, associated with, or in close proximity to obvious structures. It will be interesting to determine if the palaeobotanical remains, and the activities they represent, can be interpreted with regard to the use and spatial arrangement of the structures.
- 4.11.19 At Hadrian's Wall, Knockupworth, the low frequencies of charcoal from the Vallum ditch, mound and palaeochannel, and its uncertain taphonomy (that residual material may have been washed into features or dumped with deposits), means that charcoal analysis is unlikely to be informative; radiocarbon dating is not recommended for the same reason. Where it survives at the other sites, the charcoal should provide valuable information regarding the nature and availability of local resources, particularly during the Bronze Age and early medieval period. Much of the charcoal, being from short-lived taxa, is suitable for radiocarbon dating.
- 4.11.20 The presence of naked barley, emmer and spelt wheat in well-dated Bronze Age features at the CNDR is of some significance. The identification of what is possibly naked barley is particularly interesting, as this variety is generally under-represented in Britain, probably partly due to the fact that it is often not differentiated from the standard variety of barley. Naked barley has been recorded in Britain from the Neolithic period (Hillman 1981), and appears to have been a particularly important crop in Neolithic Scotland (McLaren 2000). Cereal remains from many sites in northern England suggest that emmer wheat and naked barley were the predominant crops during the Bronze Age (Huntley and Stallibrass 1995), but it is still unclear at what time the newer crops, such as spelt wheat and higher-yielding hulled barley, found at Bronze Age sites elsewhere in Britain, were introduced to the region (Greig 1991; Huntley and Stallibrass 1995). The Early to Middle Bronze Age date for the naked barley at the CNDR is, however, consistent with the evidence from elsewhere, which suggests that hulled barley generally superseded naked barley by the Late Bronze Age in Britain (Godwin 1956).

4.12 POLLEN

- 4.12.1 **Quantification:** 38 sub-samples from 17 monoliths were selected for pollen assessment. All but three monoliths were taken from archaeological features and deposits associated with Hadrian's Wall, the Vallum ditch and the north and south mounds of the Vallum, all at Knockupworth (*Section 3.6*). Sample 32046 was from ditch **32131**, in Parcel 32 (*Section 3.9*), whilst samples 250006 and 250007 were retrieved during a watching brief adjacent to Parcel 32 (*Section 3.15.3*), and were from a buried soil and sediments in a ditch (**200108**), sealed by the soil, that is believed to have formed part of a hengiform monument. Many of

the features and deposits from which the sub-samples have been assessed are believed to be from the Roman period or later, due to their association with Hadrian's Wall, although some are stratigraphically earlier than the Vallum mound deposits, and may date to earlier periods. The ditch at Parcel 32 is not presently closely dated, but is thought to be part of a land allotment system of early medieval origin. Radiocarbon assay has dated carbonised material, in the lowest deposit within the hengiform monument, to the ninth millennium BC (*Section 4.13*), although this carbon is probably residual and can only provide a *terminus post quem* for the feature.

- 4.12.2 **Methodology:** volumetric sub-samples were taken from the 32 samples and two tablets containing a known number of *Lycopodium* spores were added so that pollen concentrations could be calculated (Stockmarr 1971). The samples were prepared using a standard chemical procedure (method B of Berglund and Ralska-Jasiewiczowa 1986), using HCl, NaOH, sieving, HF, and Erdtman's acetolysis, to remove carbonates, humic acids, particles >170µm, silicates, and cellulose, respectively. The samples were then stained with safranin, dehydrated in tertiary butyl alcohol, and the residues mounted in 2000cs silicone oil. Slides were examined at a magnification of x400 by ten equally spaced traverses across at least two slides to reduce the possible effects of differential dispersal on the slides (Brooks and Thomas 1967) or 100 total land pollen and spores. Pollen identification was made following the keys of Moore *et al* (1991), Faegri and Iversen (1989), and a small modern reference collection. Andersen (1979) was followed for the identification of cereal grains; plant nomenclature follows Stace (1997). The preservation of the pollen was noted and an assessment was made of the potential for further analysis. Charcoal particles greater than 5µm were recorded also (Peglar 1993). Fungal spore identification and interpretation followed van Geel (1978) and Blackford *et al* (2010).
- 4.12.3 **Assessment:** 19 of the sub-samples proved productive for pollen. A summary of the sub-samples taken, context, depth, lithology, palaeoenvironmental interpretation and potential of the sub-sample for full analysis is presented in *Appendix 3*.
- 4.12.4 **NORTH MOUND OF THE VALLUM, KNOCKUPWORTH:** nine sub-samples, assessed from three monoliths (samples 50000, 50009 and 50013) from the area of the north mound of the Vallum, proved largely productive for pollen, having been taken to sample features and buried soils that may pre-date the monument. A further sub-sample from monolith 50004, placed through the earliest buried soil (**50063**), was barren of palynomorphs. Where pollen survives, assemblages are dominated by hazel (*Corylus*) and alder (*Alnus*) mixed woodland. There is some evidence to suggest open, grassy, possibly cultivated, areas within the upper part of the sequence in samples 50000 and 50009 (from possible buried soils **50072** and **50058**), and from deposits forming the mound (or derived from it) and ditch deposits in sample 50013. Pollen from sample 50009 (till deposit **50001** and fill **50061**, of pit **50060**, sealed by the north mound) may indicate older pollen assemblages.
- 4.12.5 **SOUTH MOUND OF THE VALLUM, KNOCKUPWORTH:** six sub-samples were assessed from three monoliths (samples 51040, 51043 and 51050) from the area of the south mound of the Vallum. Apart for one productive sub-sample (from sediment **51060** in palaeochannel **51057**), the pollen sub-samples yielded insufficient data to support full analysis. The exception, sealed by the mound, yielded mixed woodland pollen (predominantly alder and

hazel) with grasses and herbs.

- 4.12.6 **VALLUM DITCH, KNOCKUPWORTH:** ten sub-samples were assessed from five monoliths (samples 51014, 51015, 51019, 51021 and 51023) through the Vallum ditch fills; monolith 51023 approximately continued down from 51014 and, similarly, 51021 from 51015. Of the ten sub-samples, six proved productive for pollen. The assemblages are dominated by woodland pollen, especially alder and hazel, but other tree types are also recorded. Grasses and herbs are also present in small numbers. In 51023, a productive sub-sample from a mixed dumped deposit (**51026**), an assemblage dominated by sedges was revealed, possibly suggesting a wet local environment, and this was succeeded by assemblages where counts of tree pollen types appear to increase (eg 51014; fill **51020**). This distinction is not so clear in the other samples, where pollen assemblages appear generally similar to each other.
- 4.12.7 **TURF WALL, KNOCKUPWORTH:** the sub-sample from monolith 50025, layer **50082**, yielded small numbers of pollen, including pollen of grasses, dandelions and plantains, as well as rare tree pollen.
- 4.12.8 **BENEATH THE STONE WALL, KNOCKUPWORTH:** none of the three sub-samples, assessed from monolith 50019, proved productive for pollen.
- 4.12.9 **DITCH 32131, PARCEL 32:** all four sub-samples of monolith 32046 proved productive for pollen, and indicate assemblages dominated by herbs, including grasses (*Plantago lanceolata*), cereal-type pollen and mint (*Mentha*-type), suggesting meadow/pasture land or possible land under cultivation. Mixed woodland pollen was also present.
- 4.12.10 **HENGIFORM DITCH 200108, WATCHING BRIEF:** one sub-sample of two from a monolith (25007) through a subsoil sealing the ditch proved productive for pollen. The rich assemblage from 25007 indicates open grassy landscapes with herbs, among which are weeds of waste ground (Chenopodiaceae) and possible indicators of cultivation (cereal-type and *Brassica*-type pollen). Regional alder/hazel/birch woodland is suggested. The date of the subsoil is not known, however, and it may be much later than the monument. Samples from the ditch did not contain pollen in high concentrations, but that which was present derived from grass and herbs.
- 4.12.11 **Potential:** **NORTH MOUND OF THE VALLUM, KNOCKUPWORTH:** pollen has been recovered in sufficient quantity, from a sequence of buried soil deposits and features under the north mound of the Vallum, to support a full analysis. If these deposits can be accurately dated, this could provide important information concerning the environment prior to the construction of Hadrian's Wall.
- 4.12.12 **SOUTH MOUND OF THE VALLUM, KNOCKUPWORTH:** only the sample from the fill of a possible palaeochannel, sediment **51060**, is productive and would support full analysis, to determine the nature of the landscape prior to the construction of the mound. However, this deposit is not directly associated with anthropogenic activity, and is not, presently, closely dated, so the merit of analysis is questionable.
- 4.12.13 **VALLUM DITCH, KNOCKUPWORTH:** the samples from the Vallum ditch have provided mixed results,

and the taphonomy of the pollen grains, where recovered, needs to be carefully considered before proceeding with analysis. Sub-samples **51043** and **51048**, respectively from the base of the original cut (**51050**) and the recut (**51051**) of the Vallum ditch, are not productive for pollen and, in any case, they contain dumped, and hence mixed, deposits; as such, analysis is not recommended. Neither is a depauperate sub-sample, from basal fill **51044**, recommended for further work. The sub-samples through dumped-deposit **51026** (possibly, the slighted Turf Wall; *Section 3.6.13*) may be suitable for targeted analysis, although, as this deposit may be mixed (*Section 3.6*), this should only be considered as part of a phased programme (*Section 7.16*). Sub-samples containing pollen suitable for analysis were obtained from deposits **51020**, **51039** and **51041**, all fills in the later part of a complex sequence of deposits filling the recut (**51051**) of the Vallum ditch. Further analysis is provisionally recommended if the dating and detailed characterisation of these sediments suggest that this is justified (*Section 7.16*).

- 4.12.14 **TURF WALL, KNOCKUPWORTH:** the pollen from samples taken through the Turf Wall is not sufficient to merit further analysis.
- 4.12.15 **BENEATH THE STONE WALL, KNOCKUPWORTH:** no samples were productive for pollen from beneath the Stone Wall.
- 4.12.16 **DITCH 32131, PARCEL 32:** the material from this ditch is suitable for full analysis and, if the deposits are dated, they could provide important information concerning the contemporary environment. Presently, it is assumed that the ditch dates to the early medieval/medieval period, based on dating evidence from another nearby ditch in the same system of land allotment.
- 4.12.17 **HENGIFORM DITCH 200108, WATCHING BRIEF:** the material from sample **25007** is suitable for full analysis and would provided detailed information about local land use and the regional environment at the time during which the subsoil accumulated. As the subsoil provides a *terminus ante quem* for the hengiform ditch sediments, and because it is sealed below the bank of a hedged boundary, radiocarbon dating of this sequence should be considered, and the pollen analysed if deemed significant. Given the importance of the hengiform monument, and that there is potential to retrieve more pollen from this possibly Neolithic feature, further sub-samples should be retrieved and analysed if promising.

4.13 **RADIOCARBON DATING**

- 4.13.1 **Quantification:** in the course of the post-excavation assessment, several of the samples of organic remains retrieved during the fieldwork investigations were submitted to the Scottish Universities Environmental Research Centre (SUERC) laboratories for radiocarbon assay. This did not intend to provide a comprehensive chronology for the CNDR sites, but rather to enable the definition of a rudimentary chronological framework to help assess the significance of the archaeological remains and help determine their potential for further research, including the refinement of this chronology through a more comprehensive radiocarbon dating programme. To this end, ten samples in total, from six sites (Table 17), were subject to initial radiocarbon assay.
- 4.13.2 **Methodology:** the calibrated results were produced using the Reimer *et al* (2004) curve and

the computer programme Oxcal (v4.1; build 44; Bronk Ramsey 1995; 1998; 2001; 2009a; 2009b). Ranges have been obtained using the maximum intercept method (Stuiver and Reimer 1986) and are quoted in accordance with Stuiver and Polach (1977), but adapted for the increased precision available in later datasets (A Millard *pers comm*), rounded out by ten years when the error term is greater or equal to 25 years, and by five years when the error term is less than 25 years. When more than one result was produced on material from a single interpretative phase of a site, the statistical consistency of results can be used to determine whether it is possible that they are of the same actual age (Ward and Wilson 1978).

