SOLWAY HOLIDAY VILLAGE, SKINBURNESS DRIVE, SILLOTH, CUMBRIA

Archaeological Strip and Record

Client: Hagan Leisure UK Ltd

Planning Application No.: 2/17/0382

NGR: 311630 554160 (centre)

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Non-Technical Summary

Following the submission of a planning application for the extension of an existing residential caravan park at Solway Holiday Village, Skinburness Drive, Silloth, Greenlane Archaeology was commissioned carry out an archaeological 'strip and record' of two areas. The areas selected were intended to target features recorded during an earlier archaeological evaluation of the site so that these could be investigated further and better understood.

The history of the area is influenced by the Roman presence and tied to the fortunes of Holme Cultram Abbey during the medieval period. The town grew as a port and holiday destination in the mid-19th century yet the site remained largely unchanged from the mid-19th to mid-20th century, when it was used as an RAF base.

The strip and record revealed substantial linear and curvilinear ditches below thick deposits of topsoil and subsoil in both areas as well as other smaller features. The profiles of these ditches varied though they often included a charcoal-rich deposit towards the base and associated finds suggest some or all of them had gone out of use by the medieval period. Large quantities of iron smelting slag were recovered from across the two areas, and animal bone and carbonised grain were recovered from samples collected from the various features.

Seven phases of activity could be identified across the two areas, the first comprising the excavation of the ditches and other features, perhaps in the early medieval period, although no direct dating evidence was recovered. The ditches had certainly become filled by the medieval period and the site was ploughed following this, with former slag heaps probably ploughed out and spread into a developing subsoil. Later activity at the site included various attempts at draining the field, evidenced by ceramic drains criss-crossing the site, and the remains of a concrete and brick structure, thought to be an air raid shelter, in the west corner of Area B, sections of which were spread across the area after its demolition.

The difficulties in locating the features encountered in the original evaluation trenches make detailed discussion of the results difficult, but it is clear that the strip and record revealed a similar range of ditches and related features. The finds and material recovered from the environmental samples demonstrate that the site formed part of a wider settlement with domestic activities taking place alongside iron smelting. If the site is indeed early medieval in origin then it is of considerable significance and there is certainly the potential for related remains to be present elsewhere in the vicinity. While the current development proposals are unlikely to impact on the most significant archaeological features, on account of their considerable depth below the surface, results of the strip and record are worthy of further consideration and publication, once additional radiocarbon dates have been obtained and the iron smelting debris further analysed.

Acknowledgements

Greenlane Archaeology would like to thank Hagan Leisure UK Ltd for commissioning the project and their agent Bruce Armstrong-Payne for providing information about the site. Special thanks are due to Alan Tinnion for driving the plant and his general assistance during the fieldwork, and to HSS Hire for providing water pumps.

The fieldwork was carried out by Dan Elsworth, Tom Mace, and Joanne Beaty. The report was written by Dan Elsworth and Tom Mace, and the illustrations were produced by Tom Mace. The finds and samples were processed by Jo Dawson and Dan Elsworth, and assessed by staff in-house (Tom Mace (medieval pottery and clay tobacco pipe), Jo Dawson (retents, post-medieval pottery and glass), and Dan Elsworth (stone)), and by external specialists (Gerry McDonnell (iron working residue), Charlotte Wilkinson at York Archaeological Trust (X-ray and conservation assessment of iron finds), Hannah Russ (animal bone), and Laura Bailey at Headland Archaeology (environmental remains)). The project was managed by Dan Elsworth, and the report was edited by Jo Dawson.

1. Introduction

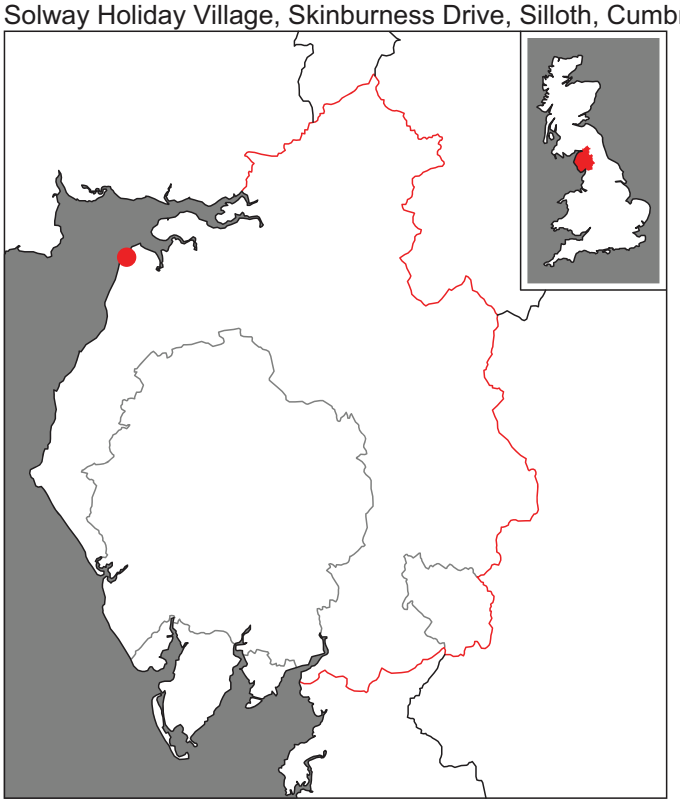
1.1 Circumstances of the Project

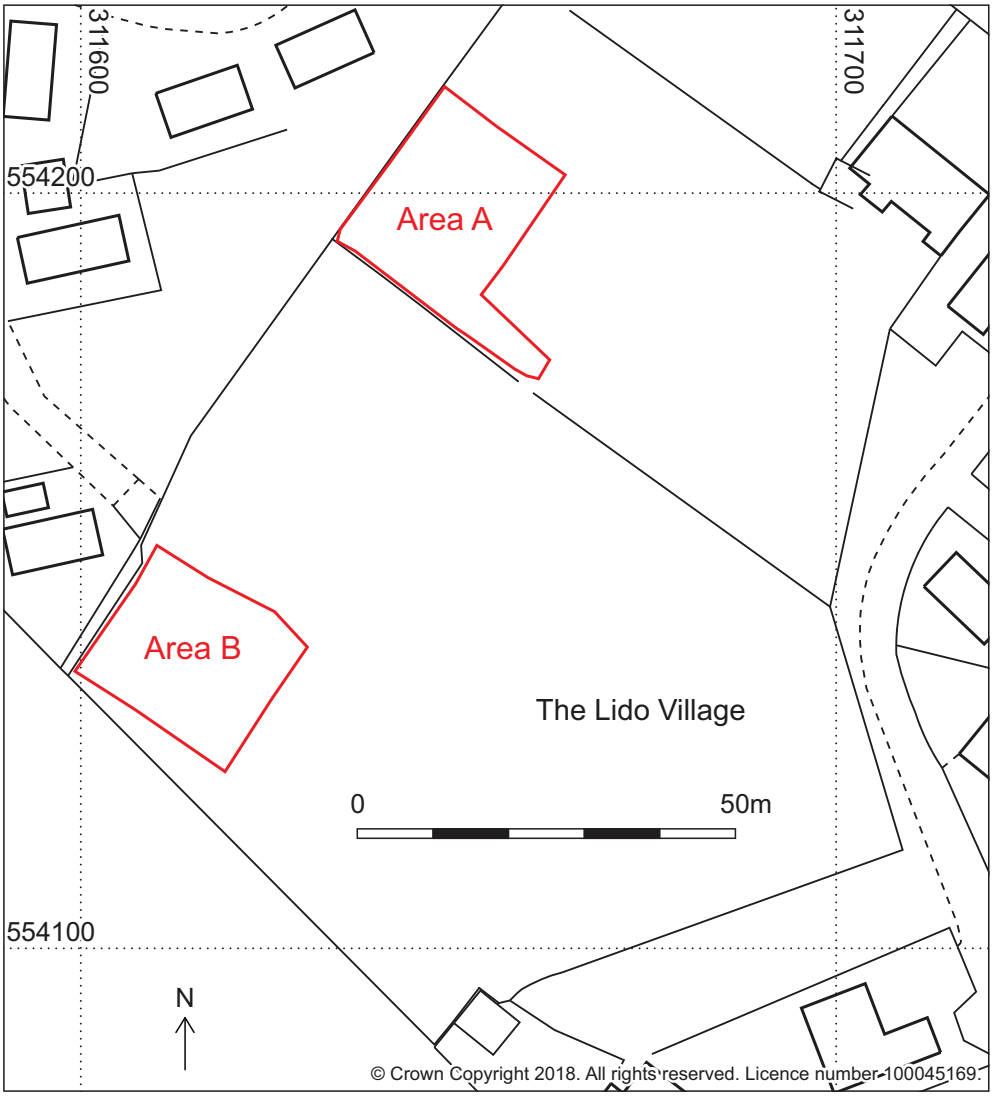
1.1.1 Following the submission of a planning application (Ref. 2/17/0382) for the extension of an existing residential caravan park at Solway Holiday Village, Skinburness Drive, Silloth (NGR 311630 554160 (centre)), and following the completion of earlier archaeological investigation of the site (OA North 2004; NPA 2004) a condition (No. 9) was placed on the decision requiring a programme of archaeological strip and record of two areas containing features of archaeological interest recorded during the evaluation so that these could be investigated and better understood. A brief, outlining the nature and extent of the work required, was produced by the Cumbria County Council Historic Environment Service (CCCHES; Parsons 2018). In response to this a project design was produced by Greenlane Archaeology and after its acceptance by the CCCHES it was commissioned by Hagan Leisure UK Ltd (hereafter 'the client') to carry out the work. The onsite work was undertaken between the 4th and 19th December 2018.

1.2 Location, Geology, and Topography

1.2.1 Silloth is a port town *c*35km west of Carlisle on the Solway Basin. The landscape of the Solway Basin forms a broad lowland plain on the fringes of the Solway Firth and Irish Sea Coast with intertidal mudflats and salt marshes and more intensively managed pastureland divided into medium to large fields by hedgerows and stone-faced hedge banks further inland (Countryside Commission 1998, 19). The site occupies 0.1 hectares to the north-east end of the town, to the south of Solway Holiday Village, at *c*7m above sea level (Figure 1).

1.2.2 The solid geology comprises the Triassic Mercia Mudstone Group (Moseley 1978, plate 1) which is overlain by an extensive mantle of glacially-derived boulder clay, the surface of which is locally moulded into drumlins, and spreads of sand and gravel (Countryside Commission 1998, 21).





Client: Hagan Leisure UK Ltd

Figure 1: Site location

2. Methodology

2.1 Introduction

2.1.1 This is the third phase of work to be carried out at the site. Firstly, a desk-based assessment (DBA) and walk-over survey was carried out by Oxford Archaeology North in December 2003 (OA North 2004). This comprised an examination of early maps of the site and various published and unpublished secondary sources and a site visit. The information collected during the DBA has been utilised in this report in *Section 3.2* to *3.5*, with some additions and amendments, and has been enhanced by the addition of a map regression (*Section 3.6*) created from extracts from maps available online. The DBA and walkover survey was followed by an archaeological evaluation of the site, comprising the excavation of 11 linear sample trenches across the area, which was undertaken by North Pennines Archaeology Ltd in March 2004 (NPA 2004). The results of both these earlier phases of work are referred to in the text, where appropriate, and summarised in *Section 3.7*.

2.2 Archaeological Strip and Record

2.2.1 The strip and record was carried out according to the standards and guidance of the Chartered Institute for Archaeologists (CIfA 2014) and comprised the examination of two areas (Area A and Area B) both approximately 20m by 25m. Area A, to the north, was orientated with the long side north-east/south west and was extended at the south-east corner by the addition of a trench, which measured *c*12.5m by 3.8m-5.2m wide, aligned perpendicularly to the main area. Area B was orientated north-west/south-east. The total area investigated was approximately 0.1 hectares; excavation was discontinued once the natural geology was reached, which was typically at a depth of between 0.7m and 1.0m below the current ground surface in Area A and 0.8m and 1.1m in Area B, generally at a height of between 5.8m and 6.3m above sea level.

2.2.2 The topsoil and subsoil deposits were removed using a mechanical excavator with a toothless bucket. Features encountered below this were subsequently cleaned and further investigated by hand. The location of the two areas was recorded relative to nearby property boundaries and other structures that were evident on the site plans and Ordnance Survey mapping utilising a total station. All finds were collected from all deposits, as far as was practical, and the areas and spoil were scanned periodically with a metal detector. The following recording techniques were used during the project:

- ***Written record***: descriptive records of all deposits and features (see *Appendix 2*) were made using Greenlane Archaeology *pro forma* record sheets, specifically trench record sheets and individual context record sheets where necessary. The contexts in Area A began at context ***1000*** and those in Area B began at ***2000***;
- ***Photographs***: photographs in both 35mm colour print and colour digital format were taken of all archaeological features uncovered during the project, as well as general views of the site, the surrounding landscape, and working shots. A selection of the colour digital photographs is included in this report and the remainder are included in the archive. A written record of all of the photographs was also made using Greenlane Archaeology *pro forma* record sheets (Greenlane Archaeology 2007);
- ***Instrument survey***: the areas investigated were surveyed using a Leica reflectorless total station coupled to a portable computer running AutoCAD 2006 LT and TheoLT, which captures the survey data in AutoCAD in real-time at a scale of 1:1. This enabled the location of each area to be positioned and allowed levels above Ordnance Datum to be provided through reference to a nearby spot height. In addition, the larger features were primarily planned using the total station, rather than through the drawing techniques listed below;
- ***Drawings***: plans and sections of features were drawn at a scale of 1:10 or 1:20 as appropriate.

2.3 Finds

2.3.1 ***Collection***: all of the finds were recovered by hand and stored in self-seal bags with white write-on panels on site before being removed for processing and assessment.

2.3.2 ***Processing***: artefacts were washed (or dried and dry brushed in the case of glass and metal), dried in a drying oven or naturally air-dried, and packaged appropriately in self-seal bags with white write-on panels.

2.3.3 ***Assessment and recording***: the finds were assessed through visual examination, identified where possible by comparison with published examples, and a list of them was compiled (see *Appendix 3)*.

2.3.4 ***Medieval pottery***: the medieval pottery is described in generic terms (e.g. *gritty ware*) with no attempt to link to specific fabrics or specific sources. Brief descriptions of the sherds are given in *Appendix 3* following *Guidelines for the Processing and Publication of Medieval Pottery from Excavations* (Blake and Davey 1983) and *Pottery in Archaeology* (Orton *et al* 2008).

2.3.5 ***Animal bone***: the animal remains were identified to element, side and to as low a taxonomic level as possible using the Author's reference collection and published and online identification guides (Hillson 2003; 2005; Wheeler and Jones 2009). Quantification used the diagnostic zone method as presented by Dobney and Rielly (1988). A taphonomic assessment of each fragment was undertaken, recording the presence and absence of cut and chop marks, burning and calcination, any evidence for animal activity (canid or rodent gnawing), and surface preservation; any other surface modifications of note were also recorded. At this stage, no attempt was made to sex any of the remains, or to measure any elements. Sheep (*Ovis* sp.) and goat (*Capra* sp.) distinction was also not considered. Fragments of bones that could be identified to element but not any specific species were grouped as far as possible using size and class or order categories. Results were recorded in an electronic proforma in Microsoft Excel.

2.3.6 ***Iron***: nineteen metallic recorded finds (50 individual finds, multiple objects in same bag) were X-rayed using standard York Archaeological Trust (Y.A.T.) procedures and equipment. One plate was used and given a reference number in the YAT conservation laboratory series (X9242). The X-ray number was written on each small find bag. Each image on the radiograph was labelled with its sample or context number. The plate was then packaged in an archival paper pocket. All finds were examined under a binocular microscope at X20 magnification. The material identifications were checked and observations made about the condition and stability of the finds, and recorded below. An assessment of each find is presented in the tables in *Appendix 5*.

2.3.7 ***Slag***: the slags were examined visually, and in addition selected samples were analysed by Hand-Held X-Ray Fluorescence (HH-XRF) to characterise the elemental composition of the slags and investigate similarities and differences across slag types. The instrument is a Bruker S1 Turbosdr hand-held XRF instrument operating at 15kV. The technique is non-destructive. A beam of x-rays is generated in the instrument and focussed on a fresh fractured surface of the sample, the x-rays interact with the elements present in the sample resulting in the emission of secondary x-rays which are characteristic (in terms of their energy and wavelength) of the elements present in the sample. The energies of the secondary x-rays are measured and a spectrum generated showing a level of background noise with peaks of the elements present superimposed on the background noise. Slag samples will be analysed for 30 live seconds; the spectrum is stored and a normalised composition determined using a bespoke computer programme. All elements heavier than magnesium (Mg, Z=12), can be detected. The data is normalised and hence gives data showing relative (semi-quantitative) percentage of detected oxides.

2.4 Environmental Samples

2.4.1 ***Strategy***: a total of 410 litres of samples were taken from 27 different contexts from 11 different features. From each of these a single bucket of up to 10 litres was processed. A summary of all of the samples taken is presented in *Appendix 6*.

2.4.2 ***Processing***: the samples were wet sieved by hand; the light fragments were floated off and collected in 250µm and 500µm sieves with the coarse component (retent) collected on a 1mm mesh. The flot and retent were then dried in a drying oven. The flot was sent for specialist assessment (see *Appendix 6*). The retent was also examined by eye and all ecofacts and artefacts extracted.

2.4.3 ***Assessment and recording***: the flot from the 250 µm sieve, once dry, was scanned using a binocular microscope. All samples were scanned using a stereomicroscope at magnifications of x10 and up to x100. Identifications, where provided, were confirmed using modern reference material and seed atlases including Cappers *et al*. (2006) and Zohary *et al*. (2012); nomenclature for wild taxa follows Stace (1997). The content of the retent was recorded on pro forma record sheets. The results are discussed in *Section 4*.

2.5 Archive

2.5.1 A comprehensive archive of the project has been produced in accordance with the project design, and current CIfA and guidelines (CIfA 2014b). The paper and digital archive and a copy of this report will be deposited in the Cumbria Archive Centre in Carlisle after the completion of the project. On completion of the project a copy of this report will be provided for the client and a digital copy will be retained by Greenlane Archaeology. In addition a digital copy will be provided to the CCCHES, and a record of the project will be made on the OASIS scheme.

3. Desk-Based Assessment

3.1 Introduction

3.1.1 Much of the following information is taken from an earlier desk-based assessment by Oxford Archaeology North (2004).

3.2 Prehistoric Period (c11,000BC – AD 1st century)

3.2.1 Evidence for human activity in the region in the period immediately following the last Ice Age is limited (Hodgkinson *et al* 2000). In the wider region habitation of this date is typically found in cave sites, with a number known on the northern edge of Morecambe Bay (Young 2002). The county was more densely inhabited during the following period, the Mesolithic (*c*8,000 – 4,000 BC), and there are sites known to date to the late Mesolithic along the Cumbrian coast (Cherry and Cherry 2002; Young 2002), including extensive remains thought to represent all-year settlement at Eskmeals to the south (Bonsall *et al* 1994) and several Mesolithic flint sites are known at St Bees Head, to the south of Silloth, spanning through to the Bronze Age (Hodgkinson *et al* 2000). Mesolithic sites typically comprise collections of distinctive artefacts, microliths, often discovered during field walking and eroding from river banks and coastal areas, and river valleys are notably places where such material is frequently found in the wider region (Middleton *et al* 1995, 202; Hodgkinson *et al* 2000, 151-152; Hodgson and Brennand 2006, 26), though few actual remains dating to the Mesolithic are known in North Cumbria (OA North 2004, 9).

3.2.2 In the following period, the Neolithic (*c*4,000 – 2,500 BC), large scale monuments such as burial mounds and stone circles begin to appear in the region and evidence of Neolithic exploitation of wetland and coastal areas and indeed settlement on the North Cumbrian Plain is indicated by the distribution of polished stone axes manufactured at Langdale in the central Lake District (Hodgkinson *et al* 2000). These are found in large numbers across the county, particularly in the north (Barrowclough 2010, 78-79), including an axe found at Silloth (Bewley 1994). Evidence for settlement is sparse though excavations at Plasketlands, near Mawbray identified a timber structure dated to the mid-fourth millennium BC (Bewley 1993).

3.2.3 During the later Neolithic and into the Bronze Age (*c*2,500 – 600 BC) monuments, particularly those thought to be ceremonial in nature, become more common still although there is a considerable emphasis on the ritual placement of items in water (Barrowclough 2010, 142-191). It is also likely that many settlement sites thought to belong to the Iron Age have their origins in this period; throughout the county these tend to comprise small enclosed groups of hut circles, although these are very difficult to identify in the archaeological record, although larger hill-top hillforts are also present where there is suitable topography (*op cit*, 192-199). Aerial photography has identified numerous cropmark sites in the North Cumbrian Plain of possible Bronze Age date, however, few of these have been excavated (Bewley 1994). A cremation cemetery near Maryport is dated from 2470 cal BC to 1520 cal BC (Hodgkinson *et al* 2000, 113); the remains of timber palisades in the moss at Bowness Common could be late prehistoric (Hodgson 1904); and a small collection of flint artefacts discovered during excavations at the Roman fort at Bowness-on-Solway included one thought to be Bronze Age (Potter 1979, 326).

3.2.4 As already mentioned there is likely to be considerable continuity on settlement sites from the end of the Bronze Age, with the Iron Age representing a period of even greater land enclosure and management, and a major expansion of forest clearance and agricultural activity occurred during this period in north Cumbria (OA North 2004, 9). Evidence of Iron Age activity in the north of the county remains scarce, though there are hillforts at the southern end of the plain at Carrock Fell and Swarthy Hill (Hodgkinson *et al* 2000), and a large number of undated enclosures have been detected through aerial photography which could be Iron Age in date (Bewley 1994).

3.3 Romano-British to Early Medieval Period (1st century AD –11th century AD)

3.3.1 Cropmarks recorded running parallel with the coastline at Silloth are interpreted as a palisade built prior to the creation of the known system of towers extending Hadrian's Wall, and a pair of side

ditches probably indicate a coastal road along the eastern side of the school to a cropmark showing a rectangular enclosure, interpreted as a camp (OA North 2004, 10). However, an archaeological evaluation across the line of the parallel ditches revealed post-medieval ceramic drains in the bottoms putting their supposed Roman origin in doubt (NPA 2006). The Romans began construction of Hadrian's Wall in AD 122, with a series of mile castles, turrets, and signal stations at regular intervals, to form a military corridor stretching from the Solway Firth to the Tyne estuary, which defined the northern frontier of the Roman Empire (Breeze and Dobson 1976). It was base to a series of garrisons of both infantry and cavalry and possibly remained in occupation beyond the formal end of Roman administration in AD 410 (Wilmott 1999). Forts and fortlets along the West Cumberland coast were connected by road, though the coast to the north of Silloth has shifted due to extensive flooding (Margary 1973). There is a milefort at East Cote to the north of Silloth, but the growth of the town may have resulted in the loss of evidence of coastal defences towards the fort at Beckfoot and damage to archaeological remains (Higham and Jones 1982). However, the stone foundations of Towers 12a and 12b were excavated at Silloth Golf Course (Bellhouse 1969) and it is assumed that there are further undiscovered fortlets along this stretch of coast towards Maryport (Higham and Jones 1982). A Romano-British farmstead excavated at Silloth also indicates the presence of a rural population in the area, and typifies rural native settlement for the period (OA North 2004, 11). The enclosure is a series of banks and ditches in a rectangular shape, with roundhouses within the enclosure (Higham and Jones 1983).

3.3.2 The limited documentary and place-name evidence for this part of Cumbria, as with much of the county, shows a complex mixture of ethnic and political groups interacting with each other following the collapse of Roman administration. As with much of the country the region split into rival kingdoms, the foremost of which the far north-west of England and south-west of Scotland was Rheged, although the consideration of its exact area of influence remains hotly debated. It seems likely that it controlled, either directly or indirectly, at least the northern part of modern Cumbria; poetry written in praise of Urien, Lord of Rheged, links it to places such as the Eden Valley but also to as far south as the River Winster (Clarkson 2010; Breeze 2012) but physical evidence is extremely scarce. As a counter argument, recent excavations at a hillfort in south-west Scotland have been taken as evidence that this was the heartland of Rheged (Toolis and Bowles 2017), however, excavations at similar sites in Cumbria have not been carried out. In Carlisle activity beyond the end of Roman control is attested archaeologically and also in a recorded account of working Roman fountains in the 7th century but elsewhere it relies on small excavations of very basic buildings (Newman 2014). Cumbria does have good physical evidence from the Anglian Period and into the Norse in the form the many crosses that are found, in particular along the western coast plain, as well as numerous place-names (Armstrong *et al* 1950). Again, archaeological evidence for activity in the Viking period is extremely limited, especially in rural areas, although a recently excavated group of burials found at Cumwhitton have shown the potential for such remains and there are many recorded in antiquarian sources that have not benefitted from modern excavation (Paterson *et al* 2014). From the late 9th and into the 11th century the northern part of Cumbria also came under the influence of the Kingdom of Strathclyde, a British kingdom based in south-west Scotland (Clarkson 2014; Edmonds 2015). The actual extent of its control is debateable, it is traditionally thought to have included only the northern part of Cumberland, but it has recently been argued that it might have encompassed a much larger part of the west coast, perhaps as far as the Furness and Cartmel Peninsulas, probably as an attempt to disrupt the alliance of Vikings in York and Dublin but also in order to control valuable iron ore reserves (Elsworth 2018).

3.4 Medieval Period (11th century AD – 16th century AD)

3.4.1 Unlike much of the rest of England the medieval period in the north of Cumbria only really began in 1092 when William Rufus took Carlisle from the Scots, and encouraged English settlement of Cumberland (Newman 2011, 82), although it still returned to Scottish control following the rule of King Stephen, who gave Cumberland and the earldom of Huntingdon to Prince Henry, the eldest son and heir apparent of David, King of Scots (Whellan 1860, 228). Cumberland was subsequently regained from the Scots, and the township of Holme Low was granted, as part of the parish of Holme Cultram, to the abbey of Holm Cultram (to the south east of Silloth) in 1150 (Winchester 2016, 164-165). The abbey and the surrounding areas were caught up in the brutal wars between the English and Scots during the 13th and

14th centuries. The monastery of Holm Cultram was specifically laid waste in 1216 as a result of the conflict between King John of England and Alexander II of Scotland (Gilbanks 1899). In the early 14th century the ongoing border conflict entered a new stage under the rulership of Robert Bruce in Scotland, with a series of attacks along the west coast. Those in 1316 and 1322 were particularly severe as they reached as far as Furness (Dickinson 1965) and caused considerable destruction across Cumberland, including plundering the monastery of Holm Cultram (Maxwell 1913, 237). The 14th century was already a time of considerable disruption in the whole region due to the effects of the plague and cattle murrain and this, plus the addition of renewed border conflict, led to Holme Cultram entering a period of extreme poverty (Walker and Graham 2013, 5).

3.4.3 During the Dissolution, the abbey was surrendered to the crown, and its estates, which principally comprised its granges, presumably including Silloth, were valued at £477 19s 3½d (Walker and Graham 2013, 7). In the wider documentary sources Silloth is specifically recorded from the end of the 13th century, its name being 'sea barn' (Armstrong *et al* 1950, 293-294). It perhaps corresponded to the grange referred to as Skinburness (Baxter 1914, 275), which was defended by a sea-dyke that probably originated in the medieval period (although the surviving earthwork seems to be later (Fletcher and Miller 1997)), but it was known as 'Silloth Grange' as late as 1718 (Grainger 1903, 173).

3.5 Post-Medieval (16th century AD – present)

3.5.1 The present town of Silloth originated as a development of the Carlisle and Silloth Bay Railway and Dock Company, which was formed in 1854 and applied to Parliament to run a railway from Drumburgh and construct a floating dock and pier or jetty at Silloth in order to allow ferry services across the Irish Sea (Winchester 2016, 270). The new town of Silloth grew from a few farmsteads and cottages to a well-planned town and rapidly gained importance as a shipping port. The views afforded of Skiddaw and the mountains ranges on the land side and across the Solway also made Silloth a popular holiday destination (OA North 2004, 13).

3.5.2 Silloth Aerodrome opened in June 1939 as a Maintenance Command Station as part of the Royal Air Force Expansion Scheme, but transferred to Coastal Command in November 1939 (Barnes nd). Several pillboxes were positioned to protect the airfield, which suffered several air raids in 1940 (Truman 2002). The airfield became an Operating Training Unit in 1943, and post-war it was used for storage and scrapping of old aircraft before it shut down in 1963, after which the Solway Lido and the adjacent caravan park were built (Barnes nd).

3.6 Map Regression

3.6.1 ***Introduction***: early maps of the area are inaccurate and lack detail; the earliest useful maps date from the mid-19th century but for Silloth these only begin with the Ordnance Survey maps from 1867 onwards.

3.6.2 ***Ordnance Survey 1867***: by this date the site is located within two long fields, with a field boundary marked north-west/south-east across the centre of the area to the north (Area A) (Plate 1).

3.6.3 ***Ordnance Survey 1900***: the field boundary to the south-west of the area has shifted but the site itself is unchanged (Plate 2; cf. Plate 1).

3.6.4 ***Ordnance Survey 1925***: the field boundary across the centre of the area to the north (Area A) has been removed (Plate 3; cf. Plate 2).

3.6.5 ***Ordnance Survey c1947***: the site is unchanged (Plate 4; cf. Plate 3).

3.6.6 ***Ordnance Survey 1952***: the site is unchanged (Plate 5; cf. Plate 4).

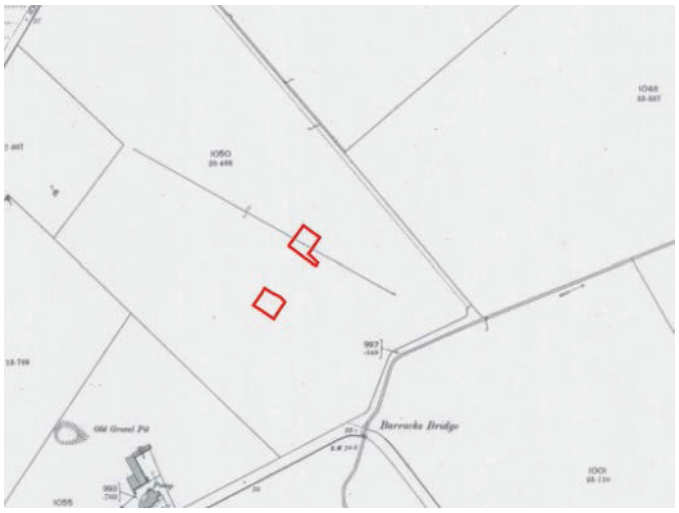


Plate 1 (left): Extract from the Ordnance Survey map of 1867

Plate 2 (right): Extract from the Ordnance Survey map of 1900

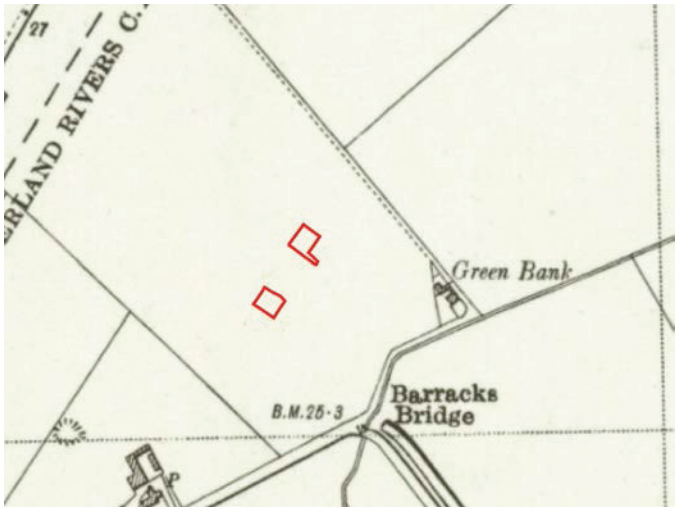


Plate 3 (left): Extract from the Ordnance Survey map 1925

Plate 4 (right): Extract from the Ordnance Survey map *c*1947

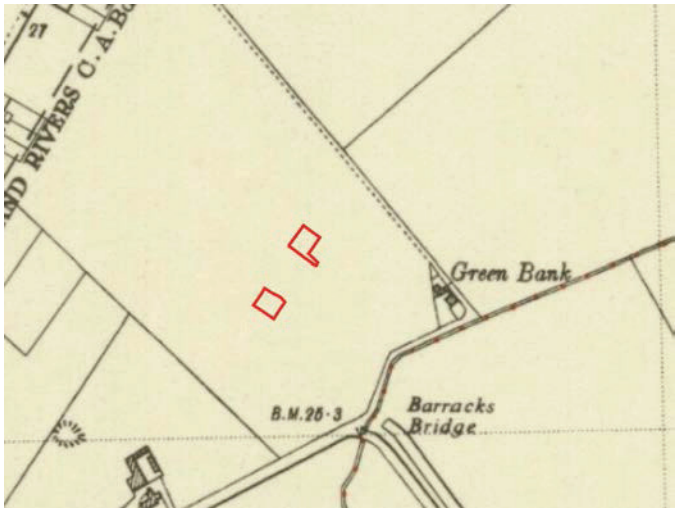


Plate 5: Extract from the Ordnance Survey map of 1952

3.7 Previous Archaeological Work

3.7.1 There have been two previous pieces of work at the site: a desk-based assessment by OA North (2004) and an evaluation by NPA (2004). The desk-based assessment carried out by OA North in December 2003 identified a high potential for the survival of below ground remains dating to the Roman period and recommended that an evaluation be carried out prior to the proposed expansion of the caravan site to allow an assessment to be made regarding the impact of the proposed development on below surface archaeological remains (OA North 2004, 17-18). The subsequent evaluation in March 2004 recorded a series of substantial linear ditches, which crossed the site east/west and north/south, and a number of smaller ditches, possibly a palisade ditch, which crossed the site north/south, three of which contained a significant amount of slag within their upper fills and quantities of charred grain in their lower fills (NPA 2004, v). These were interpreted as evidence for probable prehistoric settlement (*ibid*); however, radiocarbon dating evidence indicated a medieval date for the features, one of which yielded a calibrated date of Cal AD 990 to 1160 (Frank Giecco pers comm). (It should be noted that there are many problems with this earlier report, most notably that the orientation and scale at which the plans were produced are wrong and inconsistent with the descriptions, which are probably also inaccurate, especially in relation to the size and orientation of the trenches and features).

3.8 Summary

3.8.1 The early history of the area is influenced by the Roman presence and its medieval history is tied to the fortunes of Holm Cultram Abbey and is marred by the violent rivalry existing between the English and the Scots. The post-medieval period marked the growth of the town as a port and holiday destination after the construction of the railway and dock in the mid-19th century.

3.8.2 The cartographic evidence shows that there was a field boundary across the centre of the area to the north (Area A) from the mid-19th to early 20th century. This was removed prior to 1923 and the site then remained unchanged until at least the mid-20th century.

4. Fieldwork Results

4.1 Area A

4.1.1 Area A comprised a rectangle orientated north-east/south-west, *c*20m by 25m, with the addition of another small trench, *c*12.5m by 3.8m-5.2m wide, aligned perpendicularly against the south-east side at the south end (Figure 2) and totalled approximately 550m^2. The soft grey silty topsoil (***1000***) in Area A was between 0.3m and 0.65m thick and overlay a greyish-orange sandy silt subsoil (***1001***) that was *c*0.4m thick. Within the subsoil were two large but thin spreads of soft silt of dark grey and mid grey colour, which perhaps represent the remains of ploughed out features (***1004*** and ***1005***). Below the subsoil (***1001***) was the underlying clay natural, which comprised a pale orangey-brown firm sandy clay (***1024***). The topsoil and subsoil were deeper than anticipated based on what was recorded in the earlier evaluation and there were several ceramic land drains cut into the subsoil, which were also unrecorded by the earlier evaluation, which crossed the site at two different heights and appeared to represent multiple phases of attempts to drain the field (see Figure 2). All of the underlying archaeological features were cut into the natural (***1024***). Area A was extended from the south-east corner in an attempt to locate a supposed ditch encountered during the earlier evaluation (in Trench 6), but the difficulties of locating these remains meant that it was not present in this area and probably in fact corresponds with what appears to have been a large pit (***1023***).

4.1.2 There was an L-shaped ditch to the north-west side of the area, which ran for 8m to 10m along the north-west edge of the area from the south-west corner before turning sharply at its north-east end and exiting the trench 2.5m to the north-west (Figure 2). Two slots were investigated: a slot midway along its longest side and a slot at the corner (see Figure 4). The cut at the corner [***1009***] was found to have a U-shaped section at the corner, with gently sloping concave sides. Here it was *c*0.85m wide and at most 0.48m deep (Plate 6 and Plate 7). The uppermost fill, which was up to 0.38m thick, was a mid-brownish-orange soft silty clay (***1006***). Below that, mostly to the south-west side of the cut, was a thinner deposit of mid grey-brown soft silty clay (***1007***) and below that was a thin charcoal-rich deposit (***1008***). The cut along the widest side [***1019***] was up to 1.8m across bui became shallower (*c*0.3m deep) along the straighter section to the south-west, and appeared to only have a single fill (***1020***): a mid-brown/grey silty clay with flecks of orange clay and contained slag and flecks of charcoal (Plate 8). The base of the cut ***1019*** was slightly stepped in from the south-east edge, becoming deeper to the north-west side.

Plate 6: North-facing section of ditch *1009*

Plate 7: South-east-facing section of ditch *1009*

Plate 8: South-west-facing section of ditch *1019*

4.1.3 A long linear ditch, aligned north-east/south-west, ran across much of the area from the south-west edge to near the centre of the trench. This ditch was at least 14m long and ran out of the trench to the south-west, but its north-east end was not traceable due to the trench being flooded. Towards the north-east end the cut [***1018***] was *c*2m wide, with a slight step to the east side and steep sides (Plate 9 and Plate 10; Figure 5). There was a further slight drop to the north edge, which came to a concave base. There was a spread of soft grey-brown loam along the north-west edge (***1013***), which was probably a spread of subsoil (***1001***) obscuring this side, below which was a mottled dark grey/brown fairly firm silty clay (***1014***) with some charcoal and slag fragments, up to 0.12m thick and *c*1m wide. This deposit had either been spread to the south-east, perhaps by ploughing, or the feature may have been stepped to this side (see Figure 5). Where it stepped and became deeper to the north-west, the cut exhibited a deep U-shaped profile with at least three distinct fills. The uppermost of these fills, the bulkiest fill of the cut, was a firm, slightly mottled light grey to yellow/grey clay (***1015***), 0.37m thick, which was thinner towards the south and possibly shallower, *c*0.2m thick. Below that was a firm dark grey clay (***1016***), up to 0.2m thick, with lenses of charcoal. This deposit was deeper and thicker towards the north within the excavated slot, only 0.06m thick to the south and appearing relatively higher up within the cut. At the base of the cut was a light grey firm clay (***1017***), *c*0.12m thick to the north side and up to 0.17m thick to south side of the slot, which also contained charcoal. A further slot was dug into this feature, which appeared to be continuous, against the south-west edge of the trench (cut [***1012***]). It was only possible to excavate a small slot against this edge because of surface water entering the trench and the north-west extent of the cut was undetermined (see Figure 5); however, the feature still appeared to be stepped on the south-east side (Plate 11). The deposit above the step and across the top of the cut at this point was a mottled dark grey and orange silt (***1010***) with slag inclusions (possibly the same as ***1014***), and below that was a pale brownish grey soft silty clay (***1011***) with lots of charcoal (possibly the same as ***1015***).

Plate 9: South-west-facing section of ditch *1018*

Plate 10: North-east-facing section of ditch *1018*

Plate 11: North-east-facing section of ditch *1012*

4.1.4 A pit-like feature [***1023***] was encountered *c*4m to the south-west of the long, north-east/south-west linear ditch (***1018/1012***). This irregular cut was 2.3m long northeast/southwest and 0.3m deep with near vertical sides, and a flattish, slightly undulating base, and contained two fills (Plate 12 and Plate 13; Figure 6): the upper charcoal-rich fill of the cut was a dark grey soft silt (***1021***), 0.1m to 0.15m thick; the lower fill was a firm mid to light grey silty clay (***1022***), up to 0.2m thick. The north-east side of the feature was truncated by modern disturbance probably related to one of the earlier evaluation trenches (NPA 2004, trench 6?).

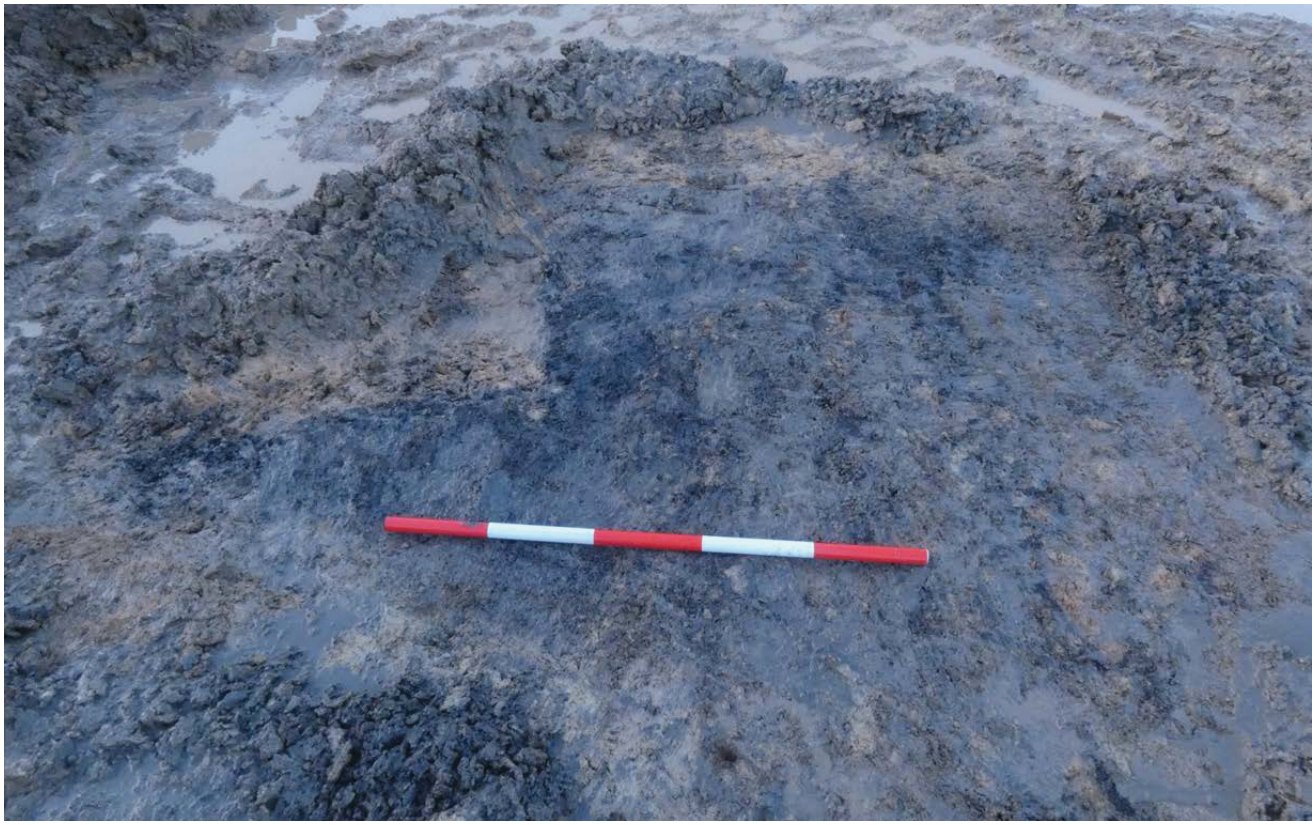


Plate 12: Feature *1023*, viewed from the north-east

Plate 13: South-west-facing section of feature *1023*

4.1.5 Against the south-west side of the excavation in the south corner of the area was a linear cut [***1002***], orientated north-east/south-west (Figure 2). It was more than 2.3m long and extended beyond the limit of excavation and was between 0.6m and 0.7m wide. It was filled with a dark grey silt and

orange firm clay (***1003***) and contained 20th century refuse. It was purposefully left unexcavated as it contained what appeared to be asbestos.