4.13.3 **Assessment:** the results of the initial programme of radiocarbon assay are presented in Table 17. The samples have been variously dated to the early Mesolithic, Bronze Age and early medieval periods. Significantly, they have highlighted the existence of a settled Bronze Age landscape and dated an early medieval settlement, of great regional importance, that, otherwise, would not have been confirmed as belonging to this period.

Parcel	Context	Group or Feature	Feature Interpretation	Material	SUERC Code	Radiocarbon Age BP	Cal BC/AD (95.4% Confidence)	$\delta^{13}\text{C}$ ‰
9	9004	9059	Roundhouse posthole	Maloideae	32723	3205 ± 35	1530 – 1420 BC	-25.0
9	9040	9039	Roundhouse posthole	Alder/hazel	32724	3485 ± 35	1910 – 1690 BC	-25.9
21 North	21158	21099	Pit	Naked barley grain	32828	3455 ± 30	1880 – 1690 BC	-24.9
32	32003	32004	Pit	Alder/hazel	32706	2855 ± 35	1230 – 910 BC	-27.7
32 Watching brief	200107	200108	Henge ditch	<i>Prunus</i> sp	33917	9320 ± 40	8720 – 8450 BC	-27.3
41	41005	41003	Ditch	Alder/hazel	32727	3180 ± 35	1520 – 1400 BC	-26.1
42	42038	42033	Roundhouse hearth	<i>Prunus</i> sp	32728	3210 ± 35	1600 – 1410 BC	-25.2
42	42164	42168	Roundhouse hearth	Alder/hazel	32732	3125 ± 35	1500 – 1310 BC	-26.0
42	42428	42541	Longhouse posthole	Diffuse porous wood	32733	1190 ± 35	AD 710 – 950	-27.9
42	42501	42541	Longhouse posthole	Diffuse porous wood	32734	1240 ± 35	AD 670 – 890	-27.0

NB – $\delta^{13}\text{C}$ ‰ relative to Vienna Pee Dee Belemnite

Table 17: Results of initial programme of radiocarbon assay

4.13.4 The results from the two roundhouses at Parcel 9 are not statistically consistent ($T'=32.0$;

T'5%=3.8; v=1), which suggests it is likely that the roundhouses are not contemporary. At Parcel 42, the determinations from the two roundhouses were statistically consistent (T'=2.9; T'5%=3.8; v=1), so may be of the same actual age, and the same is true of the two results from the longhouse (T'=1; T'5%=3.8;v=1).

4.13.5 **Potential:** there is evidently good potential for the use of chronometric data to enhance the interpretation of the CNDR sites, and this has allowed elements of them to be dated more closely than would otherwise have been the case. The lack of other forms of material dating evidence means that radiocarbon assay is the primary method for establishing robust chronologies. It is recommended that further radiocarbon determinations are obtained at analysis, as appropriate, from suitable samples containing single entity, short-lived materials in good association with their parent deposits.

4.14 SOIL MICROMORPHOLOGY

4.14.1 **Quantification:** the samples chosen for assessment, since they were considered as having good potential for soil micromorphology after consideration of the project's research aims and objectives (*Section 6*), came from deposits associated with Hadrian's Wall, at Knockupworth (*Section 3.6*; samples 50004, 50025, 51014, 51015, 51019, 51021 and 51023). However, subject to further characterisation and dating, a sample (200106) taken through a possible Neolithic hengiform ditch, investigated during a watching brief adjacent to Parcel 32 (*Section 3.15.3*), may also be suitable for analysis.

4.14.2 **Assessment:** the samples were briefly characterised, with the thickness of contexts measured. Potential locations of sub-samples for soil micromorphology and bulk analyses were also noted (Goldberg and Macphail 2006). This identified which samples are suitable for further analysis, in terms of the methods to be used and the scale and the scope of the work.

4.14.3 **Potential:** monolith 50004 could provide some information on soils associated with the construction of the Vallum, and would have value because 'lowland' Roman soils outside Carlisle have not been previously studied (Usai 2001), whilst monolith 50025 could provide information regarding the construction of the Turf Wall. Monoliths 51014, 51015, 51019, 51021 and 51023 will help to determine the nature of the sequence of backfilling of the Vallum ditch. Elements of these monoliths could also provide an indication of pollen/WPR taphonomy, thus whether and where it will be worth undertaking further analysis of the botanical materials (*Sections 4.11.9, 4.12.13 and 7.16*). Monolith 200106, if shown to sample deposits contemporary with the use of the hengiform ditch, could help to determine the nature of the activities undertaken in and around the monument.

4.15 CONSERVATION

4.15.1 Most of the assemblage is well preserved and in good condition. Consequently, no further conservation is required.

4.16 STORAGE

4.16.1 Once the post-excavation analysis is complete, the whole project archive, which will include records, plans, both black and white and colour photographs, artefacts, ecofacts

and sieved residues, will be prepared following the guidelines set out in *Environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1984, Conservation Guidelines 3) and *Guidelines for the preparation of excavation archive for long-term storage* (Walker 1990).

4.17 **PACKAGING**

- 4.17.1 The finds assemblage is currently well packed, and will require no specialist packaging. Box lists are prepared and will be updated from the database when the identification and analysis of objects is complete.

5 STATEMENT OF POTENTIAL

5.1 INTRODUCTION

- 5.1.1 Assessment of the individual sites along the length of the CNDR has made it clear that many of them will not only sustain further analysis to the benefit of the local archaeological record, but that seven of them will individually add to the body of knowledge at a regional level: Parcels 9 (*Section 3.3*); 21 North (*Section 3.5*); 32 (*Section 3.9*); 41 North (*Section 3.11*); 42 (*Section 3.12*); and watching briefs at Parcels 32 and 27 (*Section 3.15*). Furthermore, the results of the excavations within the Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site at Knockupworth (*Section 3.6*) are of international significance.
- 5.1.2 A redeeming feature of large-scale linear investigations such as this is their potential to produce a relatively non-judgemental transect through the local landscape, its parameters defined by criteria other than prospecting for sites of enhanced archaeological potential. This probably produces a more representative landscape sample on which to draw conclusions regarding a wide number of questions, from the survival and visibility of ancient activity within the modern landscape, to a realistic assessment of the nature and density of settlement at any specific period in the past. Thus, while of lesser archaeological value if considered alone, the cumulative value of the minor sites investigated during the project can contribute significantly to one or more of the research themes detailed below, much enhancing their value, contributing especially to an understanding of the history of the development of the landscape. Indeed, negative results can also be valuable and informative.
- 5.1.3 It has also become obvious that if these sites are considered together, and within their local and regional context, an improved level of understanding of the development and evolution of the landscape to the north-west of Carlisle is possible. This work can be compared with and builds upon the results of work undertaken at other sites in the Carlisle area, which are recorded in the Cumbria HER, and many of which are mentioned in the *Regional Resource Assessment* (Brennand 2006).
- 5.1.4 Prior to the commencement of fieldwork, a chronological review of the likely research potential the CNDR study area was undertaken (OA North 2008), in order to establish research objectives for the project. Following the completion of the assessment programme, in accordance with MAP2 (EH 1991, 2-3) and MoRPHE (EH 2006), this has been reconsidered, and the principal areas of potential for further research are identified and summarised below. *Section 6* lists the updated research aims and objectives formulated to address this potential. These aims and objectives have been produced with reference to the regional (Brennand 2007), Hadrian's Wall (Symonds and Mason 2009a) and national (EH 2003; 2005) research agendas.

5.2 POTENTIAL OF THE MATERIAL ASSEMBLAGE

- 5.2.1 With the exception of Parcel 27 (dealt with separately; OA North 2011), few of the sites

investigated produced artefacts in significant quantities. Whilst this is not entirely surprising, as much of the study area was relatively rural in nature, it is perhaps of interest that excavations on the line of Hadrian's Wall at Knockupworth produced so little evidence of the material culture associated with this monument.

Parcels with Finds										
	5	9	20	21N	32	42	46	47	WB	Hadrian's Wall, Knockupworth
Flint/chert				+	+	+		+		+
Prehistoric pottery				+	+	+				
Romano-British pottery					+				+	+
Medieval pottery					+					
Post-medieval and modern pottery	+	+	+	+		+	+	+		
Clay tobacco pipe	+			+		+	+	+		
Post-medieval glass			+	+						
Ironwork		+		+						
Copper alloy				+						

Table 18: Distribution of finds, showing only land parcels which produced artefacts or ecofacts

5.2.2 The finds demonstrate a wide date range, from at least the Bronze Age to the present day, with a marked focus of interest in the prehistoric period, although the few Roman and medieval finds also add detail to our understanding of the development of the present landscape. It is quite clear, at even a fairly gross level (Table 18), that finds were concentrated within Parcels 21 and 32, and it is perhaps of interest that, whilst Parcel 21 produced artefacts of prehistoric, Roman and post-medieval date, Parcel 32 produced nothing that could be dated later than the medieval period, perhaps not later than the twelfth-fourteenth century. The principal interest in the overall assemblage lies with the small group of prehistoric pottery, deriving, in the main, from Parcels 32 and 42. Whilst generically similar, in terms of fabric and temper, to Iron Age pottery over large parts of the north of England (*Section 4.4; B Vyner pers comm*), it appears to derive from contexts dated to the Bronze Age by radiocarbon assay (*Section 4.13*). It is of considerable importance to note that the pottery derived from settlement-related features rather than a funerary context, as these are rare in the North West (Hodgson and Brennand 2006), although a potential roundhouse, with pottery of Bronze Age type, has been investigated to the east of Carlisle, at Botcherby (Barkle 1998). Whilst the pottery from Parcels 21, 32, and 42 is not, *per se*, particularly typologically diagnostic, it will add to the scant understanding of the material remains of Bronze Age settlement in the region. At least one

sherd has burnt internal deposits suitable for radiocarbon dating, which will enhance that knowledge yet further. It is also of interest to note that, whilst again undiagnostic and of little potential for further study, the lithic artefacts are concentrated in the same three sites.