4.2 Area B

4.2.1 Area B comprised a rectangle, orientated north-west/south-east, *c*20m by 25m (Figure 3) with the intension of examining features revealed in Trench 2 of the original evaluation. The line of this trench was revealed and the large ditch originally encountered probably corresponds to ditch ***2006/2025***. The area was stepped slightly, *c*3m in along the south-east side to make up for the additional area stripped in Area A, and totalled approximately 480m^2. The topsoil was a soft brownish-grey silt (***2000***) and contained large blocks of brickwork, including mortared sections and concrete, particularly in the south-west corner. It was between 0.5m and 0.8m thick on top of a greyish-brown silty clay subsoil (***2001***) up to 0.3m thick above the clay natural (***2032***). Again, there were several ceramic land drains cut into the subsoil and natural (see Figure 3), which were unrecorded by the earlier evaluation (NPA 2004). All of the underlying archaeological features were cut into the natural (***2032***).

4.2.2 There was a curvilinear ditch towards the north corner of the area, which measured roughly 7m north/south before bending round to the north-east at its north end (Figure 7). The north-east/south-west section continued for around 6m and probably continued beyond the limits of the trench, but its full extent could not be traced due to surface water entering the trench and the poor weather conditions. The south end of this feature was truncated by modern disturbance probably related to one of the earlier evaluation trenches (NPA 2004, trench 2?) though it may have continued beyond that to the south. Two slots (***2031*** and ***2025***) were dug into this feature to the north. At its north end the cut [***2031***] was *c*1.3m wide, shallow, with slightly concave sides at 30˚ to horizontal, a slight 'step' to the south-east side and an even break of slope to a flat base (Figure 7; Plate 14 and Plate 15). It contained two fills: a brownish-grey silty clay upper fill (***2029***), 0.17m thick, and a darker brownish-grey silty clay lower fill (***2030***) with charcoal and slag inclusions, *c*0.07m thick. The lower fill was mostly to the south-east side of the slot through ditch, and extended *c*0.6m from the south-east edge towards the centre of ditch over the 'lip' on the south-east side of the cut (Figure 7). Nearer where the feature was truncated by the area of modern disturbance the cut [***2025***] formed a similarly wide albeit slightly deeper U-shaped profile (Figure 7 and Plate 16). The upper fill was a similar grey/brown clayey silt (***2024***; probably the same as ***2029***) with charcoal inclusions and slag deposits and the thinner, lower deposit (***2023***; probably the same as ***2030***) contained a lot of charcoal.

Plate 14: North-east-facing section of ditch *2031*

Plate 15: South-west-facing section of ditch *2031*

Plate 16: North-facing section of ditch *2025*

4.2.3 Around 2.6m to the south-east of the curvilinear ditch to the north side of the area [***2031***/***2025***] was a small circular feature [***2015***] (Figure 7), which was initially assumed to be the remnants of a bloomery but given the lack of associated metal smelting it is referred to in this report as a 'fire pit'. It was around 0.6m diameter with a heat-affected area adding *c*0.15m to the west side (Figure 8). The heat-affected area created a slight break round the outside edge of the cut, where it was shallower, and the generally smooth, shallow sides had an even break of slope to a concave base (Figure 8; Plate 18). The upper fill, a dark grey/black friable slightly sandy silt (***2012***), *c*0.25m in diameter and 0.02m thick, was dished near the centre of the cut, and contained a small amount of burnt bone. Below that was a soft, pale yellowish-grey, sandy clay, with a grey patch along the south-west side (***2013***). This oval-shaped concave deposit was 0.44m wide by 0.5m long by 0.04m thick. At the base of the cut was a firm clay/burnt clay deposit (***2014***), which had clearly been heat-affected, and varied from an intense orange, especially along the south-west edge, to a deep brown/dark brown. It too was a round oval on the whole, 0.55m to 0.65m in size, and extended in area of affect, adding 0.15m by 0.5m on the west side. The maximum depth of the cut was *c*0.09m, though the heat effect perhaps penetrated up to an additional 0.07m into the clay natural (***2032***).

Plate 17: Feature *2015*, the remnants of the 'fire pit', viewed from the north

Plate 18: North-facing section of feature *2015*

4.2.4 There were a number of seemingly intercutting features to the south of the area of modern disturbance, which is thought to have been one of the evaluation trenches, but it is unclear which one of these might represent a continuation of the curvilinear ditch [***2025***/***2031***] to the north (Figure 9; Plate 19). Unfortunately, the area of modern disturbance prevented the physical relationship between the features to the north and the features to the south from being established. The westernmost of these features [***2006***] was curvilinear in plan, 2.5m wide at the top and narrowing to 0.9m wide at the base, with sides at 45˚ to a flattish, slightly undulating base (Figure 10; Plate 20 and Plate 21). It should be noted, however, that the profile of this ditch is not particularly similar to those recorded in the curvilinear feature to the north [***2025***/***2031***]; it may be that this curving ditch is the same as ditch *102* from the evaluation (NPA 2004), but there are many problems with the earlier report. The uppermost fill [***2006***] was a brownish-grey silty clay (***2003***), up to 0.1m thick, with large pieces of slag, and sand lenses. Below that was a dark grey/brown silt (***2004***) with 10% angular red sandstone inclusions, and slag and charcoal, up to 0.15m thick and 1.1m wide. The basal fill (***2005***) was a mottled orange and dark grey silty clay, with slag inclusions, less than 0.1m thick and 0.9m wide. Against the south-east side of this ditch was another possible ditch [***2027***]; it may have been a ditch terminus or a pit (Figure 9; Plate 22). It was linear in plan, orientated north-west/south-east, and aligns fairly well with the features to the north of the modern disturbance. It was 1.5m across and a D-shaped slot, *c*0.8m wide, was excavated across the south-east end. It had shallow, slightly concave sides, up to 0.1m deep, with a gradual break of slope to a slightly concave base, and had a dark grey, fairly firmly compacted, silty clay fill (***2026***) (Figure 10). No physical relationship was apparent between these two features (***2006*** and ***2027***) in the south-west side of the old evaluation trench (Plate 23) and there was no discernible difference between the uppermost fills of either ditch (***2027*** and ***2006***) at the surface (Plate 24), so the relationship between the two features was not determined. There was possibly another cut feature to the south-east [***2028***] (Figure 9), though its fill too was indiscernible from that of the others (***2026***, the fill of ***2027*** in particular). This possible cut was oval in plan, though only 0.7m by 0.23m remained to the side of evaluation trench. It was *c*0.2m deep, with concave sides and base, and filled by a slightly sandy clay, similar in colour to ***2026*** and indiscernible from the backfill of the evaluation trench.

Plate 19: Intercutting features (*2006*, *2027,* and *2028*) to the south of the earlier evaluation trench, viewed from the south

Plate 20: North-east-facing section of ditch *2006*

Plate 21: South-west-facing section of ditch *2006*

Plate 22: South-east-facing section of possible ditch *2027*

Plate 23: The south-west elevation of the old trench in Area B

Plate 24: Intercutting features (*2006*, *2027,* and *2028*) to the south of the earlier evaluation trench, viewed from the north-west

4.2.5 In the west corner of the trench was another linear ditch [***2011***] orientated north/south, 1.1m wide and 0.45m deep (Figure 9). Its sides were shallower towards the top of the cut and steeper towards the flattish base. It contained four distinct fills, forming a fairly harmonious, symmetrical sequence across the section (Figure 10; Plate 25), and the more charcoal-rich deposits were immediately apparent to the outer edges of the feature from the surface (Plate 26). The uppermost fill was a brownish grey silt (***2007***), 0.75m wide and up to 0.2m thick. Below that, a mid-brownish orange silty clay (***2008***), 0.95m wide and up to 0.15m thick, then a lens of charcoal (***2009***), less than 0.05m thick and 1m wide, and a mid-brownish-orange silty clay (***2010***), up to 0.2m thick round the base and sides of the cut, and up to 1.1m wide. Around 5m of this ditch were exposed but it continued beyond the limit of excavation to the north and below a concrete and brick structure [***2002***] to the south (Plate 27).

Plate 25: South-west-facing section of ditch *2011*

Plate 26: Top-down view of ditch *2011*, viewed from the south

Plate 27: Ditch *2011*, viewed from the north-east

4.2.6 A brick and concrete structure [***2002***], 9m long, along the south-west edge of the area from the west corner, intruded around 2m into the area to the north-east (Figure 3 and Figure 9; Plate 28). The structure comprised a linear wall, running north-west/south-east, with a slight return at the south-east end, sat on a concrete footing, with a concrete slab to the north-west and another block of brickwork to the south-east. The bricks were fairly rough, each measuring 250mm by 120mm by 70mm; they were unfrogged and laid in English garden bond (?), bonded with a sandy mortar. The remaining section of wall was up to 0.55m tall and the exposed north side was rendered. The concrete footing on the north-east side was approximately 0.25m wide and the concrete slab to the north-west was *c*1.5m by 0.85m (Plate 29). There were plastic water pipes below the concrete slab and further metal (water?) pipes exposed in the section and near the south-west side of the trench to the south-east (Figure 3).

Plate 28: Structure *2002* (note this photograph has been brightened digitally)

Plate 29: Concrete slab to the north-west end of structure *2002*

4.2.7 To the north-east side of the area was a curious boot-shaped feature (Figure 10). This linear ditch, orientated north-east/south-west, 1.7m wide and *c*0.5m deep, originally comprised a cut [***2016***] with a U-shaped section with sloped sides and a rounded base, but it had been recut [***2022***] and presumably extended to the south-east side (Figure 10; Plate 30). The lowest deposit (***2017***) within the original cut [***2016***] comprised loosely compacted charcoal, 0.30m wide and 0.10m thick. Above that was a mixed deposit of grey and light brown clay/silt (***2018***), with some flecks of charcoal, 1m wide and *c*0.20m deep, some redeposited orangey clay (***2019***), 0.60m wide by 0.10m thick, and a grey/light brown silty clay (***2021***), with some charcoal inclusions, 0.90m wide and 0.30m thick. This upper deposit was truncated by a cut with broad-mouthed, pointed V-shape profile [***2022***], 0.25m deep, with sides at 45˚ to the horizontal. This in turn was filled by a hard grey clay (***2020***) (Plate 31).

Plate 30: Ditch *2016*, viewed from the south-west

Plate 31: North-east facing section of ditch *2016*

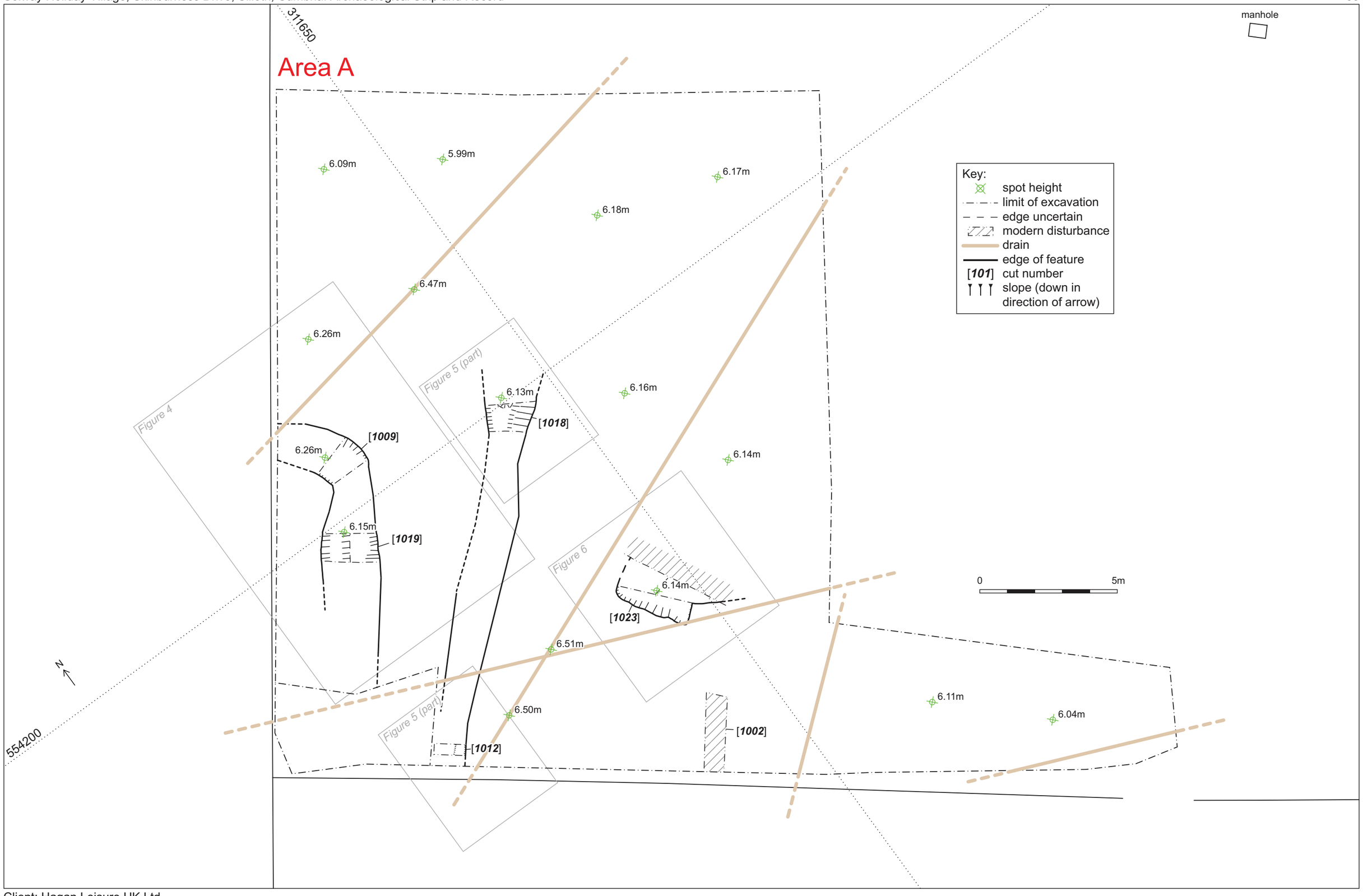


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Figure 2: Area A plan

Figure 3: Area B plan

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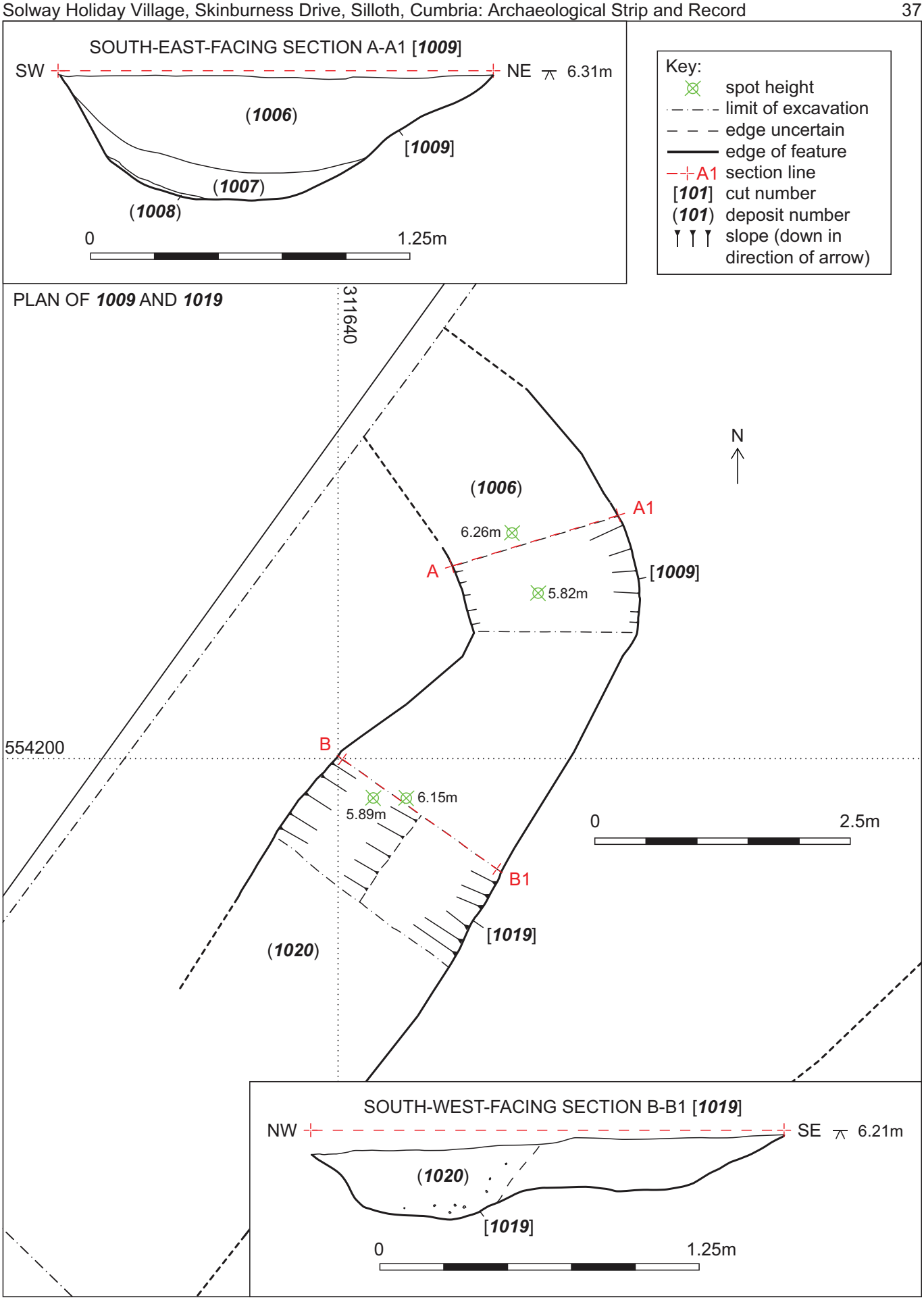

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Figure 4: Plans and sections of *1009* and *1019*

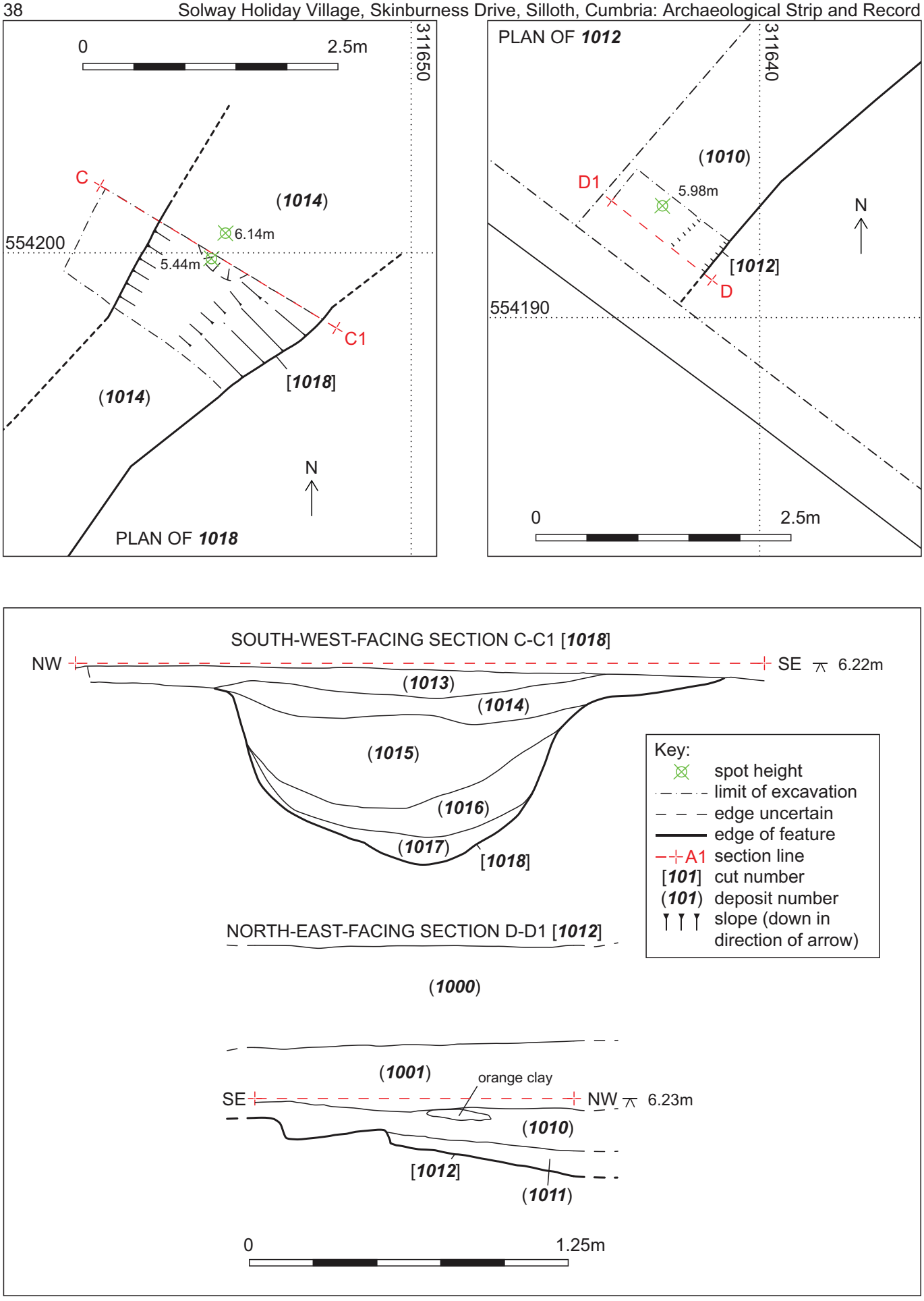

Figure 5: Plans and sections of *1012* and *1018*

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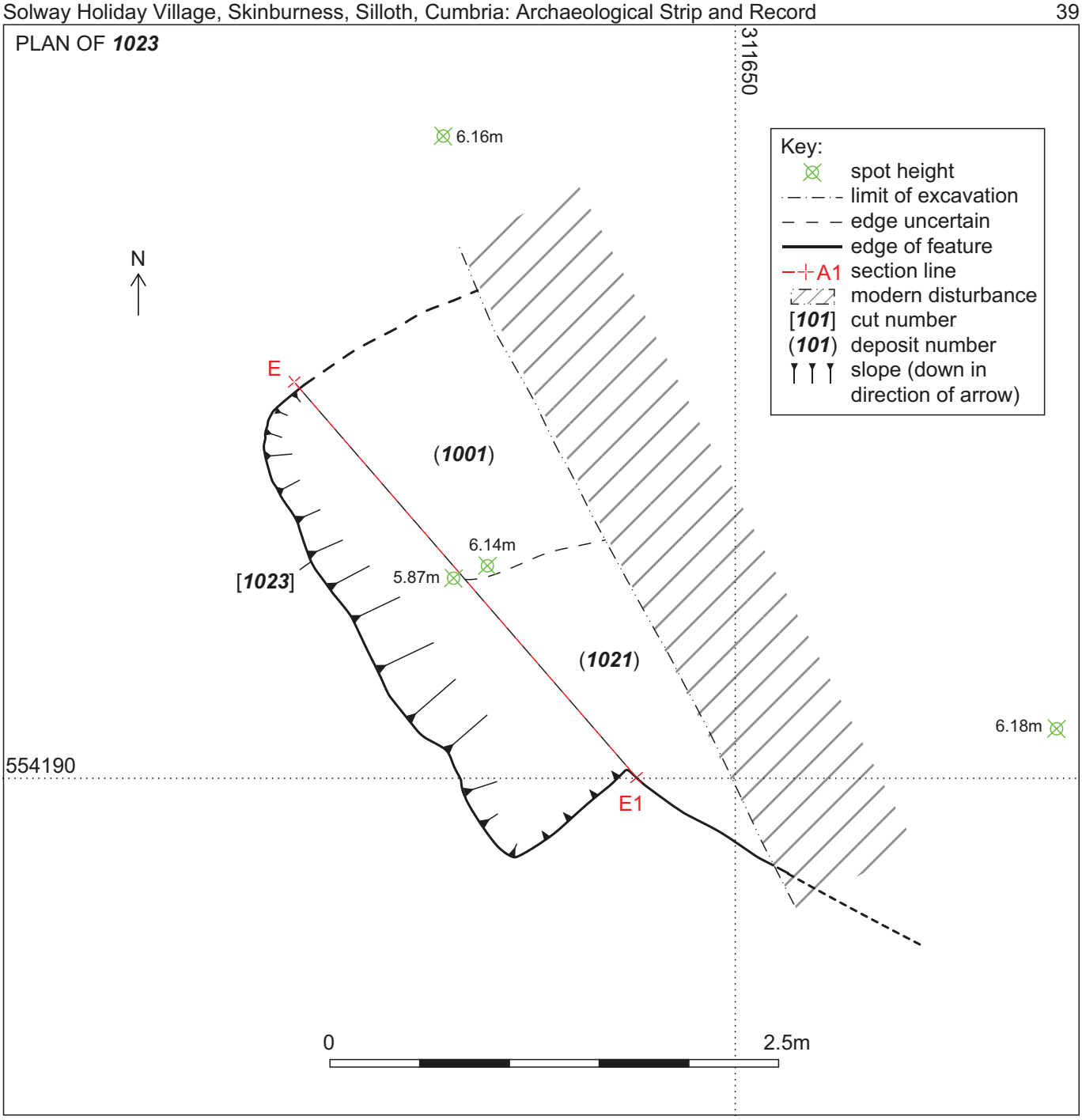

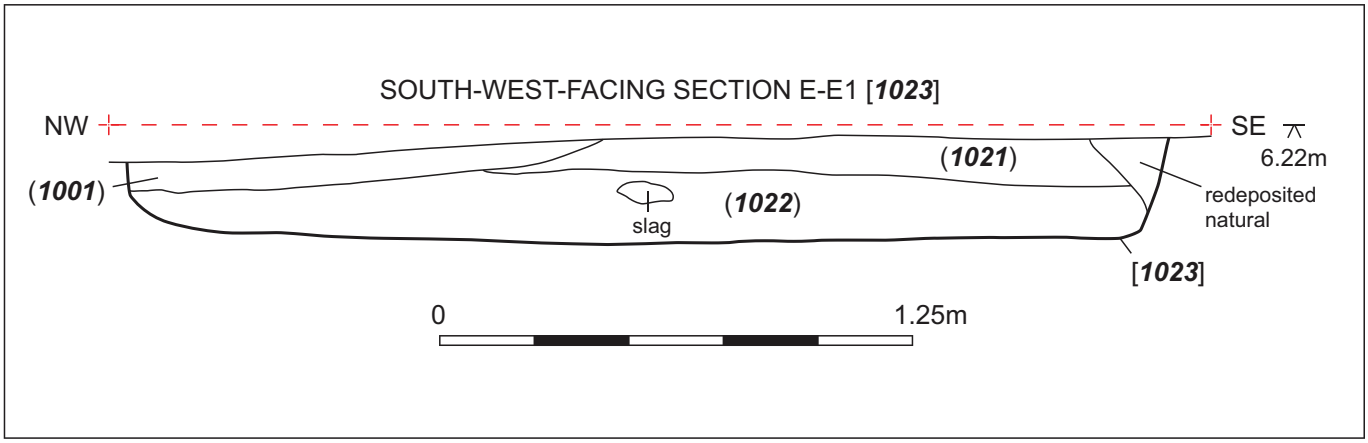

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Figure 6: Plan and section of 1023

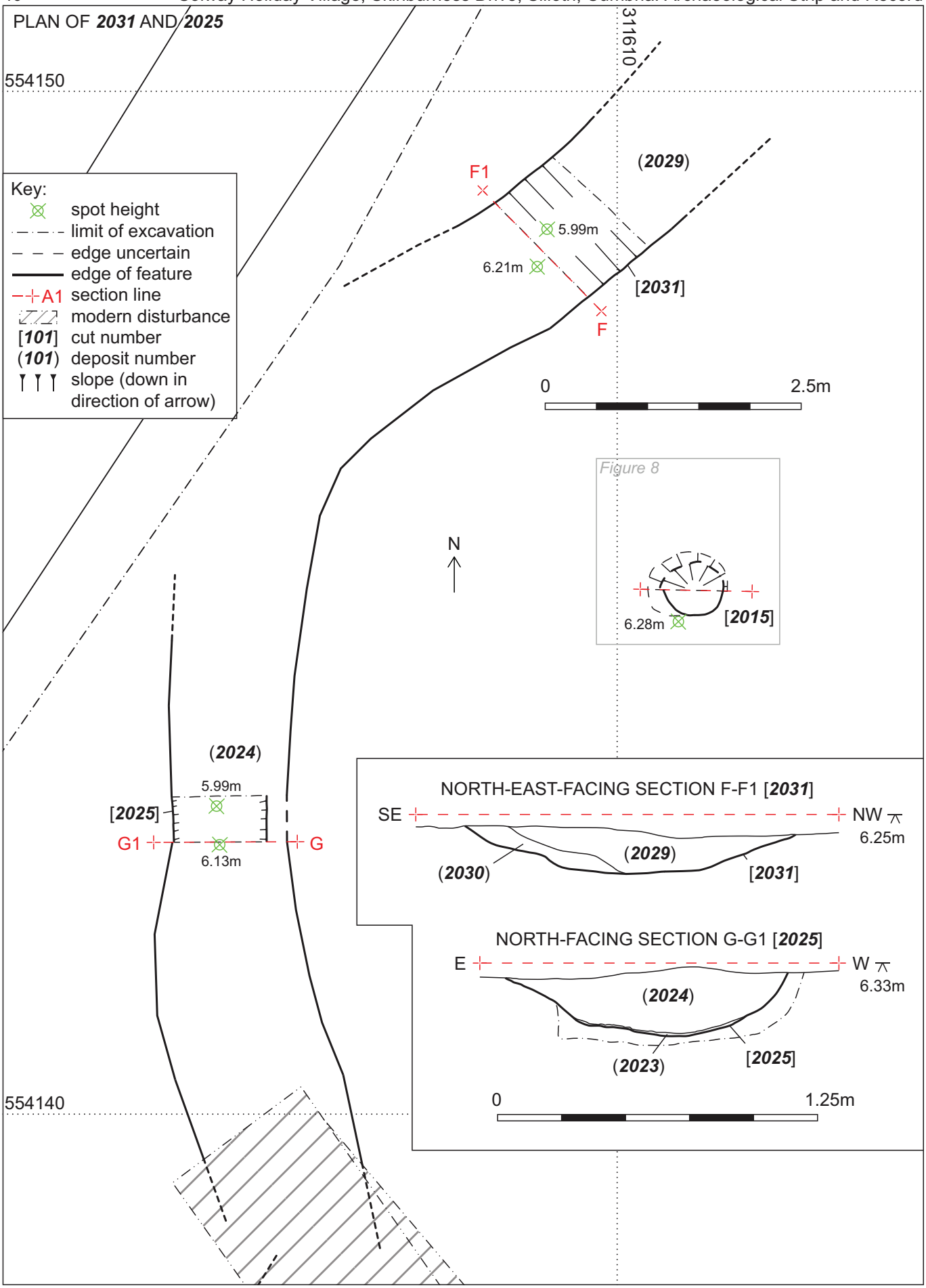

Figure 7: Plan and sections of *2031* and *2025*

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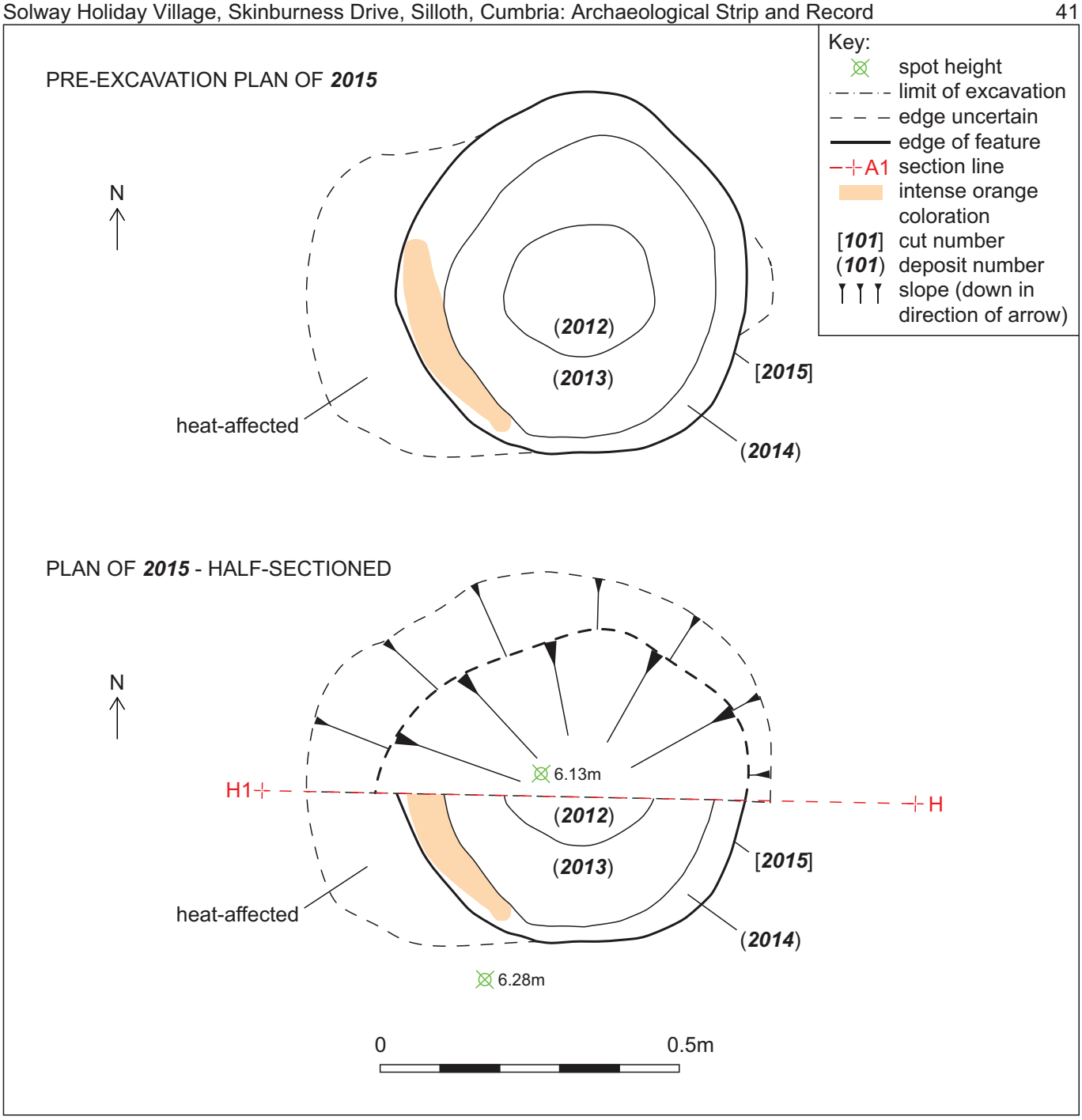

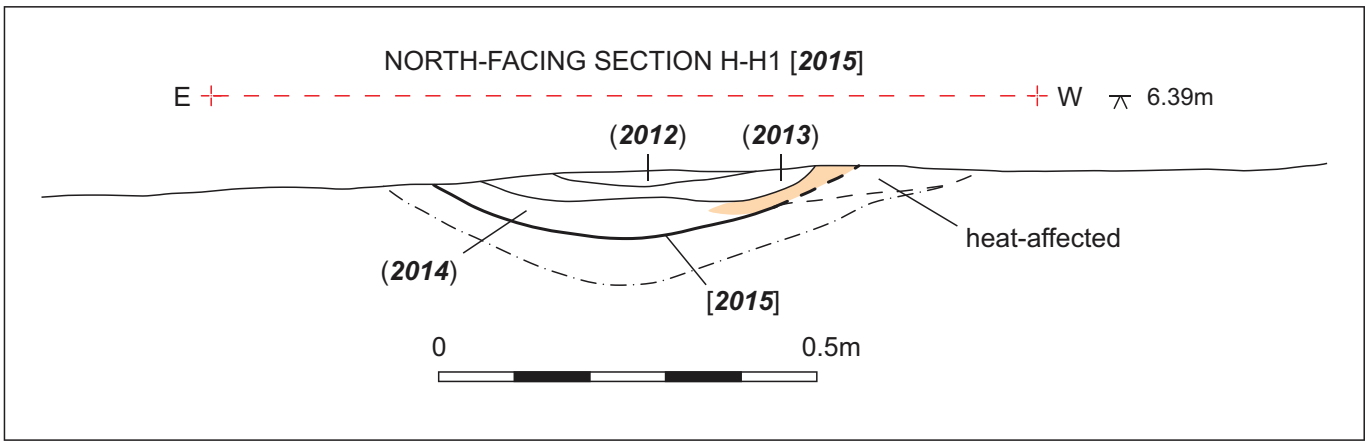

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Figure 8: Plans and section of *2015*

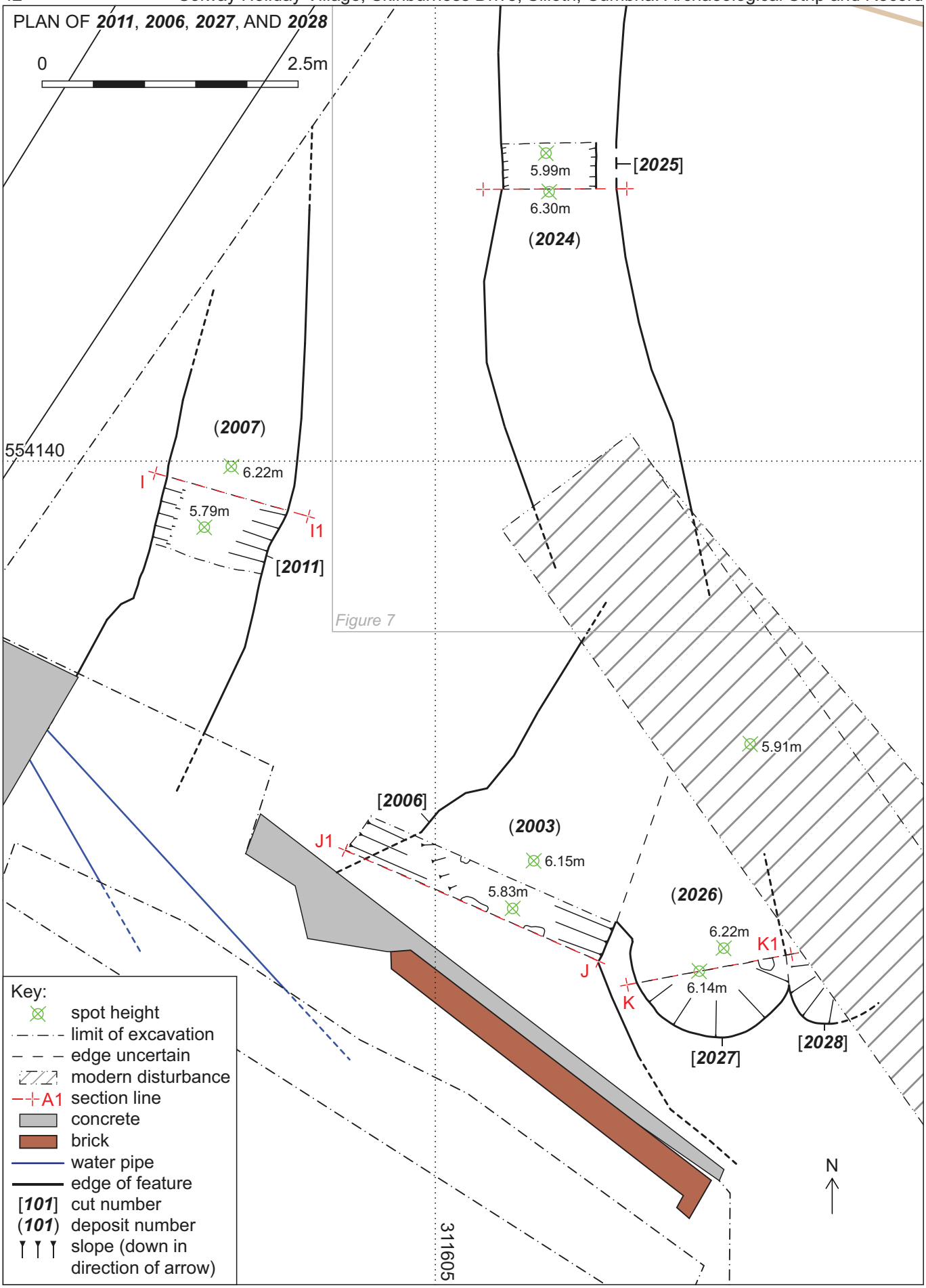

Figure 9: Plan of *2011*, *2006*, *2027*, and *2028*

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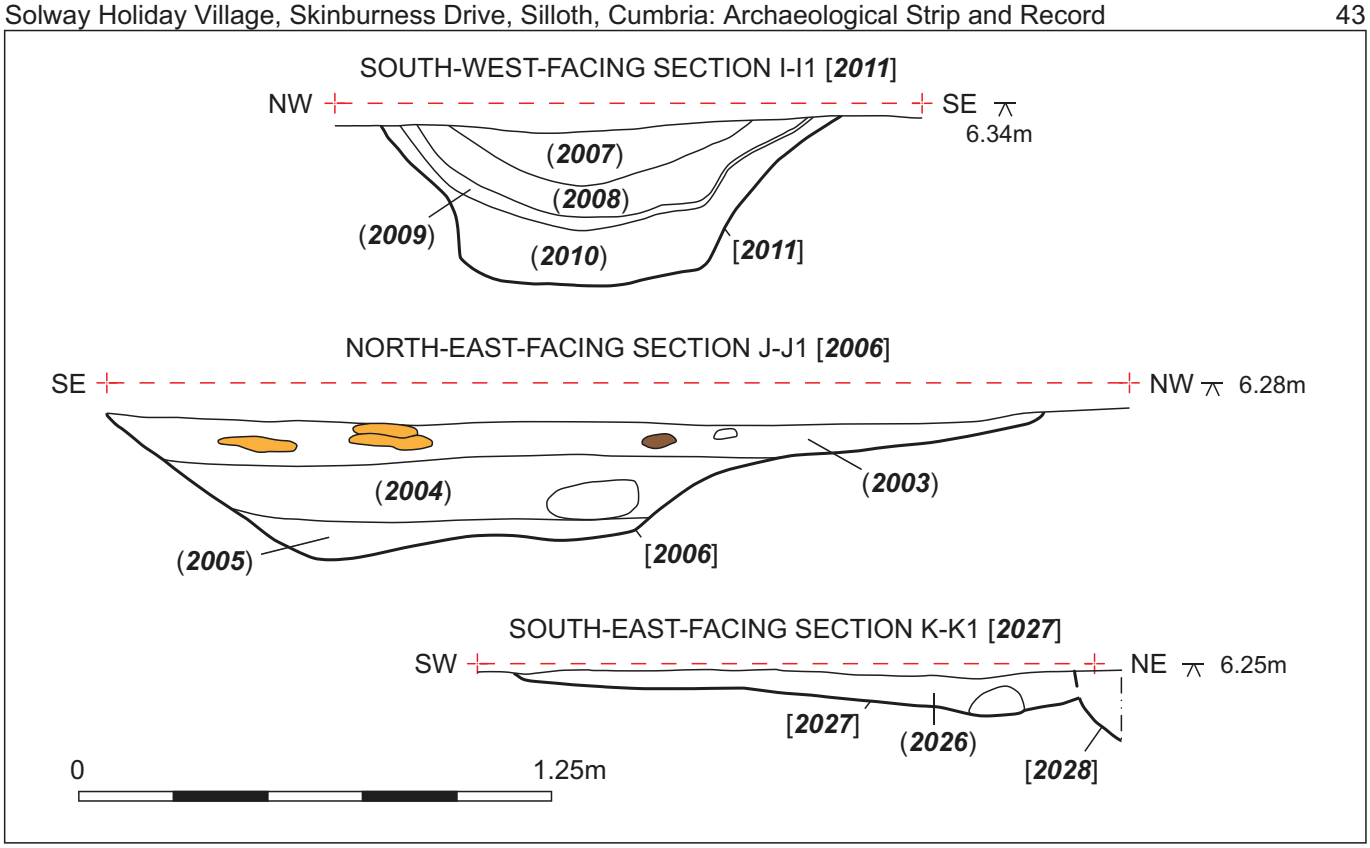