- 5.2.3 Surprisingly, considering the proximity of Carlisle (*Luguvalium*), a major Roman settlement founded in the early AD 70s (Zant 2009, 7), and the fact that the line of Hadrian's Wall was investigated by excavation at Knockupworth, the amount of Romano-British pottery recovered by the project is surprisingly small, not representing more than a few vessels, from Parcels 27, 32 and Knockupworth. Whilst Carlisle can be shown to have influenced much of its local hinterland, with a ribbon settlement following the line of the major road entering the settlement from the south, it raises the possibility that, to the north, the Wall acted as a suppressant on *ad hoc* civil settlement, being likely to have been, at times, a heavily militarised zone. A locally made mortarium fragment, from a ditch adjacent to Parcel 32, and a small sherd of decorated samian ware from the Vallum ditch, point to access to the military supply system, which is to be expected, and reflects the fact that the area was likely to have been under close military scrutiny during the second century AD.
- 5.2.4 There is very little evidence of medieval activity in the vicinity. A small amount of medieval pottery came from the fill of ditch **32014** at Parcel 32, but as there was also a small fragment of Roman pottery from the earliest fill, it might seem that the medieval deposition reflects later activity in the area, and possible reuse of the feature. Although only present in very small amounts, the pottery fabrics reflect those seen more widely in Carlisle (see, for instance McCarthy and Brooks 1988), and perhaps indicate small-scale activity in the mid-twelfth- to mid-fourteenth century.
- 5.2.5 Post-medieval and modern finds have a far wider distribution, as might be expected, appearing in Parcels 5, 9, 20, 21, 42, 46, and 47. It is highly unlikely that any of the pottery or clay tobacco pipe fragments pre-date the mid-eighteenth century, which might have some link with changing agricultural practices at that time (Berg 1994), with an increased emphasis on midden and nightsoil spreading to improve farmland. The earliest tablewares are from Parcel 46, probably dating to the early-mid-eighteenth century, and could reflect contemporary activity at nearby Kingsmoor House (*Section 3.13*). Much of the remainder of the late assemblage probably reached its place of deposition through the piecemeal disposal of domestic waste, being either burnt or heavily frost-spalled. Deposition appears to have continued at a low level into the twentieth century, and without a doubt reflects trends and changes in local usage.
- 5.2.6 The range of finds is very limited, and will not, for the most part, warrant or sustain further analysis. The exception to this is the prehistoric pottery, which has the potential to be dated with relative precision, and should be subject to fabric analysis including thin-sectioning. It is anticipated that this can contribute significantly to the understanding of the nature and use of Bronze Age and/or Iron Age pottery in the region, which is at present poorly understood. To this end, although largely undiagnostic, the lithic material from sites producing prehistoric pottery should be briefly reviewed. Other finds from this part of the project require no further analysis, but the information gained from them during assessment will aid in the dating and interpretation of individual sites and the development

of the local landscape from the Roman period to the present day.

5.3 POTENTIAL OF THE ENVIRONMENTAL ASSEMBLAGE

5.3.1 A comprehensive sampling programme for environmental remains, from a range of feature types, was undertaken along the length of CNDR. Samples were assessed for charcoal, charred plant remains (CPR), waterlogged plant remains (WPR), faunal remains, including invertebrates, pollen, other palynomorphs and soil micromorphology. Sampling was either by bulk or monolith sample, the latter being, principally, for pollen, other palynomorphs and soil micromorphology. With the exception of Stainton West, which is reported on separately (OA North 2011), environmental remains were not usually abundant. The results are summarised in Table 19 (see also *Appendices 2 and 3*) and discussed in more detail within *Sections 4.11 and 4.12*.

Parcel	Samples suitable for CPR analysis	Samples suitable for charcoal analysis	Samples suitable for WPR analysis	Sub-samples suitable for pollen analysis	Samples assessed as suitable for soil micromorphology
5	0	0	0	0	0
9	3	9	0	0	0
21 North	4	4	0	0	0
32	3	6	0	4	0
41 North	0	3	0	0	0
42	15	19	0	0	0
Hadrian's Wall Knockupworth	0	0	2	16	1
Watching Brief	1	2	0	1	0
TOTAL	25	41	2	21	1

CPR=charred plant remains, WPR= waterlogged plant remains.

Table 19: Number of environmental samples from each parcel suitable for further analysis

5.3.2 The CNDR assessment has demonstrated that sites from the Bronze Age, Roman and early medieval periods have some potential for the analysis of palaeoenvironmental remains, the latter period being perhaps the best represented in terms of the range of various different types of plant remains available. Hall and Huntley (2007) suggest, in their review of the archaeobotanical record in Northern England, that the record of plant macrofossils needs to be extended for these periods, and *The Regional Research Agenda* (Hodgson and Brennand 2007, 36; Philpott and Brennand 2007, 59-60; Newman and Brennand 2007, 84) has specifically highlighted the importance of environmental remains from sites of these dates. As such, any potential for the analysis of suitable palaeobotanical samples from the CNDR sites is regionally important, making further environmental analysis a very high priority, in the case of the CPR, notwithstanding the relatively low concentrations of the material.

5.3.3 Of the 329 bulk samples taken, CPR in sufficient quantities to warrant further analysis was recorded in 26 of these samples, charcoal in 43 and WPR in two samples. The paucity of CPR from the sites along the CNDR is not unexpected for the north-west of England,

where the archaeobotanical record of CPR for all periods is at best patchy and in some cases absent. Of the 38 sub-samples taken from monoliths on the CNDR, 21 sub-samples have some potential for further pollen analysis (Table 19). Sixteen of these, from Hadrian's Wall at Knockupworth (*Section 3.6*), came from eight separate monoliths. Of the remainder, four pollen sub-samples were from a single monolith, through the sediments in a boundary ditch at Parcel 32 (*Section 3.9*), and one was from a buried soil sealing the ditch of what may be a Neolithic hengiform monument, found during a watching brief adjacent to Parcel 32 (*Section 3.15.3*). The large number of monolith samples retrieved from Knockupworth reflects the depth of the Vallum ditch, in relation to the shallow features at the other CNDR sites, and the presence of deposits preserved by the Vallum mounds, when no similar positive features survived elsewhere on the road scheme, with, notably, the exception of a hedge-bank sealing the hengiform ditch and buried soil.

- 5.3.4 Charcoal and pollen have been identified in the fills of the hengiform ditch, and a fragment of *Prunus* sp charcoal from the basal fill has been dated to the Mesolithic period (*Section 4.13*), although this is probably residual and, thus, does not date the monument. The further analysis of both the charcoal and the pollen from a likely prehistoric monument will be of considerable importance. Regionally, during the prehistoric period, cereal grains have been recorded in only two Neolithic contexts, on the Crosby Bypass and Holbeck Park; one Early Bronze Age context, on the Crosby Bypass; and four Iron Age contexts, all in Merseyside or Cheshire (Hall and Huntley 2007, 30-51). This makes the very abundant charred naked barley grains in the fills of an isolated pit (**21099**; Parcel 21 North; *Section 3.5*), which have been radiocarbon-dated to the Early to Middle Bronze Age (*Section 4.13*), extremely significant. Rare assemblages of charcoal and CPR, albeit in lower concentrations, were also recovered from Bronze Age settlement features, at Parcels 9 and 42 (*Sections 3.3* and *3.12*); these too are of great interest, and will be examined for any evidence of spatial differentiation of activities, which has proved productive elsewhere (S Stallibrass *pers comm*).
- 5.3.5 Monolith samples, retrieved from a ditch which pre-dates both Hadrian's Wall and the north mound of the Vallum, and from a pit and buried soils sealed below the north and south mounds of the Vallum, may sample deposits of prehistoric date. Where Hadrian's Wall has previously been investigated, pollen studies from the fills of archaeological features sealed beneath the Turf Wall or the Vallum mounds have proved informative (Huntley 1999, 53-4), despite the inherent difficulties of interpretation, such as earthworm activity and water movement within buried soils. However, many of the earlier pollen studies do not record the levels of indeterminate pollen grains in the samples (*op cit*, 4), which can give an indication as to the reliability of the data and their interpretative value. Therefore, the potential for modern pollen studies from the buried soil and ditch at Knockupworth are important for our understanding of the local environment before or during the construction of Hadrian's Wall (Huntley 1999, 54-5; 2009, 55). The micromorphology of the buried soils was also perceived to be of interest, as 'lowland' Roman/pre-Roman soils outside of Carlisle have not been studied previously (*Section 4.14*; Usai 2001; Philpott and Brennand 2007, 59-60).
- 5.3.6 It is not certain that the monolith samples within the Vallum ditch will provide good pollen evidence for the landscape surrounding the Wall when it was in use. Although the pollen

concentrations in some of these sediments will allow further analysis of, at least, a portion of the sequence, and are supported by some supplementary information provided by the two WPR samples (*Section 4.11.9*), the only deposits with high potential are either from a dump of organic material within the original Vallum ditch or from the secondary silts of a later recut of it. The pollen in the dumped deposit is of uncertain provenance and, possibly, of limited value, whereas that in the recut of the Vallum ditch may relate to a time after the Wall's abandonment. A programme of scientific dating will be required to determine the archaeological potential of these pollen-rich deposits, as any information concerning the environment at the end of the Roman period or post-dating the use of the Wall will still be of great significance (Symonds and Mason 2009b, 18-19, 55). It is also proposed that the soil micromorphology of the dumped organic deposit should be examined as a priority during the analysis. This will help to validate the field interpretation, that the deposit actually constitutes the Turf Wall slighted into the Vallum ditch, perhaps even removed and deposited as a single block of material, and determine whether pollen analysis is, in fact, merited.

- 5.3.7 Pollen from a field boundary ditch at Parcel 32 has good potential for further analysis and may possibly complement the results obtained from the Vallum ditch. This ditch was part of a system of land allotment of probable early medieval date (*Section 3.9.6*), a period when the archaeobotanical record in north-west England is extremely sparse (Hall and Huntley 2007, 109). The *Regional Research Agenda* states that the analysis of all environmental remains from this time is a matter of high priority (Newman and Brennan 2007, 83), so this sample should clearly undergo further analysis. Likewise, the charcoal and CPR assemblages sampled from the hearths and postholes of an early medieval settlement at Parcel 42 (*Section 3.12.5*) provide important information on the environment and economy, particularly as, regionally, palaeobotanical material has very seldom been recovered from sites of this date (Hall and Huntley 2007).

5.4 EARLY AND LATER PREHISTORY

- 5.4.1 With the notable exception of the important discoveries at Stainton West (Parcel 27; OA North 2011), the evidence for activity within the footprint of the CNDR corridor during the Palaeolithic, Mesolithic and Neolithic periods is completely absent for the former period and very scant for the latter two periods, hinted at by only a few worked, and poorly diagnostic, flints (*Section 4.3*). Although humans were present, it is probable that their activity was concentrated at certain attractive or significant locales, and it may be of particular interest that these seem to be in or adjacent to the broad floodplain on the northern bank of the River Eden.
- 5.4.2 During works associated with the grubbing out of a hedge, just outside of the road corridor, adjacent and west of Parcel 32, a substantial ditch was detected (*Section 3.15.3-4*). It corresponds to the projected circuit of a large (100m in diameter) penannular cropmark (SMR 41815). Despite a ninth millennium cal BC radiocarbon date from *Prunus* sp charcoal found within the basal fill of the ditch (*Section 4.13*), which probably dates residual carbon, this is most likely to be a Neolithic hengiform monument. This cropmark is part of a complex of similar cropmarks, north of the Eden, sited on raised ground and surrounded on all sides by wetter low-lying areas (EH 2010). Many of the other cropmarks are also likely to be hengiform monuments or round barrows. The monuments were

probably the focus for a wide range of activities, including those taking place in the peripheral wetlands, and the Stainton West site (OA North 2011) should perhaps be seen in this context. The monumental complex is evidently of regional, indeed national, importance, and determining how it may have been articulated in practice with other parts of the landscape will be a major concern for future research. Similar monumental landscapes are known in Cumbria, the most notable being the henges of Mayburgh, King Arthur's Round Table and Little Round Table, at Eamont Bridge (Hodgson and Brennand 2006, 39); other possible hengiform enclosures are known from aerial photographs at Gutterby and Summerhill on the Cumbrian coast (*op cit*, 42).