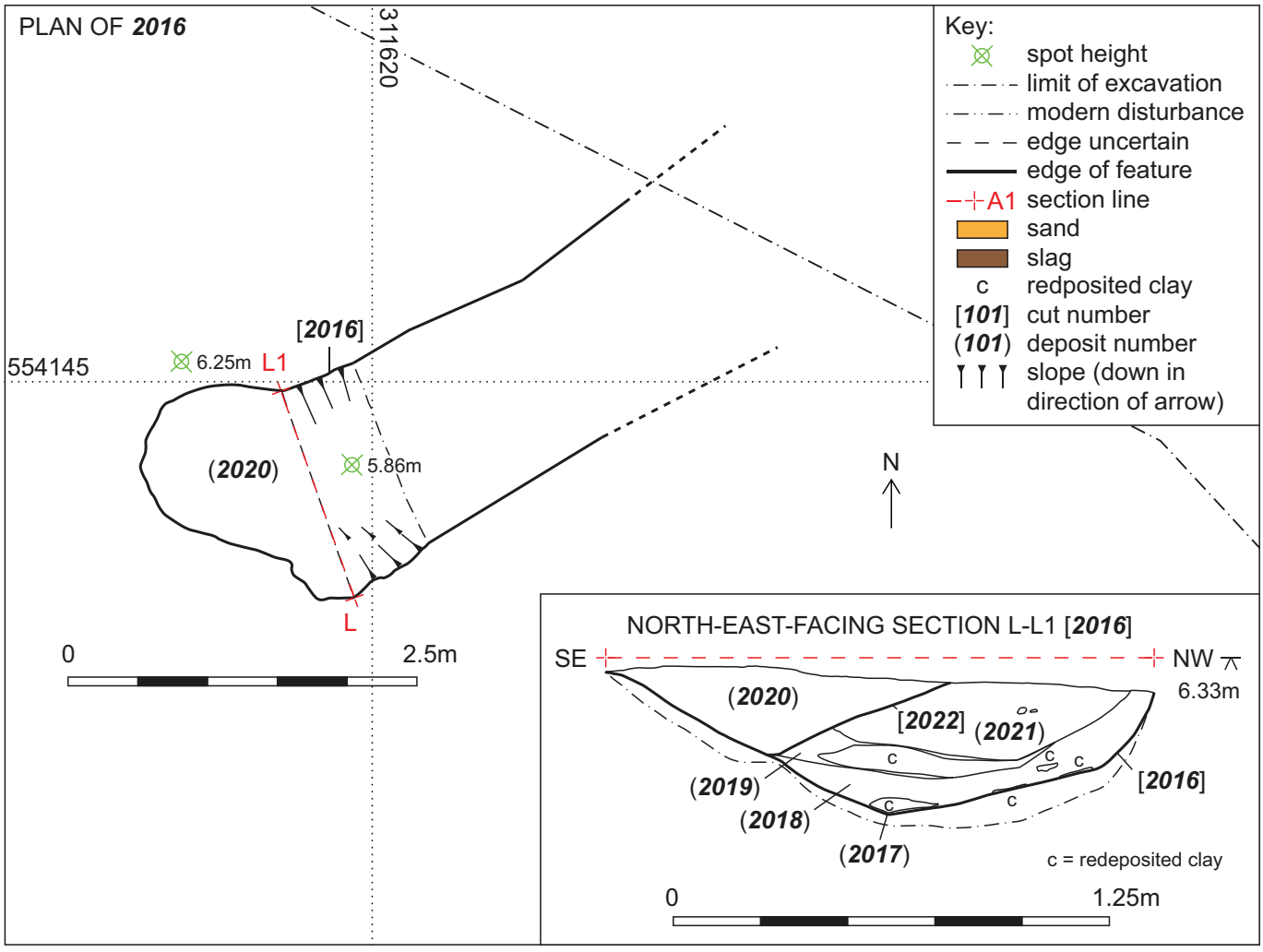

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Figure 10: Sections of *2011*, *2006*, and *2027*, and plan and section of *2016*

4.3 Finds

4.2.1 ***Introduction***: in total 280 finds were recovered by hand during the strip and record, the vast majority comprising pieces of slag. Each type is discussed in the following sections, which are organised in chronological order where possible. A summary of all of the finds is present in *Appendix 3*, and data tables from the specialist reports are presented in the appendices that follow it.

4.2.2 ***Stone***: four stone objects were retrieved during the strip and record. One of these, from the lower fill of ditch ***2011*** (***2010***) comprised an essentially natural nodule of flint but this is of note because flint does not naturally occur in the local area and was collected for a number of purposes from the prehistoric period onwards. This piece is not evidently worked and so cannot be dated. The remaining pieces comprised sections of red sandstone from the fills of ditches ***2006*** and ***2011***; two relatively large slabs and the other only a small fragment, all with one very smooth surface although on the large slabs this has been cut and notched. These all presumably relate to the sharpening and finishing of iron blades, but it would require further more specialist investigation to establish the exact uses to which they were put and their likely date.

4.2.3 ***Medieval pottery***: 10 fragments of medieval pottery were recovered in total from five different contexts, including one fragment from the retent from sample 14 (context ***2026***, see below). The material includes possible gritty ware, lightly-gritted sandy fabrics, and one piece of late medieval reduced grey ware. The suggested date ranges for these fabrics and ware types here are based on the interpretation of excavated material recovered from elsewhere in the region to which this material is broadly similar (e.g. McCarthy and Brooks 1992; Greenlane Archaeology 2011, 8-9). Medieval ceramic material was recovered from both areas.

- **Area A**: the five residual fragments recovered from the subsoil in Area A (***1001***) were a mix of soft, very lightly gritted sandy fabrics and one piece of possible gritty ware. These fragments were all small in size and much abraded. Vessel forms could not be identified apart from saying that one fragment came from a thin-walled vessel. These fragments are probably of broadly 12th to 14th century date. The sandy ware rod handle fragment from the upper fill of ditch ***1018*** in Area A is probably of a similar date;
- **Area B**: the upper fill (***2003***) of ditch ***2006*** contained a large fragment, probably the base of a gritty ware vessel of 12th to 14th century date. The fabric of this piece was similar to that of a fragment from ***2021***, which was the upper fill of the boot-shaped cut (***2016***) to the north-east side of the area. The other piece from ***2021*** was a small piece of sandy ware of a similar date. The small body fragment of reduced grey ware from the fill (***2026***) of the shallow pit or possible ditch terminus ***2027*** is probably later, perhaps 15th to 16th century, although a broad date range for the tradition ranges from the late 13th to the early 17th century (Brooks 2000, 140).

4.2.4 ***Slag***: *Slag Classification*: the slags were visually examined and the classification is based solely on morphology. The debris associated with metalworking, or submitted in the understanding that they are associated with metalworking, can be divided into two broad groups; residues diagnostic of a particular metallurgical process or non-diagnostic residues that may have derived from any pyrotechnological process (McDonnell 2001). The diagnostic ferrous debris can be attributed to a particular ironworking process; these comprise ores and the ironworking slags, i.e. the macro, hand recovered smelting and smithing slags and the micro-residues such as hammerscale and slag fragments recovered from sieving programmes. The second group, are the diagnostic non-ferrous metalworking debris, e.g. crucibles and moulds. Thirdly, there are the non-diagnostic slags, which could have been generated by a number of different processes but show no diagnostic characteristic that can identify the process. In many cases the non-diagnostic residues, e.g. hearth or furnace lining, may be ascribed to a particular process through archaeological association. The assemblage was difficult to assess, due to conflicting evidence. To investigate the slags further selected samples were analysed by Hand-Held X-Ray Fluorescence (HH-XRF) to characterise the elemental composition of the slags and investigate similarities and differences across slag types. The residue classifications used in the report are defined below.

4.2.5 *Diagnostic Ferrous Slags and Residues:*

- Ore (Ore) - iron rich natural mineral, may be identifiable to a particular type e.g. Goethite or hematite
- Tap Slag (Tap) - this smelting slag is characterised by its ropey flowed morphology, indicating a free-flowing slag. The slag is normally black in colour. The upper surface is smooth, sometimes with ripples. Large gas bubbles may be present.
- Smelting Slag (Smelt) - this smelting slag is characterised by its viscous appearance (compared with the relative free flowing morphology of smelting tap slags). When fractured it display a fine-grained texture with predominantly small vesicles.
- Slag Cake (Cake) - smelting slag that has cooled in a small pit or depression. They are often plano-convex in shape (see Hearth Bottoms below). The weight (grams), major diameter (mm), minor diameter (mm) and depth (mm) area recorded. A theoretical volume is calculated.
- Hearth Bottom (HB) - a plano-convex accumulation of iron silicate slag formed in the smithing hearth. The dimensions of the hearth bottoms (weight (grams), major diameter (mm), minor diameter (mm) and depth (mm)) are tabulated and compared to data from other sites.
- Hammerscale - there are two forms of hammerscale, flake and spheroidal generated during the smithing process. The presence of hammerscale is therefore a strong indicator that smithing (primary or secondary) was carried out on the site. Their small size precludes their hand recovery, and they are usually recovered during soil sample sieving (for environmental data).
- Smelting Scale – small flakes similar to both types of hammerscale that probably derive from the smelting rather than the smithing process. There is no morphological distinction between smithing and smelting scale, however the archaeological context will inform the interpretation.
- Metal – fragments of metallic iron.

4.2.6 *Non-Diagnostic Slags and Residues:*

- Furnace (or Hearth) Lining - the clay lining of an industrial hearth, furnace or kiln that has a vitrified or slag-attacked face. It is not possible to distinguish definitively between furnace and hearth lining; however smelting furnace lining tends to be larger than smithing hearth lining.
- Slagged Lining – heavily slag attacked furnace lining.
- Other – non-metallurgical material, e.g. stone.

4.2.7 *Results*: the assemblage comprises approximately 57kg of iron working slag, with small amounts of other residues. A general observation is that the slag pieces are medium to large whereas most smithing or smelting slag assemblages have a range of sizes of lump sizes. There are morphological features of both smelting slags and smithing slags in the assemblage, however in one sense the whole assemblage is internally consistent and probably derives from one process. The initial classification is based solely on morphology and the results are presented in Table 1. The dominant slag type of the assemblage was smelting slag which accounted for 48% by weight of the assemblage (Table 2). The smelting slag was dense, fine grained indicative of complete liquidity, but lacking the flowed surface morphologies of classic tap slag (Plate 32). Some pieces did display smooth surfaces, which is evidence of liquidity. There were 141 pieces of smelting slag recorded, giving an average weight of 200grams per piece, whereas analysis of a smelting site dominated by tap slag gives an average piece weight of c. 50grams. The second most abundant group were the slag cakes, plano-convex 'cast plates' of slag some with evidence of the feeder (Plate 33). The dimensions of the 13 slag cakes were recorded and are presented in Table 3. The average weight of the complete cakes was 1625grams and mean diameters of 150 and 124mm and a depth of 67mm. The example from Context 2024 was a double cake with one formed on top of another. One example from (unstratified) context ***1001*** was conical in profile with a depth of 100mm and major diameter of 140mm, another displayed a depression in the upper surface which is a common feature of smithing hearth bottoms. One example (context ***1001***) had the impression of large charcoal fragments (40mm long) which is characteristic of some smelting slags. The reconstructed weight, diameters and depth of the incomplete smelting cakes were determined and then

a theoretical volume was calculated, and a plot of weight against volume produced (Figure 11), with the mean dimensions of the hearth bottoms the from Burton Dassett (Mills and McDonnell forthcoming) also plotted and demonstrates that the Silloth slag cakes are much larger than the Burton Dassett smithing hearth bottoms, which argues strongly that they derive from smelting, as they were too large to have formed in a smithing hearth. There was a single piece of tap slag (context ***2003***) that displays the characteristic smooth flowed upper surface of tapped smelting slag (Plate 34), however there were no small fragments of tapped slag, which are often present in smelting slag assemblages.

4.2.8 There were 15 complete or partial hearth bottoms (Table 4, Plate 35), with a mean weight of 470grams (Mean D1=102mm; Mean D2=87mm; Mean DP=43mm), and were identified as hearth bottoms due to their small size compared to smelting slag cakes. The dimensions of the partial hearth bottoms were reconstructed and a theoretical volume calculated, which resulted in two of the partial hearth bottoms being reclassified as slag cakes, due to their size. These data were plotted with the data from the slag cakes (Figure 11) and show a spread of values with hearth bottoms placed comfortably with the minimum and maximum values of the Burton Dassett data.

4.2.9 Eight fragments of furnace (or hearth) lining and 15 pieces of slagged lining were recovered. A single piece of stone was also identified (Other heading in Table 1) and is subsequently ignored.

4.2.10 The examination of the micro-residues recovered from the sieving programme revealed the presence of small magnetic flakes (Table 5) in 20 of the 29 contexts containing micro-residues. All of these contexts are stratified and would indicate that the ironworking process(es) were in operation when the contexts were open. One context (***2026***) contained a fragment that was probably ore. There was no distinct, recognisable smithing hammerscale present in the samples. However, the micro-residues from iron smelting sites are poorly researched.

4.2.11 *Hand-Held X-Ray Fluorescence Analysis*: To investigate the elemental composition of the slag, a small number of selected samples (tap slag, smelting slag, slag cake and hearth bottom), were analysed using Hand-Held X-Ray Fluorescence (HH-XRF). The methodology is provided in *Section 2*. The aims of the analyses were to investigate the chemical composition of the slags; to assess whether there was a significant level of manganese oxide present in the slag which is a strong indicator that the slags were iron smelting slags; to assess whether there were any significant differences between the major slag types, with a focus on any differences between the slag cakes and the hearth bottoms.

4.2.12 The samples selected for analysis are presented in Table 6, and they were all from stratified contexts. The results are typical of early ironworking slags (Figure 12 shows the spectrum derived from the tap slag sample (context ***2003***)). However, there is considerable variation in the data, for example the silica (SiO_2) content varies between 13% and 83%. However, some conclusions can be drawn. Firstly, the MnO content is very low (mean 0.2%), which means (a) the ore used was very low in MnO and (b) the oxide cannot be used to discriminate between iron smelting and iron smithing slags. The MnO content of the only piece of tap slag (context ***2003***, Figure 12) was 0.2%. Secondly the P_2O_5 content is elevated, with a maximum value of 8.0% (mean 2.9%), which implies the ore contained phosphorus, and/or the iron smelters were controlling the phosphorus content of the metal, either driving the phosphorus into the slag to produce a low phosphorus iron or increasing the phosphorus content of the charge to produce a phosphoric iron. Thirdly, the slags are low in K_2O and CaO. The mean values of the oxides for each slag type are presented in Table 7, and show that there is no clear difference between the smelting slags (tap slag, smelting slag and slag cakes) and the hearth bottom data. There are two values for the hearth bottoms, the second (HB2) excludes the data from the sample from context ***1021*** which contained a very high silica value (82%), This specimen, (and others) may in fact be heavily slagged lining that has peeled away from the furnace wall.

4.2.13 *Discussion*: the Silloth slag assemblage has an unusual profile with the smelting slag and the slag cakes dominating the assemblage. The HH-XRF analysis demonstrates that the iron smelters utilised a low manganese ore that probably contained a significant phosphorus content. This means that the MnO content cannot be used to discriminate between iron smelting slags and iron smithing slags. The absence of any recognised smithing slag lumps (randomly shaped pieces of smithing slag), and the absence of any recognisable smithing hammerscale argues strongly that the debris derived from iron smelting. This would result in the hearth bottoms being reassigned either to the slag cake group and

some to the slagged lining group. If all the hearth bottoms are re-assigned to the slag cake class then the catalogue is revised and shown in Table 9, and shows that the assemblage has equal amounts of smelting slag and slag cakes.

4.2.14 The distribution of the slags between the excavation area is shown in Table 10, and shows that approximately 2/3rds of the slags were recovered from area A. Table 11 shows the quantity of material in stratified and unstratified contexts in the two areas. Less than half (47%), by weight, of the slag derived from stratified contexts, with the majority (29%) recovered from Area B. In that area the largest quantity of slag (8.5kg) was recovered from context ***2024*** the secondary fill of ditch ***2025***, there was no hand-recovered slag from the primary fill (***2023***), but there were slag fragments and particles of 'smelting scale' recovered in the sieving programme (Table 5). The largest weight of material from the sieving programme was recovered from context ***2024***. This would indicate that the ditch was open at the time of the smelting operation. Context ***2003***, the upper fill of ditch ***2006***, produced 5.5kg of slag, including the single piece of 'tap slag'. The primary fill (context ***2005***) and the middle context (***2006***) as well as ***2003*** all produced slag and scale from the sieving programme. Contexts ***2003*** also produced fragments of furnace lining (Table 5). In Area A the largest amount of slag (1.8kg) and some furnace lining (153grams) was recovered from context ***1006*** the upper fill of ditch ***1009***. Fragments of slag and furnace lining were recovered from the sieved fraction of the primary fill (context ***1008***), and slag and smelting scale were recovered from contexts ***1007*** (secondary fill) and the upper fill context ***1006***. Table 12 provides a summary of the micro-residues recovered from the sieving programme from the major features. With the exception of context ***2014***, the primary fill of pit ***2015***, they all contain some metalworking evidence, but not all contain the smelting scale. It was noted that the actual primary deposit (context ***2017***), in ditch ***2016*** was a deposit of clay, which could have been discarded from the furnace building.

4.2.15 *Conclusion*: the slag recovered from the excavations at Silloth all derive from iron smelting. The slag profile, which is dominated by slag cakes and smelting slag, is very distinct and cannot be readily paralleled in England. One possible comparison is Millbrook in Sussex on the edge of the Weald, dated to the Saxon Period (Tebbutt 1982, McDonnell 1986). There may be better parallels in Ireland. The slag morphology would suggest either an Iron Age date or an early medieval date. The site location would support this interpretation as the iron smelters in these periods would have exploited bog ores rather than bedded ores.

4.2.16 *Significance*: if the slag is iron smelting slag dating either to the Iron Age or the early medieval period it is of regional significance and very important for our understanding of the development of iron working technology in Britain, and evidence for regional variations.

4.2.17 *Further Work*: to further understand and characterise the iron working technology, e.g. smelting technology and efficiency, more detailed scientific analysis should be undertaken. Research into better parallels in England, Scotland and Ireland should be undertaken.

4.2.18 ***Post-medieval pottery***: seven fragments of post-medieval pottery were recovered from context ***1003***, the fill of 20th century trench ***1002***. They were from an ironstone hotelware monogrammed soup plate manufactured by Alfred Meakin Ltd, and were dated to after 1891, and are probably of 20th century date.

4.2.19 ***Post-medieval glass***: a complete modern green beer bottle with crown closure, punt marked 'ØL / 4 / …' was recovered from context ***1003*** (the fill of 20th century trench ***1002***).

4.2.20 ***Clay tobacco pipe***: an abraded and somewhat brittle plain clay tobacco stem fragment was recovered from ***1001***. The borehole was misshapen, so stem bore analysis is impossible; a 'best guess' would be that it probably dates from the 18th or 19th century.

4.2.21 ***Iron***: the assessment of the iron objects aims to meet the requirements of MAP2 (English Heritage, 2001) and MoRPHE (English Heritage, 2006) to produce a stable site archive. This has involved X-radiography and an assessment of the condition, stability and packaging of the finds. The condition of the various classes of material is summarised and indicators of unusual preservation noted.

The potential of the assemblage for further analysis and research is discussed, and recommendations made for further investigative conservation and long term storage.

4.2.22 *Condition Assessment Summary*: the iron small finds were found to be corroded and in overall good condition. Hairline surface cracks indicating the presence of active corrosion were noted on all but one of the finds (find 22), dry storage is essential to avoid further outbreaks of active corrosion. X-radiography showed a majority of the objects to have mineralised cores although some appeared more robust in places. X-radiography has indicated that six of the finds (12, 14, 20B, 21, 1021 and 2026) are slag or metalworking waste. These could be referred to an archaeometallurgist if the context warrants further investigation. Mineral preserved organics (possible wood) were found to be present on thirteen of the finds (12, 14, 17, 20A, 20B, 21, 23, 1001, 1006, 1010, 1021, 2009 and 2026). The size, frequency and positioning of these indicate they are incidental, relating to the burial environment rather that the object itself. Spots of vivianite were visible amongst the corrosion products on one of the finds (find 2009) indicating an anoxic waterlogged burial environment. Store dry below 15%RH.

4.2.23 *Potential - indicators of preservation:* small isolated spots of vivianite were noted on one iron find (find 2009). It is formed in anoxic waterlogged conditions, slightly acidic and rich in phosphate, conditions which favour organic preservation. There were no other indicators of specific preservation conditions indicating all other objects having come from well-aerated terrestrial deposits.

4.2.24 *Potential - evidence of technology, craft or industry or anything else of note:* X-radiography has indicated that six of the finds (12, 14, 20B, 21 1021 and 2026) are slag or metalworking waste. These could be referred to an archaeometallurgist if the context warrants further investigation. One find (find 1001) was found to have a glass like inclusion.

4.2.25 *Recommendations - Further Investigative Conservation*: investigative conservation is proposed for the following artefacts to aid identification and clarification:

SF	Material	Aim
1004	Iron	Investigate to confirm object identification

Recommendations for further work are highlighted in bold in the tables in *Appendix 5*.

4.2.26 *Analysis and specialist support*: archaeometallurgist: Slag and metalworking waste (12, 14, 20B, 21, 1021, 2026) could be referred to an archaeometallurgist if required for publication or the context warrants further investigation.

4.2.27 *Packaging and Long Term Storage*: the finds are packaged in perforated finds bags. To ensure long-term stability the finds require storage in suitable sealed containers with silica gel to provide the appropriate desiccated environment of less than 15%RH. The desiccated environment will need to be maintained. Jiffy™ foam inserts should be placed inside the finds bag for extra support. All materials used must be archive stable and acid-free.

4.2.28 ***Animal bone***: a small assemblage of animal remains (738 fragments, weighing 64.3g) was recovered via hand collection and from bulk environmental samples. This assessment includes quantification of the assemblage, identification at species level where possible, an assessment of significance and recommendation(s) for any further work.

4.2.29 In total, 738 bone and tooth specimens were recovered from 15 contexts (Table 17). The majority of the assemblage, by count, represented the remains of mammals (76.7%), with a number of fish bones (23.0%), and two bird bones from a small blackbird-sized bird (0.3%).