- 5.4.3 At the CNDR, the monuments may have continued to be a focus for Early to Middle Bronze Age settlement, evidence for which was detected at numerous locations within the road corridor, and is surely indicative of a relatively densely settled landscape by this time. Roundhouses, securely dated by radiocarbon assay, have been found at Parcels 9 (*Section 3.3*) and 42 (*Section 3.12*), and another possible structure may have existed at Parcel 21 North (*Section 3.5*). A pit containing charred cereal grain, radiocarbon-dated to the Middle Bronze Age, occurred at Parcel 21 North; a segmented ditch, at Parcel 41 North (*Section 3.11*), and a pit, at Parcel 32 (*Section 3.9*), were respectively dated by radiocarbon assay to the Middle and Middle to Late Bronze Age (*Section 4.13*).
- 5.4.4 The cereal grains in the pit, and other grains associated with the roundhouses, suggest that arable farming was practised, and it follows that good farming land may have thus been favoured for settlement. Both of the sites at which there was definitive evidence for roundhouses were perched above the floodplain, at 30-40m OD, on land that is, in more general terms, low lying and suitable for growing crops.
- 5.4.5 Finds were conspicuously rare at the above sites, which may reflect the acidic nature of the soils, but may also suggest a largely aceramic culture at this time. The lack of metal artefacts is not particularly surprising though, as this valuable resource would most likely have been recycled.
- 5.4.6 Probable Bronze Age settlement sites have previously been identified in Carlisle and its vicinity, and, in many cases, these coincide with earlier Neolithic remains. The settlements were, largely, unenclosed and, like the site in Parcel 42 on the CNDR, often favoured low hilltop settings. Sites include: Scotby Road, Durranhill (McCarthy *et al* 1997b), and Low Crosby (McCarthy 2002, 37) in the east; Botcherby (Barkle 1998) and Cumberland Infirmary (McCarthy *et al* 1998) in the west; Cocklakes, to the south-east of the city (Johnson *et al* in prep); and Carlisle Airport to the north-east (McCarthy 2002, 39). Within the city, quantities of worked flints and, although undated, ard- and plough marks below the Roman levels may suggest prehistoric agriculture (McCarthy 1993, 1-2); flat cemeteries (at Garlands Hospital; Hodgson 1956, 6-12; and Aglionby; Longworth 1992; and burnt mounds (at Garlands Hospital (LUAU 1996b; Neighbour and Johnson 2005)) have also been found. A single sherd of Bronze Age pottery was also recovered in CAU evaluation trenches north of Knockupworth Cottage (McCarthy *et al* 1997a).
- 5.4.7 The Bronze Age archaeology of the CNDR is important in increasing knowledge of the patterns of Bronze Age habitation to the west of Carlisle, and makes an extremely valuable contribution to the regional corpus. This is particularly important, as evidence for Bronze

Age farmers in lowland areas is not as well represented in the archaeological literature as the extensively documented, and more readily visible, upland clearance landscapes (Quartermaine and Leech in press; Hodgson and Brennand 2006, 34-5). That more than one settlement site has been identified in the course of the project only serves to enhance their research potential, and these sites will merit detailed stratigraphical and palaeoenvironmental study in conjunction with the other remains dating to this period from Stainton West (OA North 2011).

- 5.4.8 Given that settlement seems to have been widespread during the Bronze Age, it is significant that there should be no direct evidence from the road scheme for the occupation of the same landscape during the pre-Roman Iron Age or by native peoples during the Roman period. This is, however, not unusual for the region (Haselgrove *et al* 2001, 25; Wells 2003). Unless settlements lie, as yet undiscovered, outside of the road corridor, it is possible that other, entirely different places in the landscape were sought out in the Iron Age than had been occupied earlier. A possible candidate is Grinsdale Camp, a large earthwork and cropmark enclosure (SMR 399; EH 2010; McCarthy 2002, 46-7; Fig 1) located approximately 500m to the north-west of Parcel 42, which, if Iron Age in date, may suggest some nucleation of settlement on hilltop sites.
- 5.4.9 One further hint that the systems of land allotment established in the Bronze Age were still in use, or at least visible, in the Iron Age and later is provided by the relationship of a ditch (**50081/21096**) and the turf phase of Hadrian's Wall. Installation of a stone lining within a segment of this ditch (**50081**) at Knockupworth (*Section 3.6*), where it ran through/below the turf-phase of Hadrian's Wall, demonstrates that this feature was open and functioning, to some extent, at the time at which the Turf Wall was constructed. However, elsewhere (Parcel 21 North; *Section 3.5*), within another segment of a continuation of the same ditch (**21096**), Bronze Age-style pottery (*Section 4.4*) was recovered, which, if not residual, suggests that the ditch had already been established and was silting during this earlier period.

5.5 ROMAN PERIOD

- 5.5.1 As the CNDR crosses Hadrian's Wall at Knockupworth, necessitating the archaeological excavation of a section of the Wall, any consideration of the Roman period will inevitably be dominated by a concern with situating this excavation within its greater *Wall* context (Breeze 2006; Symonds and Mason 2009a), and, also, by the nearby presence of the Roman fort and town at Carlisle (Zant 2009). However, other than the Wall, very little Romano-British archaeology was discovered during the excavations along the CNDR road scheme. Away from Knockupworth, the only man-made feature of probable Roman date was a ditch found during a watching brief adjacent to Parcel 32 (*Section 3.15.5*), and pottery sherds, often residual, were the only other evidence of any kind for activity at this time (from the Hadrian's Wall excavations (*Section 3.6*); Parcel 32 (*Section 3.9*) and the adjacent watching brief; and from a palaeochannel investigated during a watching brief at Parcel 27 South (*Section 3.15.6*)). As such, although the general lack of settlement or enclosure evidence obliquely informs on the organisation of the surrounding landscape, and the ceramic evidence is of some specialist interest, the principal contribution the CNDR can make to furthering the understanding of the Roman period is to research on Hadrian's Wall.

- 5.5.2 The excavations at Knockupworth, encompassing a full transect of the frontier works, have yielded significant new information concerning the construction of the stone-phase of the Wall (Bidwell and Hill 2009) there, and its relationship to the turf-phase of the Wall (Wilmott 2009b), and how both phases relate to the nearby River Eden. Although no evidence of any service track (Birley 1961, 123) or the Military Way (Breeze 2006, 89) was discovered, the recent investigations have also helped to characterise the form, position and constitution of the Vallum mounds, and to determine the nature of the Vallum ditch. The characterisation of the latter is, potentially, of particular interest.
- 5.5.3 The Vallum ditch has been sampled at several places along the Wall, including four recent excavations (Wilmott 2009a, 52), and, depending upon whether its marginal mound is interpreted as being primary, it may have been, for the most part, only maintained as a barrier for a short time (*op cit*, 52-3). At many places it was backfilled and bridged by secondary causeways (Wilmott 2008, 124-5), probably when the Wall was largely abandoned during the AD 140s in preference of the Antonine Wall (Breeze 2006, 87), but, arguably (*cf* Simpson and Shaw 1922, 414-16; Breeze and Dobson 2000, 131), nowhere is there any unequivocal evidence for recutting (Wilmott 2008, 124-5; 2009a, 52-3).
- 5.5.4 At Knockupworth, the Vallum ditch was apparently deliberately backfilled, firstly, by clay-rich deposits, which may have derived from the marginal mound, and then by a substantial dump of an organic material. The structure of this organic deposit suggests that it comprised cut turves, and these may, originally, have formed the Turf Wall. An intriguing possibility is that any marginal mound and/or the south mound and the Turf Wall were slighted and deposited into the Vallum ditch, to decommission and bridge it, when the Wall was abandoned in the AD 140s. Segments of the north mound may also have been levelled at the same time. Some time later, the Vallum ditch at Knockupworth was recut slightly further to the south, possibly when Hadrian's Wall was regarrisoned upon the withdrawal from the Antonine Wall (Breeze 2006, 89), and at the same time that the stone phase of the Wall was constructed (*op cit*, 54 and 60), probably in the AD 150s (Bidwell 1999, 23). Reliably dating this sequence of events and determining if they may indeed relate to the abandonment and reoccupation of Hadrian's Wall will be a primary concern for analysis, and, if this does seem feasible, then the anomalous recutting of the Vallum ditch may suggest how this portion of the Wall functioned in its later phases. The single sherd of samian pottery (*Section 4.5.2*), recovered from midway through the sequence of the recut ditch, is obviously of relevance to this.
- 5.5.5 Pollen within the silts that accumulated in the Vallum ditch, and from monoliths sampling other features at Knockupworth (*Section 4.12*), has some potential to inform on how the land surrounding the Wall was managed, and what impact, if any, the construction of the Wall had on this. The dating of the palaeochannels at Parcel 27 South (from charcoal retrieved from an auger survey there (OA North 2011; *Section 3.15.6*)) and from abraded pottery sherds (*Section 4.5.3*) recovered from river gravels during a watching brief (*Section 3.15.6*) on the floodplain to the north side of the Eden, could help determine the character of the floodplain during the Roman period and the relationship between the Wall and the Eden.

5.6 EARLY MEDIEVAL PERIOD

5.6.1 Evidence for remains from the early medieval period in Cumbria and the North West in general is rare (Newman 2006, 91). This is particularly true of rural settlements and agricultural enclosures, like those detected at Parcels 32 and 42 (*Sections 3.9.6 and 3.12.5*) within the CNDR. At large, the environmental evidence suggests that much of the region remained cleared of woodland after the Roman period or even that clearance expanded (*op cit*, 94). Against this background, and, although the evidence is somewhat equivocal as to whether Carlisle remained an urban centre (*op cit*, 96), it perhaps follows that the prime agricultural land in its immediate hinterland should be enclosed within organised schemes of land allotment at this time. The CNDR sites, seen in their wider context, may provide confirmation for this, and any pollen evidence (*Section 4.12*) from either the ditch that was sampled at Parcel 32 (*Section 3.9*); the buried soils sealed by the hedge bank sectioned during the watching brief adjacent to Parcel 32 (*Section 3.15*); or from the latest sediments accumulating in the Vallum ditch at the Hadrian's Wall site at Knockupworth (*Section 3.6*) – if these latter can indeed be dated to the period post-dating its Romano-British use – has much potential to contribute to our understanding of this question.

5.6.2 The rectangular timber buildings found at Parcel 42 are an extremely important and rare discovery, though they seem consistent with the meagre evidence of rural vernacular structures from several other settlement sites in the region (summarised by Newman 2006, 97-9). It is noteworthy that these could only be dated to this period by radiocarbon assay (*Section 4.13*), as, despite the total excavation, recovery and wet-sieving of all archaeological deposits from the settlement features, no finds that could have derived from its habitation survived. It may also be significant that, although the settlement lay close by the former position of a Bronze Age farmstead (*Section 15.4.3*), it was sited in the lee of the hill, rather than perched on the crest above its south-facing slopes, which was the location favoured by its antecedent. Generally, this may suggest a more dispersed settlement pattern than in the immediately preceding periods, and a re-encroachment by settlements into areas that had formerly been avoided in the Iron Age and Roman period.

5.6.3 Given the regional rarity of archaeological remains of this date, any further study should aim to maximise our understanding of the evidence. The stratigraphy and palaeoenvironmental remains merit detailed analysis, and any other evidence, from cartography, cropmarks and any documentary sources, should be used to situate the CNDR settlement and enclosures within their wider context.

5.7 MEDIEVAL AND POST-MEDIEVAL PERIODS

5.7.1 On the whole, the evidence recovered from the excavations for activity during these periods was minimal and exiguous. While the plough furrows, stone drains, and some of the field boundaries and trackways almost certainly date from these periods, there was often no evidence available to confirm this and, for instance, no concentrations of pottery were apparent. The isolated pottery finds are consistent with the use of domestic waste to fertilise the fields, a common practice (Jones 2005). These characteristics accord entirely with the rural nature of the modern landscape through which the road scheme passes.

5.7.2 Perhaps the only sites within the scheme that have any relevance for the wider study of

these periods are Parcels 32, 46 and 47, and the Hadrian's Wall excavations at Knockupworth. The field boundary ditches that were most probably established in the former parcel during the early medieval period (*Section 3.9.6*) were probably still open and accumulating silts during the medieval period, as is attested by a few sherds of medieval pottery in the secondary silts within the ditches (*Section 4.6.2*). This may provide evidence that the early medieval system of land allotment continued as the basis for later schemes. The latter two parcels contained some evidence for the former gardens associated with Kingmoor House (*Section 3.13*); this was, however, not informative about the possible use and layout of the gardens, beyond what could already be gained from consulting the cartographic and documentary sources.

- 5.7.3 At Knockupworth, the Vallum ditch coincided with the former routes of the Carlisle to Port Carlisle Canal (the Carlisle Navigation Canal; McNeil and Newman 2006, 190) and the Carlisle and Silloth branch line of the North British Railway; Ramshaw 1997, 136-7). The excavations of the Vallum ditch revealed deposits backfilling the canal cutting and providing a foundation for the railway, but did not reveal any coherent structural remains of either. As a consequence, there is little opportunity for further research of these industrial features. It was clear that the construction of the canal and railway had impacted upon the Vallum ditch, truncating it where they coincided, and had completely removed the south mound; the north mound had not, however, been destroyed. The upper portion of the Vallum ditch appeared to have been backfilled with dumps of soil and clay in the post-medieval period or more recent times and does not have any potential for further research; the lower ditch deposits were not encountered at the depth of the road cutting.

5.8 CONCLUSIONS

- 5.8.1 The project has examined a rich palimpsest landscape, which owes its genesis to the end of the last Ice Age, *c* 10,000 BC, but has since undergone a slow process of modification by both natural and man-made agents in order to become the landscape seen today. Inevitably, the evidence of such change has been localised and is inconsistent in its survival, and data gathered by this project do not represent the full series of chronological periods from the end of the last glaciation to the present day.
- 5.8.2 At the outset of the project, the Roman period was perhaps envisaged as having the greatest potential for archaeological research (*Sections 1.4.4-14*), not least because the CNDR necessitated the excavation of a segment of the Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site. Evaluation work (*Section 1.5*) had also suggested that there might be the potential for archaeological remains that pre-dated the construction of the Wall, and the river terraces of the Eden were identified as being attractive environments for early farmers (*Section 1.4.2-3*). The excavations have confirmed this, by establishing the veracity of cropmark features, thought to indicate a complex of prehistoric monuments, and also by demonstrating that this landscape had been densely settled by the Middle Bronze Age. Additionally, exceeding all initial expectations, a highly significant site at Stainton West (OA North 2011) has shown that the river acted as an important focus for hunter/fisher-gatherer groups during the preceding Mesolithic period. In light of this wealth of earlier evidence, it is perhaps slightly puzzling that little evidence of pre-Roman Iron Age activity was revealed within the road corridor or that, away from the Wall, evidence for Romano-British activity is remarkably slight. Given that Carlisle was,

probably, still an important centre in the post-Roman period, it is perhaps not entirely surprising that evidence for early medieval settlement and farming should have come to light. However, this is notoriously difficult to identify archaeologically, and there had been no clear indication that it existed prior to excavation, so such finds are undoubtedly a great boon for the CNDR project, and the region more generally.

- 5.8.3 In combination, the various sites of the CNDR (including Stainton West) have great potential to enhance an understanding of Carlisle's past and make a valuable contribution to regional and national research agendas. As is so often the case, the value of the whole is greater than the sum of its parts and, in this context, even negative evidence can be informative. As such, an holistic consideration of the archaeology of the CNDR has the greatest potential for historical research, and a coherent, chronologically ordered narrative account will thereby be achieved. The people of Cumbria have ultimately funded the archaeological programme, and it is they that, potentially, have the most to gain from the project. Historical knowledge can make a significant contribution towards strengthening a sense of place and possession among modern communities, and it can help those who influence the growth and development of that landscape today to understand the importance of their ancestors' contribution to the past, and their own to the future (EH 2000): the archaeology of the CNDR certainly has the potential to enable this.

6 UPDATED RESEARCH AIMS

6.1 AIMS AND OBJECTIVES OF THE PROGRAMME OF ANALYSIS

6.1.1 This section follows the guidance of English Heritage regarding the formulation of updated research aims (EH 1991, 2–3; 2006). The original aims for the project remain valid, but can be updated with new aims and objectives derived from the statement of potential set out in *Section 5*, as follows. In the case of those aims and objectives directly relevant to the Frontiers of the Roman Empire: Hadrian’s Wall World Heritage Site (*Sections 6.1.4-5*), these have been cross-referenced to the *Hadrian's Wall Research Strategy* (Symonds and Mason 2009a). The other aims and objectives draw heavily from the *North West Regional Research Agenda* (Brennand 2007), and the draft *Research Strategy for Prehistory* (EH 2010), particularly Critical Priorities 1 and 2.

6.1.2 **Updated Research Aim 1:** What is the evidence for Neolithic communities living and farming in this area?

Objective 1: Does a detailed consideration of the morphology of the monumental cropmark features on the Eden floodplain and their relationship with natural features, the surrounding landscape and the site at Stainton West elucidate this?

Objective 2: What can the pollen evidence from the ditch of the hengiform monument tell us about contemporary land use?

6.1.3 **Updated Research Aim 2:** What is the evidence for Bronze Age communities living and farming in this area?

Objective 1: What is the evidence for Bronze Age settlements in this area and what is the nature of the houses?

Objective 2: What is the evidence for Bronze Age division of the landscape?

Objective 3: How do settlements relate to the wider landscape?

Objective 4: What does analysis of the artefactual data contribute towards an understanding of the nature, chronology and trading links of this period?

Objective 5: What further information on farming practices and management of the landscape can be determined from the environmental analyses?

Objective 6: Can a precise chronology be determined for the Bronze Age sites? Is there any difference in the types of remains encountered over time? Is there a change in the way people used and related to the landscape over the course of this period?

6.1.4 **Updated Research Aim 3:** What is the evidence for pre-Roman Iron Age and native settlement and farming in the area (A.1; Symonds and Mason 2009a)?

Objective 1: What is the evidence for settlement and farming for this period (A.1.5-7; Symonds and Mason 2009a)?

Objective 2: How does this evidence relate to a) Roman military and civic centres; b)

similar evidence from previous periods; c) similar evidence from the post-Roman period (A.1.9; Symonds and Mason 2009a)?

Objective 3: What does analysis of the artefactual data contribute towards an understanding of the nature, chronology and trading links of this period (A.1.3-4; Symonds and Mason 2009a)?

Objective 4: What further information on farming practices and management of the landscape can be determined from the environmental analyses (A.1.5-7; Symonds and Mason 2009a)?

6.1.5 **Updated Research Aim 4:** What new knowledge about Hadrian's Wall and the frontier can be derived from the excavations at Knockupworth (A.1, A.3 and A.5-8; Symonds and Mason 2009a)?

Objective 1: What is the nature of the material used to construct the Turf and Stone Walls and how have they been constructed (A.3.4 and A3.5.2; Symonds and Mason 2009a)?

Objective 2: What is the nature of the evidence for the Turf Wall (A.3.4; Symonds and Mason 2009a)?

Objective 3: How does the Stone Wall relate to the Turf Wall (A.3.1 and A3.3; Symonds and Mason 2009a)?

Objective 4: How do both phases of Wall relate to the contemporary River Eden (A.5; Symonds and Mason 2009a)?

Objective 5: What is the form and constitution of the Vallum mounds and is there any evidence for a marginal mound (A.3.5.7; Symonds and Mason 2009a)?

Objective 6: What is the nature of the Vallum ditch (A.3.5.7; Symonds and Mason 2009a)?

Objective 7: How do the two phases of Wall, the Vallum ditch and mounds relate to earlier features and deposits (A1.9; Symonds and Mason 2009a)?

Objective 8: Is the lack of evidence for the Military Way and any service track conclusive or significant (A.3.5.7; Symonds and Mason 2009a)?

Objective 9: Is there any chronological evidence for the sequence of development of the Wall and associated features (A.3.3; Symonds and Mason 2009a)?

Objective 10: Can a close-grained consideration and detailed characterisation of the deposits within the Vallum ditch and the recutting of the ditch inform the date and nature of modifications of the frontier works? Can these modifications be linked to known historical events (A.3.3 and A 3.5.7; Symonds and Mason 2009a)?

Objective 11: What does analysis of the artefactual data contribute towards the understanding of the frontier zone (A.6 and A7.4; Symonds and Mason 2009a)?

Objective 12: What is the date of the deposits sampled for pollen (A5.2; Symonds and Mason 2009a)?

Objective 13: What further information on farming practices and management of the landscape can be determined from the environmental analyses of the variously sampled deposits, and is there any evidence that this changed over time (A.1.5-7 and A.5; Symonds and Mason 2009a)?

Objective 14: What is the evidence for later activity in the vicinity of the Wall and how has this affected its survival (A.8; Symonds and Mason 2009a)?

6.1.6 **Updated Research Aim 5:** What is the evidence for settlement and farming in the early medieval period in this area?

Objective 1: What is the evidence for land division and field systems in this area? Can environmental analysis add to data on the management of the landscape in this period?

Objective 2: What is the date of the settlement and agricultural evidence found?

Objective 3: Is there any continuity/discontinuity from the preceding period or into the subsequent periods?

Objective 4: What can be learned from a detailed consideration of settlement morphology and structural form?

Objective 5: How can our understanding of the archaeological sites be enhanced by documentary sources?

Objective 6: What further information on farming practices and management of the landscape can be determined from the environmental analyses?

6.1.7 **Updated Research Aim 6:** What is the evidence for activity in the medieval and post-medieval periods?

Objective 1: What is the nature of the evidence found for medieval and post-medieval land management?

Objective 2: Is it possible to date and characterise the medieval and post-medieval activity, from the stratigraphic and artefactual evidence or from cartographic and documentary investigation?

6.1.8 **Updated Research Aim 7:** How has the topography and geomorphology of the area affected our understanding of the past landscape?

Objective 1: How does site visibility affect the understanding of landscape features through time?

Objective 2: What effect has the geomorphology of the area had upon settlement and agriculture through time, and what have been the resulting activities?

Objective 3: Can study of mapping and documentary evidence assist with the analysis of the landscape through time?

Objective 5: What has been the nature of the influence of the River Eden?

Objective 6: Has the solid and drift geology affected the survival of environmental evidence on these sites?

7 METHOD STATEMENT

7.1 PROGRAMME STRUCTURE

7.1.1 The following methodology is necessary to fulfil the revised research aims outlined in *Section 6*. The post-excavation programme will be divided into the following stages:

- full cataloguing of any data representatively sampled
- further sequential investigation of the palaeoenvironmental material
- consultation with EH and CCCHES
- analysis
- synthesis
- preparation of draft publication text and illustrative material
- issuing of final report
- archive deposition.

7.2 MANAGEMENT

7.2.1 Management and monitoring of the project will include advice and co-ordination, problem solving, and meetings with project staff and all interested external parties. The aim will be to ensure continued achievement of the research objectives, and the intelligent adaptation of strategy in order to meet these. A full review of the project will be carried out at regular intervals during its lifetime.

7.3 TASKS

7.3.1 The tasks necessary to complete the archaeological work are listed below and, together with the updated research aims (*Section 6*), these constitute an Updated Project Design for Analysis. To summarise, these consist of a final phase of stratigraphic analysis, in combination with the results now available from the finds and palaeoenvironmental assessments, and any other results that derive from the further analysis of these assemblages; preparation of comprehensive digital catalogues of the finds and palaeoenvironmental remains; and preparation of a final report. In the course of these tasks, the interpretation of the chronological development of the sites will be completed (augmented by the results of a programme of scientific dating), and the digital archive will be updated and enhanced. The paper and digital archive will be prepared for deposition at the Tullie House Museum and Art Gallery, Carlisle, in accordance with standard practices and protocols (see *Sections 4.16* and *7.22*), and in negotiation with the museum's curatorial staff, to meet its deposition policies.