4.2.30 The assemblage was extremely fragmentary, with a mean fragment weight of less than 0.1g, and contained many specimens with 'poor' surface preservation (67.3%). Many of the bone fragments were burned or calcined (66.1%), their exposure to heat having caused at least some of the observed fragmentation. No evidence for animal activity in the form of gnawing, or butchery in the form of cut- or chop-marks was present in the assemblage.

4.2.31 The animal bone assemblage was recovered from fills of ditches ***1009***, ***1018***, ***2006***, ***2011*** and ***2031***, linear feature terminals ***2016*** and ***2027***, and 'fire pit' ***2015*** (Table 17). The animal remains recovered from the two 'fire pit' fills account for around half of the overall assemblage (50.9%), with

those from ditches ***2006*** and ***2011*** forming a significant component of the remaining material (35.2% and 9.8% respectively).

4.2.32 *Mammals:* the mammal remains formed 76.7% of the overall animal bone assemblage by count (n=566), Table 18. Only two contexts contained mammal bone remains that could be identified at genus or species level. Context ***2004*** contained the extremely fragmentary remains of one or two equid (horse/donkey/mule) teeth; the hand collected material (n=200) displayed sufficient morphology to identify the remains as equid, while those recovered from the environmental sample (n=28) could only be identified as 'large ungulate'. It is likely that the tooth fragments recovered from the sample are also equid. Context ***2008*** contained seven fragments of a cattle (*Bos taurus*) molar. Material from all other contexts, and the remaining material from both ***2004*** and ***2008,*** could only be identified within size categories at superorder (ungulate) or class (mammal) level due to fragmentation and exposure to high temperatures.

4.2.33 Of interest are the small ungulate remains from contexts ***2012*** and ***2013***, fills of 'fire pit' ***2015***, which represent the foot of, almost certainly, a single lamb/kid/faun (*Ovis*/*Capra*/*Capreolus*).

4.2.34 *Fish:* Fish remains were recovered from six contexts and included Atlantic herring (*Clupea harengus*), Atlantic cod (*Gadus morhua*), remains from Atlantic salmon (*Salmo salar*) or trout (*Salmo trutta*), and unidentified flatfish (Pleuronectiforme) (Table 19). Of the 170 fish bone fragments recovered, 51.2% could not be identified at any level lower than class. A high proportion of the fish remains displayed evidence for exposure to high temperatures (65.3%).

4.2.35 Most abundant were the remains of herring, being recovered from four contexts (***1009***, ***2004***, ***2012*** and ***2013***), though primarily from the fills of 'fire pit' ***2015***; ***2012*** and ***2013***. The herring remains consisted of vertebrae including first vertebrae and the hypural ('tail bone'), suggesting that whole fish were present. In total, the remains from the fills of possible 'fire pit' ***2015*** represent a minimum of two herring based on the number of vertebrae recorded and individual herring usually having 55/56 vertebrae (Ford 1933). Single herring bones were recovered from contexts ***1009*** and ***2004***.

4.2.36 Atlantic cod and flatfish remains were also recovered from the fills of 'fire pit' ***2015***. The Atlantic cod was represented by two vomer fragments and a left dentary. The flatfish bones included five vertebrae, a left dentary and a left articular, again suggesting the presence of whole fish. Though no formal measurement was undertaken, the size variation in the remains suggests that at least two flatfish had been deposited in this feature. Neither of the flatfish individuals were of particularly large size. All of the fish remains from the 'fire pit' fills were burnt or calcined.

4.2.37 The only other fish remains of note are the two fragments of a single vertebra from a salmonid family fish recovered from the lower fill of ditch ***2011***. Unlike many of the fish remains recovered, these bone fragments were not burned.

4.2.38 *Discussion:* the animal remains provide some limited evidence for the role of animals at the site, despite poor preservation. All of the mammal taxa recovered are consistent with those expected for archaeological deposits in the UK between the Neolithic and modern periods. The fish remains represent species that are available off the Cumbrian coast in modern times, and that are consistent with the types of fish known to be exploited as dietary resources during the medieval period (Barrett and Orton 2016).

4.2.39 'Fire pit' ***2015*** is the most interesting feature in terms of animal remains. It contained the remains of a young ungulate foot; from a lamb, kid or faun, and the majority of the fish remains recovered from the site including at least two herring, two flatfish and one cod. These remains most likely result from the discard of food waste into a fire.

4.2.40 *Recommendations for future analysis and dissemination:* no further work is recommended for the animal remains recovered. The recovery of animal bones from the site provides a glimpse into the role of animals, especially those exploited as dietary resources. However, the small size of the assemblage and poor surface preservation limits any further research potential. The remains may be discarded once the final reporting and/or publication is completed.

4.2.41 The data and discussion of the animal remains should be integrated into the site narrative and form a small section within the overall site reporting. There is nothing within the animal bone assemblage that warrants publication in its own right.

4.4 Flots

4.4.1 27 bulk sediment samples were recovered from suitable contexts during the strip and record. The aims of the assessment were to assess the presence, preservation and abundance of any environmental remains and to determine the potential of the material for indicating the character and significance of the deposit.

4.4.2 Results of the assessment are presented in Table 14 to Table 16 in *Appendix 6*. Material present in all of the samples was sufficient for AMS (Accelerated Mass Spectrometry) radiocarbon dating. The majority of samples contained abundant modern root material.

4.4.3 ***Cereal grain****:* cereal grains were present in varying quantities in nine of the sampled features. Oats (*Avena* sp.) and bread/club wheat (*Triticum aestivo-compactum*) were the most commonly occurring cereals. Oats were particularly abundant in fill ***2005*** of ditch ***2006***. Occasional hulled barley (*Hordeum vulgare*) grains were also identified in fills ***2003***, ***1010*** and ***1014*** of ditches ***2006***, ***1012*** and ***1018*** respectively. The cereals were generally very well preserved and unabraded. Cereals recovered from fill ***1008*** of ditch ***1009*** were abraded and vesicular.

4.4.4 ***Cereal chaff***: cereal chaff was present in seven deposits across four features (Table 14 to Table 16) and was particularly abundant in deposits ***2003***, ***2004*** and ***2005*** of ditch ***2006***. Chaff recovered included floret bases from cultivated oats (*Avena sativa*), undifferentiated awn fragments, undifferentiated culm nodes and indeterminate straw fragments. Occasional glume wheat glume bases were also present.

4.4.5 ***Wild taxa***: occasional charred 'weed seeds' (here used to include seeds, fruits, achene, caryopses etc.) were present in ten deposits across six features (Table 14 to Table 16). A small variety of weed seeds including knotgrass (*Polygonum aviculare*), goosefoots (*Chenopodium* sp.), knotgrasses (*Polygonum* sp.) and small (<2mm) grass seeds (Poaceae). Stinking camomile (*Anthemis cotula*), a weed of arable fields, was recovered from fill ***2004*** of ditch ***2006***. A small number of vetch/pea (*Vicia* sp. *Lathyrus* sp.) seeds were also present in individual deposits from five features (Table 14 to Table 16).

4.4.6 ***Other charred plant remains***: a small number of charred compacted organic concretions containing straw fragments and occasional cereal grains were present in fill ***1008*** of ditch ***1009***. Occasional small hazel (*Corylus avellana*) nutshell fragments were recovered from four deposits from three features (Table 14 to Table 16).

4.4.7 ***Wood charcoal***: wood charcoal was present in varying quantities in all sampled features (Table 14 to Table 16). The charcoal was well preserved and contained fragments of a size sufficient for AMS radiocarbon dating. The charcoal is predominantly oak but non-oak species are also present. Large fragments of oak charcoal were recovered from deposit (2009) a charcoal lens in ditch [2011]. The charcoal was unabraded and it is possible that it may have been the remains of a post. Four fragments of oak charcoal, ranging in size from 10 to 35mm, were also hand-collected from deposits ***1004***, ***1006*** and ***1021***. A small number of heather (*Calluna vulgaris*) stem fragments were identified in deposit ***2004*** from ditch ***2006***. Heather commonly grows in heaths, moors and rocky places and was used for various purposes including fuel, thatching, bedding, furnishing, broom making and dye production (Edlin 1973).

4.4.8 ***Scientific dating potential of the remains***: the dating potential of the remains will be dependent on the nature of the research questions posed. All but one (***1017***) of the sampled deposits contained material sufficient for radiocarbon dating. The environmental remains that offer the best potential for AMS radiocarbon dating are the cereal grains and non-oak charcoal fragments.

4.4.8 ***Discussion and Recommendations***: the environmental assemblage offers some information on site economy. Oats and bread/club wheat were the most commonly encountered cereals. Occasional hulled barley grains were also present. All were common cultivars in Medieval Britain. Historically oats were seen to be crops of poor soils as they yield less than other cereals when grown on good soils.

However archaeobotanical and historical evidence confirm that oats were not restricted to areas of poorer soil (Moffet 2006; 50).

4.4.9 The abundant cereal grain and weed seed assemblage provides valuable information on harvesting and crop processing techniques. Both oats and bread/club wheat are present in many of the deposits. It is not clear whether they were deliberately sown together as a mixed crop and were incidentally burnt together, or whether they represent an accumulation of debris from various burning events.

4.4.10 The presence of polygonum together with straw etc suggests that the entire crop was harvested together rather than just the panicles or ears. It is possible that it may have been used for fodder or thatch.

4.4.11 The range of flora reflects the exploitation of a variety of habitats including agricultural fields and heathland plants. The presence of hazel nutshell suggests that wild foods may also have been gathered and consumed, although it is possible that the nutshells were incidentally collected with fuelwood. It is likely that some of the wild plant species were growing locally either as weeds of the cereal crops or around the settlement.

4.5 Retents

4.5.1 Hand-recovered material from the retents is discussed with the hand-retrieved finds in the relevant sections above: slag, medieval pottery, bone, and iron, with the exception of charcoal and charred plant remains, which is discussed with the flots, above.

5. Discussion

5.1 Summary of Results

5.1.1 There were thick deposits of topsoil across the site overlying a thinner deposit of subsoil, which sealed features that were cut into the underlying natural. Several substantial linear and curvilinear ditches were encountered during the course of the strip and record, all of which contained several different fill deposits and frequently included a charcoal-rich deposit towards the base of the cut. The ditches appeared to be continuous though their profiles varied somewhat along their length, although it is not clear whether ditches revealed in the two different areas form parts of a single feature. Other features were also encountered, some of which may have been large pits or the ends of ditches, while a small feature that had evidently been utilised for *in situ* burning was also revealed but is of uncertain purpose.

5.1.2 There was a small ditch in Area A which contained mid-20th century refuse and two larger areas of modern disturbance (one in Area A and one in Area B), which probably represent the location of trenches from the earlier evaluation (NPA 2004). The west corner of Area B had also been substantially disturbed by a concrete and brick structure, sections of which had been spread through the topsoil and subsoil at this end of the site after it had been demolished. There were also several ceramic field drains across both areas, the presence of which was not commented upon in the earlier report, which may have caused additional disturbance to any underlying features.

5.1.3 The bulk of the finds recovered during the evaluation comprised a large quantity of slag, recovered by hand from the topsoil and subsoil and from within some of the features. Much of this material is not closely dateable, although the form of the slags suggests a date between the Iron Age and Early Medieval periods (see *Appendix 4*) the earliest finds from the site included fragments of medieval pottery. Medieval pottery was recovered from both areas of predominantly 12th to 14th century date, although a fragment of late medieval reduced grey ware of probably 15th to 16th century date was also recovered from the retent of one of the samples (from context ***2026***). This material was generally quite abraded, especially the material recovered from the subsoil (***1001***) in Area A. The material was usually retrieved from the upper fills of ditches (e.g. from the upper fills of ditch cuts ***1018***, ***2006***, and ***2016***).

5.2 Phasing

5.2.1 Despite the difficulty of dating the majority of the features revealed during the strip and record it is apparent from the range of material that was recovered, particularly the industrial residue, carbonised organic material and animal bone that the area of investigation is on the edge of a substantial and important site. Seven phases of activity can be identified.

5.2.2 ***Phase 1 (natural)***: the earliest deposits are represented by the naturally occurring boulder clays present in the two areas: ***1024*** and ***2032***. In Area A this comprised a relatively homogenous mid-orangey brown sandy clay, but in Area B this ranged from a much brighter orange to a pale blueish-grey clay. In both cases this undoubtedly represents material laid down during the last Ice Age, with the possibility that some might represent material deposited as a result of contemporary or later coastal change.

5.2.3 ***Phase 2 (early medieval?)***: the lack of intercutting features means that it is not possible purely on the basis of the archaeological evidence to determine whether any of the various ditches and pits were created at different times. It is therefore necessary to place ditches ***1012/1018***, ***1009/1019, 2006, 2011, 2025/2031*** and pit/ditches ***1023*** and ***2016*** and 'fire pit' ***2015*** in the same phase. The obvious ditches are presumably delineating the extent of some form of settlement or activity area, which is presumably focussed on an area to the west, while the possible pits are either forming a similar function or represent specific activities. Pit/ditch ***2016*** seemed to have been rapidly filled with a succession of dumped deposits, primarily clays, and was perhaps initially excavated as a clay pit and then utilised to dispose of unwanted material. Pit/ditch ***1023*** was truncated by a trench from the previous evaluation (it appears to correspond with the presumed ditch found in Trench 6) and was difficult to fully investigate due to flooding, but contained large amounts of charcoal. Given the evidence from elsewhere on the site

and its form it is conceivable that it originated as a simple charcoal kiln; structures of similar form are recorded elsewhere (Carlin 2008, 89-90). The 'fire pit' (***2015***) was initially presumed to represent the base of a bloomery, given its form and the quantities of iron working slag from the site, but it contained no associated evidence for this but did contain relatively large amounts of animal bone, much of it burnt. It seems more likely, therefore to have been associated with a more domestic activity such as cooking, unless it was expressly for the purpose of producing bone ash for use in the iron working process as a means of adding calcium (see Photos-Jones 2004). Dating this initial phase is difficult due to the lack of diagnostic artefacts, but it clearly preceded the final, medieval, phase relating to these features (Phase 4, see *Section 5.2.5* below). The form of the slags recovered from the site is suggested as being early, either Iron Age or Early Medieval (see *Appendix 4*) and the single radiocarbon date obtained, thought to have been from the base of one of the ditches although this is not clear, is from *c*AD 1,000. It therefore seems reasonable to assume that Phase 2 dates to the early medieval period, perhaps the late 10th or early 11th century.

5.2.4 ***Phase 3 (early medieval?)***: while the other features seem to have filled fairly quickly, probably as a result of their being used and then going out of use, the ditches seem to have filled fairly gradually, initially with deposits that probably resulted from gradual erosion, but also with some deposition, either deliberately as rubbish or accidentally as a result of activities taking place nearby, of charcoal and slag rich material. This presumably specifically relates to the active use of the wider site and the contents of the samples show that it was a mixture of domestic activity, including the processing of grain, and industrial, specifically smelting of iron. Again dating is difficult but it seems likely to belong to the late 10th or early 11th century on the basis of the following phase and the one carbon date. The site here also draws parallels with Killickaweeny in Co. Kildare in Ireland, which comprised a large settlement site defined by substantial ditches and containing evidence for both domestic activity and iron working dating primarily to the 9th to 10th centuries AD (Walsh 2008).

5.2.5 ***Phase 4 (medieval)***: it seems that following the initial filling of the ditches that the final filling of these was more gradual and probably primarily after several of the broadly domestic type activities, which were associated with Phase 3, had ceased. Medieval pottery of broadly 12th to 14th century date was recovered from the upper fills of some of these features, in particular ditch ***2006*** and feature ***2016***. What appeared to be a shallow pit (***2028***), probably cutting through ditch ***2006***, also contained medieval pottery, albeit of a later date, but can also be included in this phase.

5.2.6 ***Phase 5 (medieval to post-medieval)***: this phase is essentially a continuation of Phase 4, and represents the total abandonment of whatever settlement had previously been present. It is likely that the subsoil present in both areas (***1001*** and ***2001***) developed due to ploughing of the site; some possible plough furrows were observed but the wet conditions and nature of the investigation precluded detailed recording of these. The presence of large amounts of slag within these deposits, particularly in Area A, which also had two dark ashy lenses within the subsoil (***1004*** and ***1005***) suggests that slag heaps had been ploughed out as part of this phase. This activity can be dated to at least beginning in the medieval period on the basis of the finds, although it potentially continued into the 18th/19th century.

5.2.7 ***Phase 6 (late 19th – early 20th century***): it is clear that following the site being ploughed repeated attempts were made to drain the whole area. While some of this may have begun before the late 19th century and utilised more basic version of drainage techniques that didn't involve the use of ceramic 'tiles' the majority did. It is evident in Area A that two attempts to drain this area were made using ceramic tiles. This activity therefore must date from after *c*1830, when such tiles were introduced into the area, but is more likely to be late 19th or early 20th century in date (see Davis and Davis 2013).

5.2.8 ***Phase 6 (mid-20th century***): the development of the site by the RAF in 1939 led to the construction of a probable air raid shelter, represented by structure ***2002*** in Area B, which cut through one of the Phase 1 ditches. In Area A a narrow trench (***1003***) was also excavated and although not investigated in detail during the strip and record it was apparent from the finds recovered that this was also mid-20th century in origin.

5.2.9 ***Phase 7 (late 20th century***): the most recent activity on site is represented by the demolition of the RAF features, specifically the probable air raid shelter (***2002***) although a number of pill boxes

recorded in the initial desk-based assessment and walkover survey (OA North 2004) have also been removed. The site was then covered by a substantial deposit of topsoil (***1000*** and ***2000***), which must, at least in part, have been brought to the site given its considerable depth.

5.3 Conclusion

5.3.1 The difficulties in locating the trenches from the previous evaluation and the features found within them make comparing the results with those of the strip and record difficult. The inaccurate descriptions and lack of detailed illustrations in the evaluation further compound this; for example the ditch found in Trench 2 of the evaluation was described as being 1.75m deep when it is clear from the associated section drawing that this is actually the total trench depth, the ditch being closer to perhaps 0.6m deep at its deepest point. Similarly the natural in Trench 4 was described as being at a depth of 0.45m below the surface during the evaluation when it was closer to twice this during the strip and record. Despite these difficulties it is clear from the evaluation report that some substantial features were present, including remains associated with iron working, with a single radiocarbon date suggesting the site was occupied potentially at the end of the early medieval period, although it is not clear where this was obtained from.

5.3.2 The strip and record essentially confirmed the results of the evaluation, demonstrating that an archaeological landscape primarily comprising a series of large sinuous ditches was present. It also revealed that the supposed ditch revealed in Trench 6 of the evaluation was more likely a large pit (***1023***) as well as discovering additional features. The finds again demonstrated the importance of metal working on the site but also included pottery that indicated that the ditches had certainly gone out of use by the medieval period. The environmental samples also revealed extensive evidence for the processing of cereals as well as animal bone, much of it burnt, including deep sea species of fish. There was clearly therefore a considerable settlement perhaps to the west of and defined by the ditches. If the primary phase of the site is indeed early medieval, finding comparable examples in the region is extremely difficult. Extensive iron working evidence associated with post-hole built structures set within an area defined by ditches and dated to the late 7th to early 8th century has been recently revealed in Nether Wasdale (Helen Evans pers comm). A better comparison is perhaps the site at Killickaweeny in Ireland, which has already been referred to, where an entire settlement of 8th to 10th century date was excavated, within which were various structures, extensive evidence for domestic activity, and considerable amounts of iron working debris (Walsh 2008). This of course leads to some potential difficulties in making such comparisons across the Irish Sea, but the west coast of Cumbria has extensive evidence for being well connected with Ireland and the Isle of Man from the Neolithic period onwards.

5.3.3 Even if the features encountered were found to be entirely medieval in date, in which a more logical argument would be that they relate to a grange associated with Holme Cultram, the site is clearly of some considerable significance, with the wider environs evidently of great potential for further discoveries. However, given the depth at which the deposits of most importance were found, the current development proposals for the site are unlikely to impact upon these. Nevertheless, the results of the strip and record are worthy of publication after obtaining further radiocarbon dates, and the industrial residue would benefit from further analysis.

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Appendix 1: Project Design

SOLWAY HOLIDAY VILLAGE, SKINBURNESS DRIVE, SILLOTH, CUMBRIA

Archaeological Strip and Record Project Design

Client: Hagans Leisure UK Ltd

NGR: 31163 55416 (centre)

November 2018

1. Introduction

1.1 Project Background

1.1.1 Following the submission of a planning application (Ref. 2/17/0382) for the extension of an existing residential caravan park at Solway Holiday Village, Skinburness Drive, Silloth (NGR 31163 55416 (centre)), and following the completion of earlier archaeological investigation of the site (OA North 2004; North Pennines Archaeology 2004) a condition (No. 9) was placed on the decision requiring a programme of archaeological strip and record of two areas containing features of archaeological interest recorded during the evaluation so that these could be investigated and better understood. A brief outlining the nature and extent of the work required was produced by the Cumbria County Council Historic Environment Service (CCCHES; Parsons 2018) and this project design was produced in response.

1.2 Greenlane Archaeology

1.2.1 Greenlane Archaeology is a private limited company based in Ulverston, Cumbria, and was established in 2005 (Company No. 05580819). Its directors, Jo Dawson and Daniel Elsworth, have a combined total of over 30 years continuous professional experience working in commercial archaeology, principally in the north of England and Scotland. Greenlane Archaeology is committed to a high standard of work, and abides by the Chartered Institute for Archaeologists' (CIfA) Code of Conduct. The strip and record will be carried out according to their standards and guidance (CIfA 2014a).

1.3 Project Staffing

1.3.1 The project will be managed and supervised by ***Dan Elsworth (MA (Hons), CAIfA)*** with suitably qualified assistance. Daniel graduated from the University of Edinburgh in 1998 with an honours degree in Archaeology, and began working for the Lancaster University Archaeological Unit, which became Oxford Archaeology North (OA North) in 2001. Daniel ultimately became a project officer, and for over six and a half years worked on excavations and surveys, building investigations, desk-based assessments, and conservation and management plans. These have principally taken place in the North West, and Daniel has a particular interest in the archaeology of the area. He has recently managed a number of similar projects in the region including strip and record projects near Carlisle (Greenlane Archaeology 2015), Barrow-in-Furness (Greenlane Archaeology 2016a), in Lancashire (Greenlane Archaeology 2016b), and Kendal (Greenlane Archaeology 2018).