7.3.2 CCCHES, and EH (for Hadrian's Wall, Knockupworth), have been invited to review the proposed Updated Project Design for Analysis and comment on a) the ability of the available data to fulfil the stated aims and objectives of the project and, therefore, the

analysis to be undertaken; b) the likely form of any publication or any other means of dissemination. As a result of these discussions, OA North proposes that the appropriate dissemination of the results of the archaeological analysis should, as a minimum, include the production of a full archaeological publication (see *Section 7.21*).

7.4 PROCESSING AND TRANSPORT OF ARTEFACT ASSEMBLAGES

7.4.1 The finds will be marked, where appropriate, to allow complete integration into the site database. At an early stage in the analytical programme, where required, arrangements will be made to transport all relevant assemblages to the designated external specialists, if they are not already in their possession, to facilitate analysis and reporting of the material. Conversely, on the completion of this work, material will need to be received from the specialists, sorted and checked against database records.

7.5 DIGITAL DATA IN THE ANALYSIS PHASE

7.5.1 During fieldwork and assessment, databases were compiled containing the stratigraphical, finds and palaeoenvironmental information from the project; they also include indices to the digital photographs and primary graphical sources. These databases will be audited and augmented throughout the analysis. Ultimately, the information in the databases, in addition to the digital photographs and scans of the textual and graphic archive, will be included in the permanent site archive deposited with the receiving museums (*Section 7.22*), and some or all of the data may be presented in a digital format to accompany the final publication.

7.5.2 The survey and graphical data have been digitised, cross-referenced with the stratigraphic databases, and incorporated into a GIS (Geographical Information System). The GIS will be updated throughout analysis, and it may be desirable to incorporate mapping data from previous phases of work (*Section 1.4*). Digital mapping data may also be provided as an accompaniment to the final publication. On the completion of analysis, metadata will be compiled on the digital mapping data and will be provided to the Cumbria Historic Environment Record (HER), along with databases, and GIS shapefiles.

7.6 STRATIGRAPHIC ANALYSIS

7.6.1 The stratigraphic data recovered from certain of the excavations (as indicated in *Section 3* above) will need to be analysed in greater detail in order to refine the provisional phasing and resolve problems highlighted by the assessment. A broad stratigraphic framework has been produced for the assessment, but it is clear from this work that there are some areas where further detailed worked is required. This broad stratigraphic framework will, therefore, be reviewed and refined, and it will also be essential to compile detailed sub-phasing, which will require careful analysis of the primary records, all contexts, and site plans and sections.

7.6.2 All contexts need to be attributed to these phases and sub-phases once established, and the site database will then require updating and amending. In the course of this analysis, the site matrices will require reconfiguring to conform to the amended periods and sub-phasing, and to include those contexts which could not be resolved at the assessment stage.

- 7.6.3 A detailed analytical document of the stratigraphic information for all sites, accompanied by phase drawings, sections and other relevant line illustrations, as required, will be drafted. This will provide detailed information on the periods and sub-phases for all the sites. The draft text and phase drawings will form the basis both of the summary information to be supplied to specialists and of the stratigraphic section of the final report, as well as the publication.
- 7.6.4 The sites will be considered together, and in relation to other known archaeological sites in the study area, and to their wider landscape and regional context. This will involve an element of library-based research and cartographic regression analysis. Amongst the sources to be consulted will be the National Mapping Programme (NMP; EH 2010) and the Cumbria HER, as well as all relevant published excavation reports for the surrounding area (eg Bewley 1993). This will be of particular relevance when considering how the Hadrian's Wall Frontier Zone relates to wider patterns of contemporary settlement and land use, especially in the light of the apparent dearth of evidence for native British activity of this period from the CNDR (*Section 5.4.8*).
- 7.7 **STRUCK LITHICS AND WORKED STONE**
- 7.7.1 An archive catalogue of this assemblage will be prepared, and its presence or absence noted in any stratigraphic discussion. A report will be compiled for incorporation in the publication.
- 7.8 **PREHISTORIC POTTERY**
- 7.8.1 The assemblage is worth reporting in more detail in the final publication. A few possible Bronze Age rim-sherds are present and perhaps three or four would be worth drawing. Radiocarbon dating and residue analysis should be undertaken on appropriate sherds, including the single sherd bearing trace residues, and thin-section and geochemical analysis may be justified on a representative selection of sherds. Most of the ceramics are stable, although somewhat friable. The paucity of diagnostic or larger pieces suggests that conservation is not justified, though care should be taken in handling this material.
- 7.9 **ROMANO-BRITISH POTTERY**
- 7.9.1 An archive catalogue of this assemblage should be prepared, and its presence or absence noted in any stratigraphic discussion. Some sherds may require illustration in the report.
- 7.10 **MEDIEVAL AND POST-MEDIEVAL POTTERY**
- 7.10.1 An archive catalogue of this assemblage should be prepared, and its presence or absence noted in any stratigraphic discussion. Following discussions with the receiving museum, at least some of the material may be discarded.
- 7.11 **CLAY TOBACCO PIPES**
- 7.11.1 An archive catalogue of the pipes should be prepared, and note made of its presence or absence within any stratigraphic discussion. Following discussions with the receiving museum, at least some of the material may be discarded.

7.12 METALWORK

- 7.12.1 Further work should attempt to identify the coin, and, if this is possible, then it should be reported on. An archive catalogue of the metalwork should be prepared, and note made of its presence or absence within any stratigraphic discussion. Following discussions with the receiving museum, some of the material may be discarded; if Roman, the coin may be illustrated in the report.

7.13 GLASS

- 7.13.1 An archive catalogue of this assemblage should be prepared, and its presence or absence noted in any stratigraphic discussion. Following discussions with the receiving museum, some or all of the material may be discarded.

7.14 ANIMAL BONE

- 7.14.1 An archive catalogue of this assemblage should be prepared, and its presence or absence noted in any stratigraphic discussion. The calcined bone from Parcel 32 (*Section 4.10.3*) should be considered for radiocarbon dating, unless more suitable material is available. Following discussions with the receiving museum, at least some of the material may be discarded.

7.15 CHARCOAL AND CHARRED PLANT REMAINS

- 7.15.1 Material will be selected and isolated for radiocarbon dating purposes (*Section 7.17*). Those assemblages deemed worthy of further analysis (*Section 4.11.17-21; Appendix 2*) will be characterised and considered in detail with regard to the information they can provide concerning their stratigraphic context and the wider interpretation of the archaeological sites where they occur, as well as the environment and economy of the period they date to. The results will be incorporated within the stratigraphic narrative and a report prepared for the publication. As part of the project review (*Section 7.21.1*), EH and CCCHES will be given opportunity to comment on the results of the analysis.

7.16 POLLEN

- 7.16.1 After a consideration of the soil sedimentology (*Section 7.18*), in order to understand better the taphonomic factors affecting the pollen recovered, and a programme of radiocarbon assay (*Section 7.17*), a judgement, made in consultation with CCCHES and EH, will be made as to the validity of analysing the productive elements of the sequence sampled in the Vallum ditch of Hadrian's Wall (*Section 4.12.13*) and the hengiform ditch adjacent to Parcel 32 (*Section 4.12.17*). If warranted, further sub-samples will be taken from the monoliths, and volumetric samples from these will be prepared using a standard chemical procedure (method B of Berglund and Ralska-Jasiewiczowa (1986)). Slides will be examined at a magnification of x400 by equally spaced traverses across at least two slides to reduce the possible effects of differential dispersal on the slides (Brooks and Thomas 1967). Pollen identification will be made following the keys of Moore *et al* (1991), Faegri and Iversen (1989), and a small modern reference collection. Andersen (1979) will be followed for the identification of cereal grains; plant nomenclature will follow Stace (1997). Fungal spore identification and interpretation will follow van Geel (1978) and Blackford *et al* (2010). Charcoal particles greater than 5µm will also be recorded (Peglar

1993).

- 7.16.2 The data obtained from this will be recorded on *pro forma* sheets, stored digitally and manipulated with the computer programme TILIA/TILIAGRAPH (Grimm 1991). The data will be presented as pollen diagrams and interpreted in the report, which will include a non-technical summary, and both the botanical and colloquial plant names. The data will be compared with the published work from other relevant archaeological investigations.
- 7.16.3 The analysis will provide information concerning the wider landscape setting of the various features and demonstrate how this changed over time and space. Following analysis, a full report will be produced for the archive report and the data will be integrated within the publication, as appropriate. It is important that the palynological analysis is integrated with, and considered alongside, the other analyses undertaken.

7.17 **RADIOCARBON DATING**

- 7.17.1 Following analysis of the stratigraphy (*Section 7.6*) and a reconsideration of the material suitable for dating (*Section 4.11*), further samples will be selected for radiocarbon assay to produce a comprehensive coverage of the sites. It is not yet certain precisely how many further samples will be subject to assay, but this will be determined through discussion with EH and CCCHES. It is anticipated, however, that somewhere in the region of 10-15 additional radiocarbon dates may be required, the main constraint being the availability of suitable material. Areas of principal interest for dating, if feasible, will include the confirmed and putative prehistoric and early medieval settlement remains at Parcels 9, 21 North, 32, 41 North and 42 (*Section 3*); the hengiform ditch and later associated buried soil (*Section 3.15*); the Vallum ditch deposits and buried soils at Hadrian's Wall, Knockupworth (*Section 3.6*); and samples analysed for palaeobotanical remains (*Sections 4.11-12*).
- 7.17.2 Certificates will be prepared for these samples and submitted along with them to an appropriate laboratory. The aim will be to establish the robust association of the dated material with their parent deposits by secondary sampling of the same deposits, and to date deposits and features that have not yet been reliably dated. Primacy will be given to those deposits and features that have the greatest potential to enhance stratigraphic or specialist interpretations. It is anticipated that these samples will include flots of CPR and charcoal, and CPR, charcoal or sediment samples extracted from monoliths. In the case of the latter, consideration will be given to the presence of other significant data (such as pollen horizons) and to obtaining results in sequence. Wherever possible, Bayesian modelling will be undertaken. The results will be incorporated within the stratigraphic narrative and an over-arching summary report prepared for the publication.

7.18 **SOIL MICROMORPHOLOGY**

- 7.18.1 Those assemblages deemed worthy of further analysis (*Section 4.14.3*) will be characterised and considered in detail with regard to the information they can provide concerning their stratigraphic context and the wider interpretation of the archaeological sites where they occur. Analyses will focus upon soil micromorphology/sediment micromorphology, and may include bulk samples and thin sections. Studies will variously consider particle size, magnetic susceptibility, loss on ignition, soil pH and geochemistry. The results will be incorporated within the stratigraphic narrative and a report prepared for

the publication. In the case of the Vallum ditch at Hadrian's Wall (Knockupworth), this work will guide the level of palynological analysis (*Section 7.16.1*).

7.19 INTEGRATION OF DATASETS AND SYNTHESIS

7.19.1 The information gathered from analysis of the finds will be reviewed and integrated into the stratigraphic narrative. This will allow re-interpretation of the site using a thematic approach. The GIS will allow detailed interrogation of the data and the testing of hypotheses and phasing.

7.20 ILLUSTRATIONS

7.20.1 During each part of the analytical programme, a selection will be made of appropriate material for illustration. This will include general plans and sections, phase plans, photographs, and artefacts. Illustrations will be produced by experienced illustrators, using standard conventions.

7.21 PRODUCTION OF TEXT AND PUBLICATION

7.21.1 Following the completion of the analysis of the stratigraphical and artefactual evidence, a comprehensive final report will be produced for publication as a monograph (*Lancaster Imprints Series*). The exact word length cannot presently be estimated with any accuracy, although the main publication will comprise a single volume, which is unlikely to exceed 200,000 words. This will target both an academic and informed audience and will be written in an accessible style. The results of the project will be presented and situated within their wider archaeological context, locally, regionally and nationally, as is appropriate. It is possible that the publication will be accompanied by digital media, such as a website and/or CD containing digital plans, catalogues and specialist reports. All media will integrate the results of work undertaken on all parts of the CNDR, including Parcel 27 (OA North 2011). Prior to publication, the draft text will be submitted for internal revision, peer review, review and comment by CCCHES and EH, and will be passed to all specialists after editing, for their comments.

7.21.2 OA North suggests that serious consideration should also be given to more popular forms of dissemination, for instance a popular publication, schools' packs, websites, museum displays/exhibitions *etc.* The CNDR site is archaeologically particularly important and wider dissemination of the results will provide Cumbria with a valuable return on its research investment. The site lends itself to interdisciplinary study, being relevant, for example, to such themes as technology, the natural environment and climate change, in addition to its obvious significance for prehistory, Hadrian's Wall studies and the early medieval period.

7.22 ARCHIVE DEPOSITION

7.22.1 OA North undertakes to liaise throughout the project with the receiving museum (Tullie House Museum and Art Gallery, Carlisle) to meet its deposition policies (see also *Section 4.16*). On completion of the analysis, a discard policy will be implemented, in agreement with the museum. On submission of the completed text for publication, the archive will be updated as necessary and the receiving museum will be contacted to obtain the latest information on its deposition arrangements. Material in files and boxes will be checked,

and indices and box lists will be compiled and appended.

7.22.2 The digital archive will be checked and indexed, and hard copies made of the data if required by the recipient museum. The digital data will be accompanied by metadata, which will explain origin and accuracy.

7.23 PROJECT TEAM

7.23.1 The key members of the Project Team are listed in Table 20. Rachel Newman will provide academic oversight on both the analytical programme and the publication.

Archaeological Researcher		Task
Andrew Bates	OA North	Animal Bone
Fraser Brown	OA North	Project Management
Paul Clark	OA North	Stratigraphic Analysis
Antony Dickson	OA North	Lithics
Denise Druce	OA North	CPR/Charcoal
Seren Griffiths	External Specialist	Radiocarbon Dating
Christine Howard-Davis	OA North	Finds Management
Elizabeth Huckerby	OA North	Environmental Management
Richard Macphail	External Specialist	Soil Micromorphology
Mairead Rutherford	OA North	Pollen
Blaise Vyner	External Specialist	Prehistoric Pottery

Table 20: Key members of the Project Team

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APPENDIX 1: HADRIAN'S WALL, KNOCKUPWORTH: SUMMARY OF CONTEXTS AND FINDS

General Deposits Within the Road Footprint			
Context	Group	Context Type	Comments
50000		Layer	Topsoil; contained Romano-British and post-medieval pottery, and Ceramic Building Material
50001		Layer	Natural glacial till
General Deposits Within the Drainage Run			
Context	Group	Context Type	Comments
51000		Layer	Topsoil
51001		Layer	Sandy silty subsoil
51002		Layer	Sandy silty subsoil
51013		Layer	Natural glacial till
51014		Layer	Natural sand deposits
51015		Layer	Natural glacial till
51018		Layer	Natural sand deposits
51019		Layer	Natural sand deposits
Early Ditch (excavated in multiple segments)			
Context	Group	Context Type	Comments
50077	50081	Fill	Fill of 50078
50078	50081	Cut	Ditch cut
50079	50081	Fill	Fill of 50080
50080	50081	Cut	Ditch cut
50081		Cut	Group number for early ditch sealed by Turf Wall and Vallum mound
50084	50081	Fill	Fill of 50086
50085	50081	Fill	Fill of 50086
50086	50081	Cut	Ditch cut
50119	50081	Fill	Fill of 50121
50120	50081	Fill	Fill of 50121
50121	50081	Cut	Ditch cut
50123	50081	Fill	Fill of 50121
50126	50081	Fill	Fill of 50127
50127	50081	Cut	Ditch cut

Contexts Relating to Hadrian's Wall			
Context	Group	Context Type	Comments
50082		Group	Turf wall deposit; contained probable Prehistoric flint flake and Romano-British pottery
50108		Cut	Pit cut
50109		Fill	Fill of 50108
50110		Group	Stone-phase of Hadrian's Wall
50111		Group	Turf-phase of Hadrian's Wall
50112		Layer	Sandy silty subsoil
50113		Layer	Turf Wall deposit
50114		Layer	Turf Wall deposit
50115		Layer	Turf Wall deposit
50116		Layer	Bioturbation
50118		Layer	Soil matrix sealing rubble core of wall
50122		Layer	Turf Wall deposit
50124		Fill	Fill of 50125
50125		Cut	Cut of natural feature
50131		Fill	Fill of 50132
50132		Cut	Possible posthole cut
50133		Fill	Fill of 50134
50134		Cut	Irregularly shaped cut
50135		Layer	Subsoil
50137		Group	Hadrian's Wall
50138		Layer	Turf Wall deposit
Deposits Relating to North Mound of Vallum Within the Road Footprint (multiple segments)			
Context	Group	Context Type	Comments
50002	50076	Layer	Mound deposit
50003	50076	Layer	Mound deposit
50004	50076	Layer	Mound deposit
50005	50076	Layer	Mound deposit
50006		Layer	Buried soil
50053	50076	Layer	Mound deposit
50054	50076	Layer	Mound deposit
50055	50076	Layer	Mound deposit
50056	50076	Layer	Mound deposit

Context	Group	Context Type	Comments
50057		Layer	Buried soil/turf
50058		Layer	Buried soil/turf
50059		Layer	Natural deposit
50060		Cut	Pit cut sealed beneath mound deposit
50061		Fill	Fill of 50060
50062		Layer	Buried soil/turf
50063		Layer	Buried soil/turf
50064	50076	Layer	Gravel layer within mound
50065		Layer	Sandy silty subsoil
50066		Layer	Sandy silty subsoil
50067		Cut	Cut for shallow pit
50068		Fill	Fill of 50067
50069		Cut	Cut for modern land drain
50070		Fill	Fill of 50069
50071	50076	Layer	Mound deposit
50072		Layer	Buried soil
50073		Cut	Cut for modern land drain
50074		Fill	Fill of 50073
50075	50076	Layer	Mound deposit
50076			Group deposit for Vallum north mound
50083	50076	Layer	Mound deposit
50089		Fill	Fill of 50090
50090		Cut	Cut of possible palaeochannel sealed by mound deposits
50091		Layer	Mound deposit
50092		Layer	Mound deposit
50093		Layer	Mound deposit
50094		Layer	Mound deposit
50095		Layer	Mound deposit
50096		Layer	Mound deposit
50097		Layer	Mound deposit
50098		Cut	Cut for modern land drain
50099		Fill	Fill of 50098
50100		Cut	Cut for modern land drain
50101		Fill	Fill of 50100
50102		Layer	Mound deposit
50103		Layer	Mound deposit

Context	Group	Context Type	Comments
50104		Cut	Cut of possible palaeochannel sealed by mound deposits
50105		Fill	Fill of 50104
50106		Fill	Fill of 50107
50107		Cut	Cut of possible palaeochannel sealed by mound deposits
Deposits Relating to North Mound of Vallum Within Drainage Run			
Context	Group	Context Type	Comments
51008		Layer	Mound deposit
51009		Layer	Mound deposit
51010		Layer	Mixed deposit
51011		Layer	Mixed deposit
51012		Layer	Mixed deposit
51016		Layer	Mound deposit
51017		Layer	Possible buried land surface
51071		Cut	Modern ceramic land drain
Deposits Relating to South Mound of Vallum Within the Drainage Run			
Context	Group	Context Type	Comments
51033		Layer	Eroded mound deposit
51034		Layer	Eroded mound deposit
51035		Layer	Eroded mound deposit
51036		Layer	Possible buried land surface
51037		Layer	Sandy silty subsoil
51052		Layer	Mound deposit
51053		Layer	Mound deposit
51054		Layer	Mound deposit
51057		Layer	Mound deposit
51056		Layer	Possible buried land surface
51057		Cut	Cut for palaeochannel
51058		Layer	Mound deposit
51059		Fill	Fill of 51057
51060		Fill	Fill of 51057
51061		Fill	Fill of 51057
51062		Fill	Fill of 51057
51063		Fill	Fill of 51057
51064		Fill	Fill of 51057

Context	Group	Context Type	Comments
51065		Cut	Modern ceramic land drain
51066		Cut	Stone-lined land drain
51067		Cut	Modern ceramic land drain
51072		Fill	Fill of 51057
Contexts Relating to Vallum Ditch Within the Drainage Run			
Context	Group	Context Type	Comments
51003		Fill	Fill of 51005
51004		Fill	Fill of 51005
51005		Cut	Cut of Vallum ditch
51006		Layer	Mixed deposit
51007		Layer	Mixed deposit
51020		Fill	Late fill of recut 51051
51021		Fill	Late fill of recut 51051
51022		Fill	Late fill of recut 51051
51023		Fill	Late fill of recut 51051
51024		Fill	Fill of original cut 51050
51025		Fill	Late fill of recut 51051
51026		Fill	Fill of original cut 51050
51027		Layer	Sandy silty subsoil
51028		Layer	Sandy silty subsoil
51029		Fill	Late fill of recut 51051
51030		Fill	Late fill of recut 51051
51031		Layer	Natural sand deposit
51032		Layer	Natural clay deposit
51038		Fill	Late fill of recut 51051
51039		Fill	Late fill of recut 51051
51040		Fill	Late fill of recut 51051
51041		Fill	Deliberate backfill of recut 51051
51042		Fill	Deliberate backfill of recut 51051
51043		Fill	Fill of original cut 51050
51044		Layer	Natural clay deposit
51045		Layer	Natural clay deposit
51046		Layer	Natural sand deposit
51047		Layer	Natural clay deposit
51048		Fill	Primary fill of recut 51051

Context	Group	Context Type	Comments
51050		Cut	Original Vallum ditch cut
51051		Cut	Vallum ditch recut
51068		Cut	Modern ceramic land drain
51069		Cut	Modern ceramic land drain
51070		Cut	Modern ceramic land drain
Deposits Relating to Railway/Canal Within the Road Footprint			
Context	Group	Context Type	Comments
50007		Layer	Modern farm track
50008		Layer	Hardcore make-up layer for farm track
50009		Layer	Levelling deposit
50010		Cut	Cut of drainage ditch
50011		Fill	Fill of 50010
50012		Cut	Cut of drainage ditch
50013		Fill	Fill of 50012
50014		Cut	Cut for modern ditch
50015		Fill	Fill of 50014
50016		Cut	Cut for modern drainage ditch
50017		Cut	Modern cut
50018		Fill	Fill of 50017
50019		Cut	Foundation cut for farm track
50020		Cut	Possible cut or hollow formed by settlement of material
50021		Fill	Fill of 50020
50022		Layer	Substantial dumped-deposit infilling former railway/canal
50023		Cut	Cut for modern land drain
50024		Fill	Fill of 50023
50025		Cut	Cut for modern feature
50026		Fill	Fill of 50026
50027		Layer	Dumped deposit infilling former railway/canal
50028		Layer	Dumped deposit infilling former railway/canal
50029		Cut	Cut for land drain
50030		Fill	Fill of 50030
50031		Layer	Dumped deposit infilling former railway/canal
50032		Layer	Dumped deposit infilling former railway/canal; contained eighteenth-century pottery