1.3.2 All artefacts will be processed by Greenlane Archaeology, and it is envisaged that they will initially be assessed by Jo Dawson, who will fully assess any of post-medieval date; medieval pottery will be assessed by Tom Mace. Finds of earlier date will be assessed by specialist sub-contractors as appropriate, but it is anticipated that this might include Gerry McDonnell for the assessment of metal working residue.

1.3.3 Environmental samples, and faunal or human remains will be processed by Greenlane Archaeology. It is envisaged that any environmental samples would be assessed by staff at Headland Archaeology, and significant quantities of animal bones by Naomi Sewpaul. Other remains, such as industrial material, will be assessed by specialist sub-contractors as appropriate.

2. Objectives

2.1 Archaeological Strip and Record

2.1.1 To mechanically strip two areas both 20m by 25m examining the features of archaeological interest revealed in the earlier evaluation. This will assess the presence or absence of features of archaeological interest within these areas, their extent, date, nature, and significance.

2.2 Report

2.2.1 To produce a report detailing the results of the archaeological strip and record, that will present the results, and assess the potential of the site and significance of the remains.

2.3 Archive

2.3.1 Produce a full archive of the results of the project.

3. Methodology

3.1 Archaeological Strip and Record

3.1.1 Two areas each 20m by 25m will be stripped by machine over the two areas of primary archaeological interest revealed during the previous evaluation – the ditches of a possible enclosure and related features, taking into account any constraints. These will be stripped by machine until a horizon in which any archaeological features corresponding to those found during the evaluation can be recognised. These will then be revealed, fully exposed, and sampled. This will comprise 50% half section in the case of pits and non-linear features and 10-20% sectioning in the case of linear features, although particularly significant features or features where there are particular research queries such as their dating or function, that have not been resolved by a 50% sample, will be 100% excavated where it is practical to do so. It is anticipated that the strip and record will initially take 10 days on site with three archaeologists.

3.1.2 The methodology, which is based on Greenlane Archaeology's excavation manual (Greenlane Archaeology 2007), will be as follows:

- The position of the two areas to be investigated, as determined by the brief, will be located through reference to local topography such as field boundaries by hand and/or through the use of a total station in order to locate the area to be stripped, although reference will also be made to the results of the previous evaluation in order to refine this where necessary;
- The overburden (which is likely to largely comprise topsoil) and underlying subsoil will be removed by machine under the supervision of an archaeologist until the level at which the features identified during the evaluation is reached;
- All features revealed at this level will be examined by hand in a stratigraphic manner, using shovels, mattocks, or trowels as appropriate for the scale. Deposits will typically only be sampled, rather than completely removed, below the first identified level of archaeological interest, unless there are specific research queries that require 100% excavation or if it is specified by the CCCHES;
- The position of any features, such as ditches, pits, or walls, will be recorded and where necessary these will be investigated in order to establish their full extent, date, and relationship to any other features. Negative features such as ditches or pits will be examined by sample excavation, typically half of a pit or similar feature and approximately 10-20% of a linear feature;
- All recording of features will include hand-drawn plans and sections, typically at a scale of 1:20 and 1:10, respectively, and photographs in both 35mm colour print and colour digital format;
- All deposits, trenches, drawings and photographs will be recorded on Greenlane Archaeology *pro forma* record sheets;
- All finds will be recovered during the strip and record for further assessment as far as is practically and safely possible. Should significant quantities of finds be encountered an appropriate sampling strategy will be devised;
- All faunal remains will also be recovered by hand during the strip and record, but where it is considered likely that there is potential for the bones of fish or small mammals to be present appropriate volumes of samples will be taken for sieving;

- Deposits that are considered likely to have, for example, preserved environmental remains, industrial residues, and/or material suitable for scientific dating will be sampled. Bulk samples of between 20 and 60 litres in volume (or 100% of smaller features), depending on the size and potential of the deposit, will be collected from stratified undisturbed deposits and will particularly target negative features (e.g. gullies, pits and ditches) and occupation deposits such as hearths and floors. An assessment of the environmental potential of the site will be undertaken through the examination of samples of suitable deposits by specialist sub-contractors (see *Section 1.3.3* above), who will examine the potential for further analysis. All samples will be processed using methods appropriate to the preservation conditions and the remains present;
- Any human remains discovered during the strip and record will be left *in situ*, and, if possible, covered. The CCCHES will be immediately informed as will the local coroner. Should it be considered necessary to remove the remains this will require a Home Office licence, under Section 25 of the Burial Act of 1857, which will be applied for should the need arise;
- Any objects defined as 'treasure' by the Treasure Act of 1996 (HMSO 1996) will be immediately reported to the local coroner and securely stored off-site, or covered and protected on site if immediate removal is not possible;
- The area subject to excavation will be backfilled if required.

3.1.4 Should any significant archaeological deposits be encountered during the strip and record these will immediately be brought to the attention of the CCCHES so that the need for further work can be confirmed. Any additional work will be carried out following discussion with the CCCHES and subject to a new project design, and the ensuing costs will be agreed with the client.

3.2 Report

3.2.1 The results of the strip and record will be compiled into a report, which will include the following sections:

- A front cover including the appropriate national grid reference (NGR) and planning application number;
- A concise non-technical summary of results, including the date the project was undertaken and by whom;
- Acknowledgements;
- Project Background;
- Methodology, including a description of the work undertaken;
- Results of the strip and record, including descriptions of any deposits identified, their extent, form, and potential date, and an assessment of any finds or environmental remains recovered during the strip and record;
- Discussion of the results including an assessment of the significance of any archaeological remains present within the study area, and areas of further archaeological potential. Any recommendations for further work, and appropriate types of further work, will be provided separately;
- Bibliography, including both primary and secondary sources;
- Illustrations at appropriate scales including:

  - a site location plan related to the national grid;

  - copies of early maps, plans, drawings, photographs and other illustrations of elements of the site collected as part of the desk-based assessment as appropriate to aid the understanding of the results of the strip and record;

- a plan showing the location of the strip and record area in relation to nearby structures and the local landscape;

- plans and sections of the strip and record area showing any features of archaeological interest;

- photographs of the strip and record, including both detailed and general shots of features of archaeological interest and the area;

- illustrations of individual artefacts as appropriate.

3.3 Archive

3.3.1 The archive, comprising the drawn, written, and photographic record of the strip and record, formed during the project, will be stored by Greenlane Archaeology until it is completed. Upon completion it will be deposited with the Cumbria Archive Centre in Carlisle (CAC(C)). The archive will be compiled according to the standards and guidelines of the CIfA (CIfA 2014b). In addition details of the project will be submitted to the Online AccesS to the Index of archaeological investigationS (OASIS) scheme. This is an internet-based project intended to improve the flow of information between contractors, local authority heritage managers and the general public.

3.4.2 A copy of the report will be deposited with the archive at the CAC(C), one will be supplied to the client, and within six months of the completion of fieldwork, one paper and one digital copy will be provided for CCCHES. In addition, Greenlane Archaeology will retain one copy, and a digital copy will be deposited with the OASIS scheme as required.

3.4.3 The client will be encouraged to transfer ownership of the finds to a suitable museum. Any finds recovered during the strip and record will be offered to an appropriate museum, most likely Tullie House Museum and Art Gallery in Carlisle. If no suitable repository can be found the finds may have to be discarded, and in this case as full a record as possible would be made of them beforehand.

4. Work timetable

4.1 Greenlane Archaeology will be available to commence the project from the **3rd December 2018**, or at another date convenient to the client. The project will comprise the following tasks:

- ***Task 1***: archaeological strip and record of the two areas each 40m by 25m, following agreement with the CCCHES and client;
- ***Task 2***: post-excavation work on archaeological strip and record, including processing of finds and production of draft report and illustrations;
- ***Task 3***: feedback, editing and production of final report and archive.

5. Other matters

5.1 Access

5.1.1 Access to the site for the strip and record will be organised through co-ordination with the client and/or their agent(s).

5.2 Health and Safety

5.2.1 Greenlane Archaeology carries out risk assessments for all of its projects and abides by its internal health and safety policy and relevant legislation. Health and safety is always the foremost consideration in any decision-making process.

5.3 Insurance

5.3.1 Greenlane Archaeology has professional indemnity insurance to the value of **£1,000,000**. Details of this can be supplied if requested.

5.4 Environmental and Ethical Policy

5.4.1 Greenlane Archaeology has a strong commitment to environmentally and ethically sound working practices. Its office is supplied with 100% renewable energy by Good Energy, and uses ethical telephone and internet services supplied by the Phone Co-op. In addition, the company uses the services of The Co-operative Bank for ethical banking, Naturesave for environmentally-conscious insurance, and utilises public transport wherever possible. Greenlane Archaeology is also committed to using local businesses for services and materials, thus benefiting the local economy, reducing unnecessary transportation, and improving the sustainability of small and rural businesses.

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Appendix 2: Summary Context List

Area A

Context	Type	Description	Interpretation
1000	Deposit	Mid grey soft silt with 1% rounded cobble, 0.3m – 0.65m thick	Topsoil
1001	Deposit	Mottled greyish-orange soft sandy silt, with 2% rounded gravel and plentiful charcoal flecks, up to 0.4m thick	Subsoil
1002	Cut	Linear in plan, orientated north-east/south-west, 2.3m+ long and 0.6m – 0.7m wide, not excavated	20th century trench
1003	Deposit	Mottled dark grey and orange firm clay and silt, with iron, ceramic, and possible asbestos inclusions, 0.6m – 0.7m wide and 2.3m+ long	Fill of ***1002***
1004	Deposit	Dark grey soft silt, with slag inclusions, at least 3m by 5m, 0.1m thick	Spread of material containing slag. Probably same as ***1005***
1005	Deposit	Mid grey soft silt, with slag inclusions, 2m2, 0.1m thick	Spread of material with slag, same as ***1004***
1006	Deposit	Mid brownish-orange soft silty clay with 1% rounded pebbles	Upper fill of ditch ***1009***
1007	Deposit	Mid grey-brown soft silty clay	Mid fill of ditch ***1009***
1008	Deposit	Dark grey very soft charcoal-rich	Base fill of ditch ***1009***
1009	Cut	L-shaped, curvilinear ditch with U-shaped section at the corner, with gently sloping concave sides; at the corner it was *c*0.85m wide and at most 0.48m deep	Cut of L-shaped ditch
1010	Deposit	Mottled dark grey and orange firm silt with slag inclusions	Upper fill of ***1012***
1011	Deposit	Pale brownish grey soft silty clay with lots of charcoal	Lower fill of ***1012***
1012	Cut	Linear orientated north-east/south-west, stepped, not excavated to west due to water	Cut of ditch
1013	Deposit	Mid soft (wet conditions) grey/brown silty-clay/loam, excavated within/above slot in ***1018*** >2.1m wide, 10s of metres long – beyond limited of excavation in Area A	Possible subsoil above ditch ***1018***
1014	Deposit	Mottled dark grey and dark brown fairly firm silty-clay, with same charcoal and some slag fragments, up to 0.12m thick, *c*1m wide by several metres long	Mottled uppermost fill of ditch ***1018***
1015	Deposit	Slightly mottled light grey – yellow/grey firm clay, 0.37m thick, 1.4m wide by several metres long; petering to south side of cut across trench – thinner towards south and possibly shallower, *c*0.2m thick	Light grey bulky fill of ditch ***1018***
1016	Deposit	Dark grey firm clay with lenses of charcoal and abundant charcoal inclusions, maximum of 0.2m thick, *c*1.2m wide. Apparently deeper and thicker towards north within slot in – only 0.06m thick to south and higher up.	Dark charcoal-rich fill of ditch ***1018***
1017	Deposit	Light grey firm clay, containing some charcoal, *c*0.12m thick at base of ***1018*** to north side and up to 0.17m thick to south side of slot in ***1018***. Deeper to north but thicker to south in slot through ***1018***	Lowest light grey fill of ditch ***1018***
1018	Cut	Linear/curvilinear in plan, orientated approximately north/south, *c*2m wide, sides with a slight step to the east side, then steep concave sides to a rounded base with slight drop to north edge; concave base, which appears deeper towards the north. U-shaped profile, not truncated	Linear ditch cut
1019	Cut	Linear in plan, orientated north/south, 1.85m wide and 0.24m deep, with sloped sides and base slightly curved with a step-in.	Ditch cut
1020	Deposit	Mid brown/grey with orange flecks of clay, medium compaction silty clay with slag and charcoal flecks, 1.85m wide by 0.24m deep	Fill of ditch ***1019***

Context	Type	Description	Interpretation
1021	Deposit	Dark grey soft silt with slag inclusions, 0.1m – 0.15m thick	Upper charcoal-rich fill of ***1023***
1022	Deposit	Mid grey – light grey firm silty clay, with slag inclusions, up to 0.2m thick	Lower fill of ***1023***
1023	Cut	Irregular, oval (?) in plan, orientated north-east/south-west, 2.3m long and 0.3m deep with near vertical sides, and a flattish, slightly undulating base. Truncated by trench 6 of the evaluation?	Cut of large pit?
1024	Deposit	Firm mid orangey-brown clay, containing less than 10% rounded gravel	Natural

Area B

Context	Type	Description	Interpretation
2000	Deposit	Mid brownish grey soft silt with 30% brick, including mortared sections and concrete, particularly in south-west corner, 0.5m – 0.8m thick	Topsoil and dumped material
2001	Deposit	Mid greyish brown firm silty clay with 1% rounded pebble, up to 0.3m thick	Subsoil
2002	Structure	Brick and concrete, bricks fairly rough, 0.25m x 0.12m x 0.07m, unfrogged, laid in English garden bond (?). Linear wall running east/west with slight return at east end, sat on concrete footing, concrete slab to west and block to east. Wall up to 0.55m tall and footing 1 brick length wide, concrete to west 1.5m x 0.85m, wall 6m+ long. North side rendered, south side not exposed. Bonded with sandy mortar	Air raid shelter
2003	Deposit	Mid brownish grey firm silty clay with 2% sub-angular cobble, large slag, and sand lens, up to 0.1m thick and 2.5m wide	Upper fill of ditch ***2006***
2004	Deposit	Dark grey brown soft slit with 10% angular red sandstone inclusions, 2% rounded pebble, and slag and charcoal, up to 0.15m thick and 1.1m wide	Middle fill of ditch ***2006***
2005	Deposit	Mottled orange and dark grey firm silty clay, with slag inclusions, <0.1m thick, 0.9m wide	Lower fill of ditch ***2006***
2006	Cut	Curvilinear in plan, 2.5m wide at top, 0.9m wide at base, steep sides – slightly >45degrees, flattish/undulating base	Cut of curving ditch, same as ***102*** in evaluation?
2007	Deposit	Mid brownish grey soft silt with 1% rounded gravel, 0.75m wide, up to 0.2m thick	Upper fill of ditch ***2011***
2008	Deposit	Mid brownish orange firm silty clay with 1% small angular sandstone, 0.95m wide, 0.15m max thick	Mid fill of ditch ***2011***
2009	Deposit	Black soft charcoal, <0.05m thick, 1m wide	Lens of charcoal in ditch ***2011***
2010	Deposit	Mid brownish orange compacted silty clay with 1% rounded gravel, up to 0.2m thick, 1.1m wide	Lower fill of ditch ***2011***
2011	Cut	Linear in plan, orientated north/south, 1.1m wide, 0.45m+ deep, side shallow 45degrees then steep, base flattish	Linear ditch
2012	Deposit	Dark grey/black friable slightly sandy-silt, charcoal-rich, round deposit 0.23m – 0.25m diameter and 0.02m thick. Also contained a small amount of burnt bone	Charcoal-rich fill of 'fire pit' ***2015***
2013	Deposit	Yellowish, pale yellowish-grey, with grey patch along one side, soft sandy clay, 0.44m by 0.5m by 0.04m thick. Oval-shaped concave deposit	Yellowish sandy-clay below ***2012*** in 'fire pit' ***2015***
2014	Deposit	Varying from intense orange to deep brown/dark brown, firm clay/burnt clay, 0.55m – 0.65m, round oval on the whole, extending in area of effect +0.15m by 0.5m on west side, 0.09m deep remaining, up to 0.07m thick	Lowest deposit within 'fire pit' ***2015*** – clearly heat-affected

Context	Type	Description	Interpretation
2015	Cut	Circular feature with additional heat-affected area to one side (towards nearest houses). Max. 0.63m x 0.61m with area of heat to west side and 0.15m to side. Concave base, shallow sides with slight, shallower break/heat-affected area – generally smooth, even break of slope to base	Concave base of 'fire pit'
2016	Cut	Linear in plan, orientated east/west, 1.7m wide and *c*0.5m deep, with sloped sides and rounded base	Possible linear terminus
2017	Deposit	Black loosely compacted charcoal, 0.30m wide, 0.10m deep	Primary charcoal fill of linear terminus ***2016***
2018	Deposit	Grey mix with light brown medium to hard compaction clay/silt mix, with some flecks of charcoal, 1m wide and *c*0.20m deep	Secondary fill of linear terminus ***2016***
2019	Deposit	Orangey hard compacted clay, 0.60m wide x 0.10m deep	Redeposited orange clay of linear terminus ***2016***
2020	Deposit	Grey hard compacted clay, 0.25m deep x 1m wide	Redeposited grey clay, fill of secondary cut ***2022***
2021	Deposit	Grey/light brown mix medium compaction silty clay, with some charcoal inclusions, 0.90m wide and 0.30m deep	Quaternary fill of terminus ***2016***
2022	Cut	Broad-mouthed, pointed V-shape cut, 0.25m deep, with sides at 45˚ to the horizontal	Possible secondary or later cut of terminus. Cuts through fill
2023	Deposit	Charcoal	Charcoal primary fill of ***2025***, same as ***2005***
2024	Deposit	Grey/brown clayey silt with charcoal inclusions and slag deposits	Secondary fill of ***2025***, same as ***2003***
2025	Cut	Ditch cut with deep U-shaped profile	Ditch cut, possibly same as ***2006***
2026	Deposit	Dark grey fairly firmly compacted silty-clay, with small infrequent small rounded pebbles and stones, up to 0.1m deep, *c*1.5m across. 0.8m excavated at southeast end of feature	Fill of shallow pit or possible ditch terminus ***2027***
2027	Cut	Linear in plan, orientated north-west/south-east, 1.5m across by 0.8m excavated at southeast end, up to 0.1m deep. Sides shallow, slightly concave, with gradual break of slope to slightly concave base	Possible pit or ditch terminus
2028	Cut?	Oval/round in plan, 0.7m x 0.23m remain to side of evaluation trench; *c*0.2m deep. Sides and base concave. Filled by a slightly sand-clay, similar in colour to ***2026*** and indiscernible from backfill of evaluation trench	Possible pit to edge of evaluation trench
2029	Deposit	Mid brownish-grey moist, otherwise firmly compacted, silty clay with infrequent small rounded stone inclusions, 0.17m thick, 1.11m wide by several metres long and out of trench to northwest end of feature	Upper fill of ditch ***2031***
2030	Deposit	Darker brownish-grey friable/moist silty clay with some charcoal and slag inclusions, *c*0.07m thick, mostly to south-east of slot through ditch ***2031***. Extends *c*0.6m from south-east edge to centre of ditch ***2031*** over 'lip' on south-east of cut	Lower fill of ditch ***2031***
2031	Cut	Linear/curvilinear in plan, orientated north-east/south-west, several metres lone, extending beyond limit of excavation of Area B to north-east, *c*1.29m wide at this point. Shallow, slightly concave sides, 30 degrees to horizontal. Even break of slope to flat base with slight 'step' to south-east side	Linear / curvilinear ditch cut is possibly the same as ***2006***
2032	Deposit	Varying from mid-orange to pale greenish grey firm clay from east to west, containing less than 10% rounded gravel	Natural

Appendix 3: Summary Finds List

Context	Type	Qty	Description	Date range
1001	Slag	76	See *Appendix 4*	
1001	Fe	5	See *Appendix 5*	
1001	Pottery	5	A mix of small, soft, very lightly gritted/sandy fabrics and possible gritty ware fragments: 1x curved fragment of lightly gritted (frequent, well-sorted inclusions, up to 1mm), soft (will mark paper), sandy fabric, varying from pale orange to cream colour, possibly gritty ware, no surface remaining; 1x soft (will mark paper), very lightly gritted (infrequent, very small, very fine inclusions), uniform pale orange fabric from a thin-walled vessel, with slight trace of thin, shiny, yellowish glaze on external surface; 1x lump of soft, light orange sandy fabric, with few, very small, very fine inclusions; 1x fine, soft, uniform, very pale whitish orange (slightly darker orange internal surface), sandy fabric, with very few, very fine inclusions and possible reddish brown slip applied externally, from a thin-walled vessel; 1x uniform, whitish sandy fabric from a thin-walled vessel, with very small, very fine inclusions, with darker reddy brown outer surface (possible slip) with thin yellowish glaze above	12th – 14th century
1001	Clay tobacco pipe	1	Small plain brittle stem fragment, 16mm long, with flat oval-shaped section, 7mm by 5.5mm, with distorted/misshapen borehole	?18th to 19th century
1001	Pb	1	Thin strip, less than 0.5cm wide, slightly curled into a loop	Not closely dateable
1003	Pottery	7	Rim-to-base of plain ironstone soup plate with blue transfer-printed monogram in circle on rim, and green transfer-printed maker's mark 'HOTEL WARE / [image of crown] / ALFRED MEAKIN LTD / ENGLAND.' and '3 […]' transfer-printed in blue	1891 onwards, probably 20th century
1003	Glass	1	Complete green beer bottle with crown closure, punt marked 'ØL / 4 / **…**'	20th century
1004	Slag	6	See *Appendix 4*	
1004	Fe	2	See *Appendix 5*	
1004	Charcoal	1	See *Appendix 6*	
1005	Slag	8	See *Appendix 4*	
1005	Fe	5	See *Appendix 5*	
1005	Ceramic	2	See *Appendix 4*	
1006	Slag	18	See *Appendix 4*	
1006	Fe	6	See *Appendix 5*	
1006	Ceramic	1	See *Appendix 4*	
1006	Charcoal	1	See *Appendix 6*	
1007	Slag	7	See *Appendix 4*	
1007	Ceramic	2	See *Appendix 4*	
1007	Haematite	1	See *Appendix 4*	
1010	Slag	10	See *Appendix 4*	