Context	Group	Context Type	Comments
50033		Layer	Dumped deposit infilling former railway/canal
50034		Layer	Dumped deposit infilling former railway/canal
50035		Layer	Dumped deposit infilling former railway/canal
50036		Layer	Dumped deposit infilling former railway/canal
50037		Layer	Dumped deposit infilling former railway/canal
50038		Layer	Dumped deposit infilling former railway/canal
50039		Layer	Dumped deposit infilling former railway/canal
50040		Layer	Dumped deposit infilling former railway/canal
50041		Layer	Dumped deposit infilling former railway/canal
50042		Layer	Dumped deposit infilling former railway/canal
50043		Layer	Dumped deposit infilling former railway/canal
50044		Layer	Dumped deposit infilling former railway/canal
50045		Layer	Dumped deposit infilling former railway/canal
50046		Layer	Dumped deposit infilling former railway/canal
50047		Cut	Modern truncation
50048		Layer	Possibly uppermost surviving Vallum ditch deposit beneath railway/canal deposits
50049		Cut	Cut for land drain
50050		Fill	Fill of 50049
50051		Cut	Cut for land drain
50052		Fill	Fill of 50050

NB – Comments in **bold** refer to artefacts recovered from the context

APPENDIX 2: CPR AND CHARCOAL

Context Number	Parcel	Feature Number	Feature type	Summary of CPR assessment	Summary of Charcoal Assessment
9012	9	9059	Posthole	-	Diffuse porous wood
9018	9	9059	Posthole	-	Mixed assemblage, mostly oak wood
9024	9	9059	Posthole	-	Mostly oak wood
9026	9	9039	Posthole	Barley grains and crop weed seeds	Mixed assemblage, mostly oak wood
9028	9	9039	Posthole		Mostly oak wood
9032	9	9039	Posthole	Barley grains and wheat chaff	-
9034	9	9039	Posthole	Barley grains	Mixed assemblage
9043	9	9059	Posthole	-	Mixed assemblage
9058	9	9057	Pit	-	Alder/hazel wood
9066	9	9065	Pit	Barley, wheat and oat grains, and crop weed seeds	Mixed assemblage
21100	21	21099	Pit	Barley, including naked variety, and wheat grains	Alder/hazel wood
21158	21	21099	Pit	Barley, including naked variety, and wheat grains	Alder/hazel wood
21328	21	21327	Pit	-	Oak wood
21392	21	21377	Posthole	Barley grains and wheat chaff	-
21402	21	21377	Posthole	-	Alder/hazel wood
32003	32	32004	Pit	Wheat grains	Oak wood
32006	32	32005	Posthole	Possible emmer wheat grain	Oak and ash wood
32032	32	32014	Ditch	Oat grains	-
32039	32	32038	Posthole	-	Alder/hazel and oak wood
32049	32	32050	Pit	-	Mixed assemblage, mostly oak wood
32055	32	32056	Pit	-	Mixed assemblage
32058	32	32057	Posthole	-	Oak wood
41005	41	41004	Ditch terminus	-	Alder/hazel and oak wood
41011	41	41010	Ditch terminus	-	Alder/hazel wood
41015	41	41014	Pit	-	Alder/hazel wood
42038	42	42037	Hearth	-	Alder/hazel and blackthorn-type wood
42049	42	42034	Posthole	Crop weed seeds	Alder/hazel and oak wood
42053	42	42033	Posthole	-	Mixed assemblage, mostly oak wood
42063	42	42033	Posthole	Indeterminate grains and cereal chaff	Mixed assemblage, mostly oak wood
42100	42	42468	Ring-gully	-	Oak wood
42113	42	42111	Ring-gully	-	Alder/hazel and oak wood, including roundwood
42117	42	42111	Ring-gully	-	Mixed assemblage, including hawthorn-type
42121	42	42111	Ring-gully	Barley and wheat grains, and crop weed seeds	Alder/hazel and oak wood, including roundwood

Context Number	Parcel	Feature Number	Feature type	Summary of CPR assessment	Summary of Charcoal Assessment
42123	42	42111	Ring-gully	-	Ash wood
42125	42	42111	Ring-gully	Crop weed seeds	-
42156	42	42168	Stakehole	Cereal chaff	-
42164	42	42163	Hearth	-	Mixed assemblage
42237	42	42034	Posthole	-	Oak wood
42261	42	42260	Pit	Weed seeds	Alder/hazel and oak wood, including roundwood
42275	42	42274	Slot	Barley and oat grains, cereal chaff, weed and grass seeds, tubers/rhizomes and grass stem fragments	-
42289	42	42282	Posthole	Barley and oat grains, cereal chaff, grass seeds and stem fragments	-
42354	42	42541	Posthole	Barley, wheat and oat grains, and grass seeds	Oak wood
42372	42	42371	Pit	Barley grains and grass seeds	Alder/hazel and oak wood, including roundwood
42428	42	42541	Posthole	-	Mixed assemblage, mostly oak wood
42432	42	42431	Posthole	Weed and crop weed seeds	Oak wood
42439	42	42431	Posthole	Crop weed seeds	Mixed assemblage
42445	42	42444	Posthole	Barley and wheat grains, and grass seeds	-
42446	42	42444	Posthole	Barley and oat grains, and weed and grass seeds	-
42523	42	42524	Posthole	-	Alder/hazel wood
42535	42	42536	Hearth	Crop weed seeds	Alder/hazel and oak wood
200106	Watching brief	200108	Ditch	Large grass seed, two wheat grains and hazelnut fragment	Mostly oak, a few fragments of alder/hazel, hawthorn-type and blackthorn-type
200107	Watching brief	200108	Ditch	-	Mostly oak and a few fragments of blackthorn-type

APPENDIX 3: POLLEN

Sample Number	Context Number	Parcel	Depth (m)	Feature/Deposit	Lithology	Interpretation	Potential
50000	50072	HW	0.06-0.07	Possible buried soil under north mound of Vallum	Light brown mottled clay	Alder woodlands with open grassy spaces	Good
	50072	HW	0.19-0.20	Possible buried soil under north mound of Vallum	Grey-brown sand	Alder woodland and grass	Moderate /Poor
	50001	HW	0.30-0.31	Glacial till under north mound of Vallum	Dark clay in red stones	Alder woodland and grass	Good
50004	50063	HW	0.13-0.14	Possible buried soil sealed below north mound of Vallum	Orange-brown clay with stones	Insufficient pollen	Poor
50009	50058	HW	0.18-0.19	Possible buried soil sealed by north mound of Vallum	Fine grey sands	Alder/hazel woodland and grass	Good
	50061	HW	0.25-0.26	Pit sealed by 50058 , under north mound of Vallum	Light-darker fine grey sands	Hazel woodland with alder and grass	Good
	50001	HW	0.46-0.47	Glacial till under north mound of Vallum	Coarse brown sand	Hazel/mixed woodland	Good
50013	50083	HW	0.11-0.12	Deposit forming or derived from north mound of Vallum	Sandy clay	Alder /mixed woodland and open, possibly cultivated, spaces	Good
	50084	HW	0.39-0.40	Upper deposit in ditch 50081 beneath north mound of Vallum	Light brown clay	Alder/mixed woodland with some herbs	Good
	50085	HW	0.46-0.47	Lower deposit in ditch 50081 beneath north mound of Vallum	Light brown clay	Alder/mixed woodland with some herbs	Good
50019	50113	HW	0.09-0.10	Underneath Hadrian's Wall (Stone Wall)	Pale grey clay	Insufficient pollen	Poor
	50116	HW	0.18-0.19	Underneath Hadrian's Wall (Stone Wall)	Brown silty clay	Insufficient pollen	Poor
	50115	HW	0.31-0.32	Underneath Hadrian's Wall (Stone Wall)	Brown/orange silt sand	Insufficient pollen	Poor
50025	50082	HW	0.25-0.26	Turf Wall deposit	Compacted brown clay	Insufficient pollen	Poor

Sample Number	Context Number	Parcel	Depth (m)	Feature/Deposit	Lithology	Interpretation	Potential
51014	51020	HW	0.49-0.50	Late fill of Vallum ditch 51051	Grey clay	Mixed woodland with herbs	Good
	51026	HW	0.73-0.74	Dumped deposit in Vallum ditch 51050 (Turf Wall?)	Dark grey clay	Insufficient pollen	Poor
	51026	HW	1.04-1.05	Dumped deposit in original cut of Vallum ditch 51050 (Turf Wall?)	Dark grey clay	Mixed woodland, grasses and herbs	Good
51015	51039	HW	0.67-0.68	Fill of recut 51051 of Vallum ditch	Grey clay	Alder/hazel woodland with grasses and herbs	Good
	51041	HW	0.94-0.95	Fill of recut 51051 of Vallum ditch	Black organic silt	Alder/hazel woodland with grasses and herbs	Good
51019	51043	HW	0.15-0.16	Lower fill (mound slump?) of original cut of Vallum ditch 51050	Sticky red clay	Insufficient pollen	Poor
	51044	HW	0.61-0.62	Basal fill (mound slump?) of original cut of Vallum ditch 51050	Red clay /grey mottling	Insufficient pollen	Poor
51021	51041	HW	0.34-0.35	Fill of recut 51051 of Vallum ditch	Red/black silty clay	Alder/hazel woodland with grasses and herbs	Good
	51048	HW	0.60-0.61	Basal fill of recut (51050) of Vallum ditch	Red silt clay	Insufficient pollen	Poor
51023	51026	HW	0.45-0.46	Dumped deposit in original cut of Vallum ditch 51050 (Turf Wall?)	Organic peaty layer	Sedges, mixed woodland	Good
51040	51061	HW	0.60-0.61	Palaeochannel deposit below south mound of Vallum	Grey clay and sand	Insufficient pollen	Poor
	51062	HW	0.72-0.73	Palaeochannel deposit below south mound of Vallum	Mottled sand/clay	Insufficient pollen	Poor
51043	51001	HW	0.05-0.6	Relict ploughsoil? sealing south mound of Vallum	Brown silt	Insufficient pollen	Poor

Sample Number	Context Number	Parcel	Depth (m)	Feature/Deposit	Lithology	Interpretation	Potential
51043	51060	HW	1.02-1.03	Palaeochannel deposit below south mound of Vallum	Grey silt	Mixed woodland, grasses and herbs	Good
51050	51055	HW	0.30-0.31	Deposit forming south mound of Vallum	Red sandy clay	Insufficient pollen	Poor
	51056	HW	0.60-0.61	Buried soil under south mound of Vallum	Grey silt (buried soil?)	Insufficient pollen	Poor
32046	32130	32	0.34-0.35	Ditch 32131 (Parcel 32)	Dark silty sand	Grasses, herbs and mixed woodland	Good
	32129	32	0.44-0.45	Ditch 32131 (Parcel 32)	Light brown sand	Grasses, herbs and mixed woodland	Good
	32129	32	0.59-0.60	Ditch 32131 (Parcel 32)	Dark brown clay sand	Grasses, herbs and mixed woodland	Good
	32128	32	0.79-0.80	Ditch 32131 (Parcel 32)	Dark-light brown sand	Grasses, herbs and mixed woodland	Good
200106	200106	WB	1.14-1.15	Hengiform ditch (Watching Brief) 200108	Brown sand	Barren of palynomorphs	Poor
	200106	WB	1.29-1.30	Hengiform ditch (Watching Brief) 200108	Brown sand	Grasses and herbs	Poor
200107	200104	WB	0.09-0.10	Buried soil sealing hengiform ditch (Watching Brief) 200108	Brown sand and silt	Grasses and herbs	Poor
	200104	WB	0.49-0.50	Hengiform ditch (Watching Brief) 200108	Brown sand and silt	Grasses and herbs	Good

NB – HW=Hadrian's Wall and WB=Watching Brief