Context	Type	Qty	Description	Date range
1010	Fe	3	See *Appendix 5*	
1011	Slag	2	See *Appendix 4*	
1014	Slag	8	See *Appendix 4*	
1014	Pottery	1	Fairly small (rod) handle fragment, in a soft (marks paper), sandy fabric, varying from a light orange to very pale whitish brown colour, with infrequent, fine inclusions, with a thin light apple-green to yellow glaze	12th – 14th century
1015	Slag	4	See *Appendix 4*	
1016	Slag	4	See *Appendix 4*	
1020	Slag	2	See *Appendix 4*	
1020	Fe	2	See *Appendix 5*	
1020	Ceramic	1	See *Appendix 4*	
1021	Slag	2	See *Appendix 4*	
1021	Fe?	1	See *Appendix 5*	
1021	Charcoal	1	See *Appendix 6*	
1022	Slag	4	See *Appendix 4*	
2001	Slag	8	See *Appendix 4*	
2003	Slag	15	See *Appendix 4*	
2003	Pottery	1	A large flattish piece of a soft (marks paper), fairly uniform, sandy fabric, varying from a reddish orange (interior margin and core) to pale brown (to the outer margin and surface), with frequent grit inclusions (generally up to 1mm but some up to 2mm in size); no glaze apparent; possible gritty ware base fragment (similar fabric to fragment from ***2021***)	12th – 14th century
2004	Slag	10	See *Appendix 4*	
2004	Bone	1	See *Appendix 7*	
2004	Stone	2	1 x large block of red sandstone, one surface has a very smooth finish but this is cut by numerous notches and lines, 1 x smaller fragment of red sandstone with one very smooth surface	Not closely dateable
2005	Slag	1	See *Appendix 4*	
2007	Bone	5	See *Appendix 7*	
2009	Fe	1	See *Appendix 5*	
2009	Stone	1	Large block of red sandstone, one surface has a very smooth finish but this is cut by numerous notches and lines	Not closely dateable
2010	Stone	1	Pale yellow coloured flint pebble, very rolled and with cortex, not evidently worked	Not closely dateable
2012	Bone	12	See *Appendix 7*	
2021	Pottery	2	Small fragments: 1x soft, lightly gritted, light reddish orange, sandy fabric, with some small grit inclusions (up to 1mm), no glaze apparent, possibly gritty ware (similar fabric to fragment from ***2003***); 1x small lump of soft sandy fabric, with sparse, fine to very fine grit inclusions, varying from a pale buff colour (to the outside?) to a mid to dark grey core (no inner margin present), no glaze apparent	12th – 14th century
2024	Slag	13	See *Appendix 4*	
2026	Fe	3	See *Appendix 5*	

Context	Type	Qty	Description	Date range
2026 (retent)	Pottery	1	Body fragment from a thin-walled, late medieval reduced grey ware vessel, made from a soft, uniform, sandy fabric with no obvious inclusions, with a mid-grey core, inner margin and inner surface, and whitish outer margin and surface below a thin layer of light olive green glaze applied externally	15th – 16th century
2030	Slag	2	See *Appendix 4*	

Appendix 4: Slag Data

Context	HB Weight	Tap Slag Count	Tap Slag weight	Smelt Slag count	Smelt Slag weight	Slag Cake weight	FL Count	FL Weight	Slagged Lining Count	Slagged Lining Weight	Other Weight
1001	2058			50	9086	12347			7	520	58
1004	1806			5	1189						
1005				5	328				1	29	
1006	1359			13	1785		3	153			
1007				3	424		3	225			
1010				8	701		1	9			
1011				1	186				1	263	
1014				7	1225		1	8			
1015				1	588				3	59	
1016				2	330				1	49	
1020				2	274						
1021	279			1	767						
1022				4	176						
2001	596			3	1237	2565			1	177	
2003		1	874	13	2910	1765					
2004				9	2289				1	238	
2024				12	4084	4447					
2030				2	706						
Total	6098	1	874	141	28285	21124	8	395	15	1335	58

Table 1: Initial classification of the Silloth macro-slags, ordered by context number (weight in grams)

Slag type	Percentage
Tap Slag	1
Smelting Slag	48
Slag Cake	36
Hearth Bottom	12
Furnace Lining	1
Slagged Lining	2
Total	100

Table 2: The percentages of each slag in the initial classification

Context	Cake Weight	D1	D2	DP	Complete?
1001	2621	160	140	80	y
1001	2267	140	135	100	y
1001	2050	160	150	70	y
1001	1361	160	140	50	y
1001	1279	150	95	60	n
1001	1161	150	130	60	y
1001	912	100	95	80	n
1001	696	135	90	45	n
2001	1678	150	130	70	y
2001	887	120	125	50	y
2003	1765	170	145	60	y
2024	2838	175	150	70	y
2024	1609	175	90	80	n

Table 3: Dimensions of the slag Cakes (weight (grams); D1 - major diameter (mm); D2 - minor diameter (mm); DP - depth (mm)

Context	HB Weight	D1	D2	DP	Complete?
1001	228	75	70	30	y
1001	248	85	80	25	y
1001	363	110	90	35	y
1001	384	100	80	45	y
1001	392	110	85	45	n
1001	397	100	65	55	n
1001	415	90	90	35	y
1001	488	105	70	35	n
1001	523	90	80	60	y
1001	542	120	95	60	y
1001	571	95	90	45	y
1001	713	130	100	50	y
1006	585	95	90	55	y
1006	774	135	95	45	y
1021	279	100	85	30	y

Table 4: Dimensions of the hearth bottoms (weight-grams; D1-major diameter (mm); D2 - minor diameter (mm); DP - depth (mm))

Context	Sieve Number	classic HS?	smelt HS?	slag	FL	ore?	metal	stone	Sample Weight
1005		n			y				13.5
1006	17	n	y	y	y			y	33.1
1007	18	n	y	y					56.9
1008	19	n		y	y			y	19
1010	20			y	y			y	156
1011	21	n	y		y	y?			20
1014	22	n		y	y			y	116.1
1015	23	n	y	y	y			y	25.3
1016	24	n	y	y	y			y	1.6
1017	25	n		y	y				0.7
1020		n			y				3.4
1021	26	n	y	y	y			y	3.4
1022	27	n	y	y	y			y	2.2
2003	1	n	y	y	y			y	1.1
2004	2	n	y	y					95.1
2005	3	n	y	y					20.1
2008	4	n	y		y				3.6
2009	5	n	y						0.1
2010	6	n	y	y	y				3.4
2012	7	n	y	y	y			y	1.8
2013	8	n	y	y	y			y	12.6
2017	9	n		y	y			y	2.4
2018	10	n	y	y	y			y	0.2
2021	11	n	y		y				3.7
2023	12	n	y	y					37
2024	13	n	y	y					180.1
2026	14	n		y	y		y?	y	17.3
2029	15	n		y	y			y	0.3
2030	16	n	y		y				77.6

Table 5: Summary of the micro-residues recovered from the sieving programme. (sample weight - grams)

Slag Type	context
Cake	1004
HB	1021
HB	1006
HB	1006
Tap	2003
Cake	2003
Smelt	2003
Smelt	2024
Smelt	2004
Cake	2024

Table 6: List of samples selected for HH-XRF analyses

Type	Tap Slag	Smelting Slags			Slag Cakes			Hearth Bottoms		
Context Number	2003	2003	2004	2024	1004	2003	2024	1006	1006	1021
MgO	4.6	0.2	n.d.	n.d.	1.3	n.d.	n.d.	1.4	1.3	n.d.
Al_2O_3	2.8	4.8	16.0	6.7	6.4	25.9	4.7	3.2	4.2	13.1
SiO_2	15.4	12.9	50.5	22.7	20.2	52.6	14.0	16.6	18.1	82.3
P_2O_5	1.6	4.0	4.2	2.7	2.6	8.0	2.8	1.7	2.0	n.d.
S	0.7	0.4	n.d.	0.3	0.6	n.d.	1.3	0.8	0.3	n.d.
K_2O	0.3	0.1	0.4	0.1	0.4	n.d.	n.d.	0.4	0.3	0.7
CaO	1.2	1.2	2.2	0.9	1.2	2.1	0.7	0.8	0.9	0.5
TiO_2	0.1	0.1	1.1	0.2	0.2	2.3	0.1	0.1	0.2	0.7
V_2O_5	0.1	0.1	0.5	0.2	0.2	0.8	0.1	0.1	0.1	0.2
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
MnO	0.2	0.3	0.1	0.2	0.2	n.d.	0.1	0.1	0.2	0.1
FeO	72.9	75.9	24.9	65.9	66.7	8.2	76.0	74.8	72.5	2.5
CoO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
NiO	n.d.	n.d.	0.1	n.d.	n.d.	0.1	n.d.	n.d.	n.d.	n.d.
CuO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

Table 7: HH-XRF semi-quantitative data (weight %, n.d. – not detected)

	Tap	Smelting	Cake	HB	HB2
MgO	4.6	0.1	0.4	0.9	1.3
Al_2O_3	2.8	9.2	12.3	6.8	3.7
SiO_2	15.4	28.7	28.9	39.0	17.3
P_2O_5	1.6	3.6	4.4	1.2	1.8
S	0.7	0.2	0.6	0.4	0.6
K_2O	0.3	0.2	0.1	0.5	0.4
CaO	1.2	1.4	1.3	0.7	0.8
TiO_2	0.1	0.5	0.9	0.3	0.1
V_2O_5	0.1	0.3	0.4	0.1	0.1
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	n.d.
MnO	0.2	0.2	0.1	0.1	0.1
FeO	72.9	55.6	50.3	49.9	73.6
CoO	n.d.	n.d.	n.d.	n.d.	n.d.
NiO	n.d.	0.1	0.1	n.d.	n.d.
CuO	n.d.	n.d.	n.d.	n.d.	n.d.

Table 8: Average values of the three slag types (weigh %. n.d. - not detected)

Context	Tap Slag Count	Tap Slag weight	Smelt Slag count	Smelt Slag weight	Slag Cake weight	FL Count	FL Weight	Slagged Lining Count	Slagged Lining Weight
1001			50	9086	17611			7	520
1004			5	1189					
1005			5	328				1	29
1006			13	1785	1359	3	153		
1007			3	424		3	225		
1010			8	701		1	9		
1011			1	186				1	263
1014			7	1225		1	8		
1015			1	588				3	59
1016			2	330				1	49
1020			2	274					
1021			1	767	279				
1022			4	176					
2001			3	1237	2565			1	177
2003	1	874	13	2910	1765				
2004			9	2289				1	238
2024			12	4084	4447				
2030			2	706					
Total	1	874	141	28285	28026	8	395	15	1335
%		1		48	48		1		2

Table 9: Revised slag listing (weight in grams)

Area	Tap Slag weight	Smelt Slag weight	Slag Cake weight	FL Weight	Slagged Lining Weight	Total
Area A	0	17059	19249	395	920	37623
Area B	874	11226	8777	0	415	21292
Total	874	28285	28026	395	1335	58915
Percentage						
Area A	0	29	33	1	2	64
Area B	1	19	15	0	1	36
Total	1	48	48	1	2	100

Table 10: Distribution of the slags between the two excavation areas, by weight (grams) and percentage

Weight	Tap Slag weight	Smelt Slag weight	Slag Cake weight	FL Weight	Slagged Lining Weight	
Area A unstrat	0	9086	17611	0	520	27217
Area strat	0	7973	1638	395	400	10406
Area B unstrat		1237	2565		177	3979
Area B strat	874	9989	6212	0	238	17313
Totals	874	28285	28026	395	1335	58915
%	Tap Slag weight	Smelt Slag weight	Slag Cake weight	FL Weight	Slagged Lining Weight	Total
Area A unstrat	0	15	30	0	1	46
Area strat	0	14	3	1	1	18
Area B unstrat	0	2	4	0	0	7
Area B strat	1	17	11	0	0	29
Totals	1	48	48	1	2	100

Table 11: Distribution of the slags in unstratified and stratified contexts by weight (grams) and percentage

Area	Ditch/Pit	Cut	Primary Fill	HS	Slag	Fl
A	D	1009	1008		y	y
A	D	1012	1011	y		y
A	D	1018	1017		y	y
A	D	1019	1020			y
A	?	1023	1022	y	y	y
B	D	2006	2005	y	y	
B	D	2011	2010	y	y	y
B	P	2015	2014			
B	D	2016	2018	y	y	y
B	D	2025	2023	y	y	
B	?	2027	2026		y	y
B	D	2031	2030/2029	y		y

Table 12: Summary of the micro-residues recovered from the primary fills of the main features

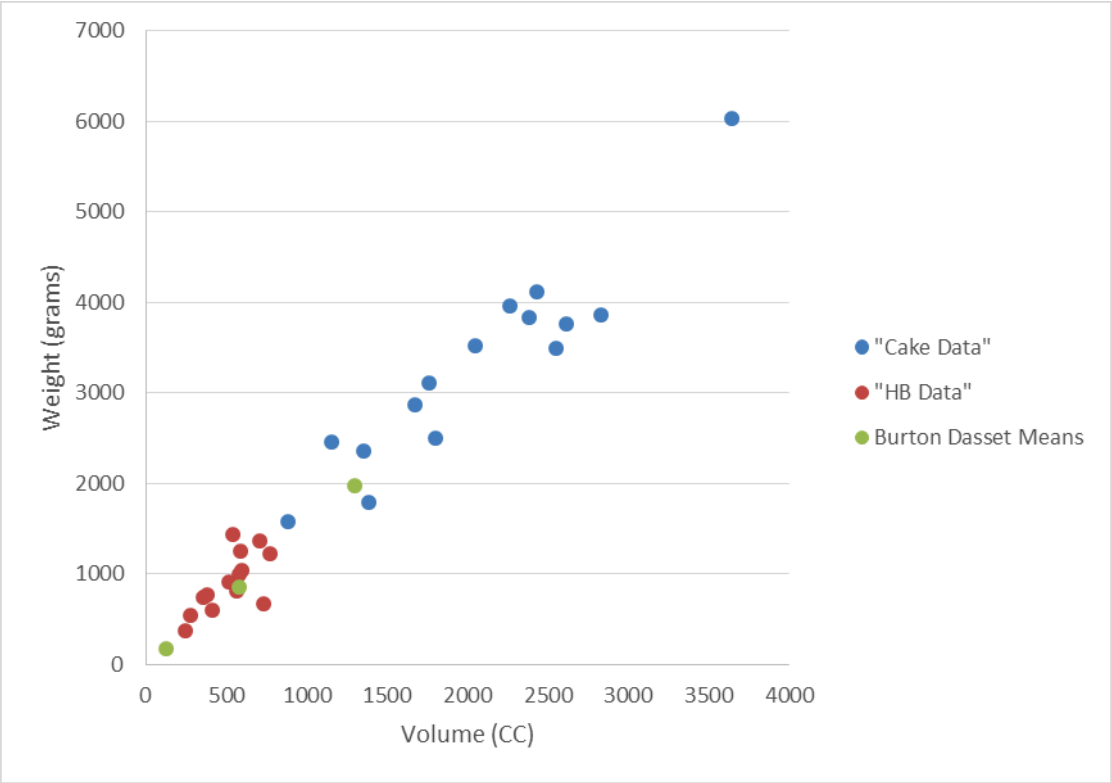

Figure 11: Plot of the weight against calculated volume for the Silloth slag cakes and the hearth bottoms, with the minimum, mean and maximum values of the Burton Dassett hearth bottoms included

Plate 32 (left): Example of smelting slag from Context 2003

Plate 33 (right): Smelting slag cake from Context 2001, showing the 'feeder' on the bottom right corner

Plate 34 (left): Tap slag sample (Context 2003), showing flowed upper surface

Plate 35 (right): Example of a hearth Bottom (Context 1006). Note depression in the upper surface

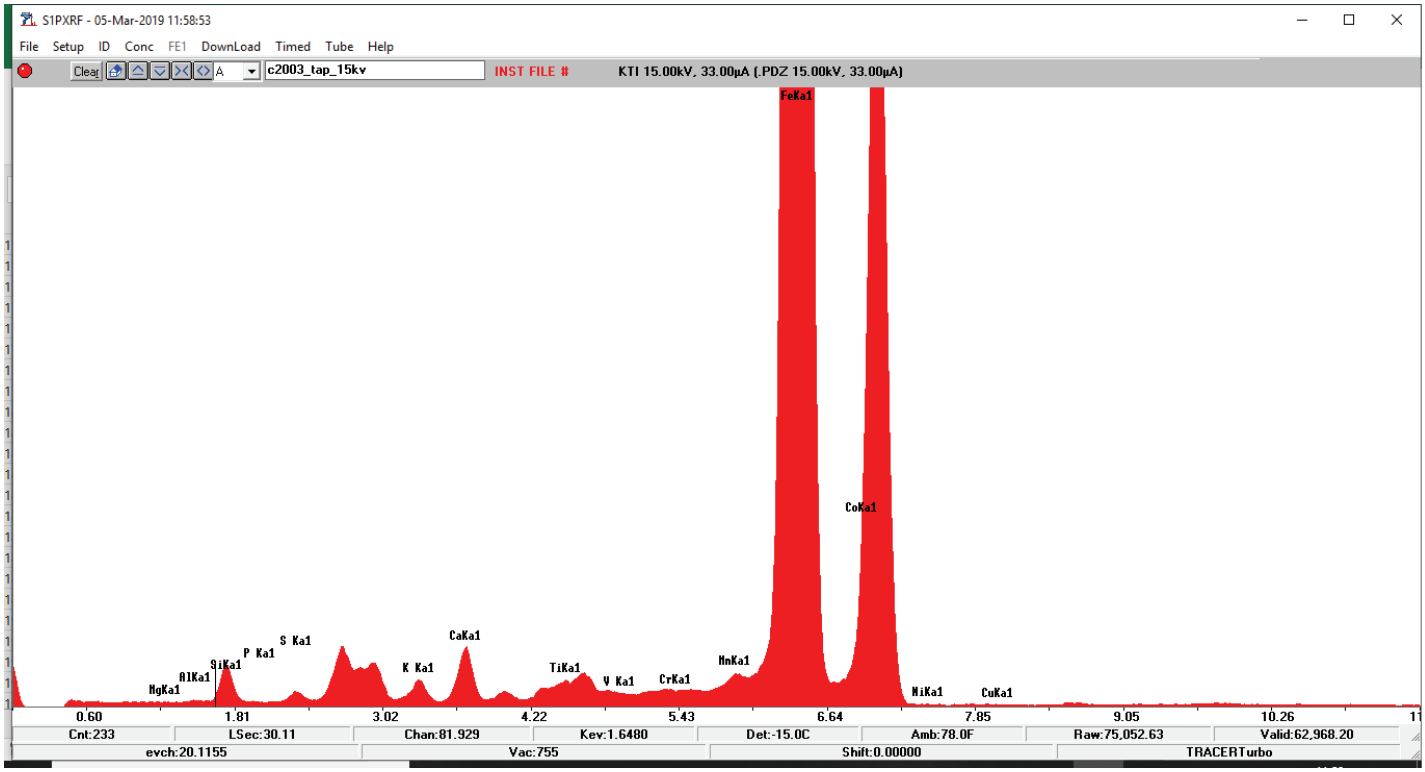

Figure 12: HH-XRF spectrum from the tap slag sample (Context 2003).

Appendix 5: Iron Data

X-ray	RF	Context	Assessment
9242	4	2008	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential. X-ray shows the metal core to be mineralised. **Recommendation: No further action. Store dry.**
9242	12	2023	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be mineralised and indicates the object to be slag or metalworking waste. **Recommendation: Refer to Archaeometallurgist if context warrants further investigation. Store dry.**
9242	14	2026	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be mineralised and indicates the object to be slag or metalworking waste. **Recommendation: Refer to Archaeometallurgist if context warrants further investigation. Store dry.**
9242	17	1006	Fe object in overall good condition. Two separate pieces the smaller of which appears to be a dislodged concretion. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be heavily mineralised. The smaller fragment is barely visible indicating there to be little or no metal remaining and that this fragment is a section of dislodged concretion. **Recommendation: No further action. Store dry.**
9242	18	1007	Fe object in overall good stable condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. X-ray shows the metal core to be heavily mineralised. **Recommendation: No further action. Store dry.**

X-ray	RF	Context	Assessment
9242	20 A	1010	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be fairly mineralised and patchy with cracks faintly visible. **Recommendation: Nor further action. Store dry.**
9242	20 B	1010	Fe objects in overall good condition. Seven separate fragments, no clear joins. Encrusted sand, silt and small stone inclusions cover the surface of the fragments overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the fragments indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal cores to be mineralised. Five of the fragments appear to be slag or metalworking waste. **Recommendation: Refer to Archaeometallurgist if context warrants further investigation. Store dry.**
9242	21	1011	Fe objects in overall good condition. Two separate fragments with no clear joins. Encrusted sand, silt and small stone inclusions cover the surface of the fragments overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the fragments indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be mineralised and patchy and indicates the smaller fragment to be slag or metalworking waste. **Recommendation: Refer to Archaeometallurgist if context warrants further investigation. Store dry.**
9242	22	1014	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the object indicating the presence of active corrosion. Dry storage is essential. X-ray shows the metal core to be mineralised with visible cracks. **Recommendation: No further action. Store dry.**
9242	23	1015	Fe objects in overall good condition. One hobnail and four fragments, possible dislodged concretions. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the finds indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be heavily mineralised. The fragments are barely visible on the x-ray plate indicating there to be little or no metal remaining and that they are sections of dislodged concretions. **Recommendation: No further action. Store dry.**

X-ray	RF	Context	Assessment
9242	-	1001	Fe objects in overall good condition. Five in total, two of the finds join together and could be re-adhered if necessary. The others do not appear to be related. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the finds indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. A glass like inclusion is also present on the second largest of the fragments. X-ray shows the metal cores to be fairly strong and robust although mineralised with some cracks towards the edges. **Recommendation: No further action. Store dry.**
9242	-	1004	Fe object in overall good condition. Two separated pieces with no clear joins however the shape indicates they may be part of the same object. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer if uneven brown and orange corrosion products. Hairline cracks are present on the surface of the objects indicating the presence of active corrosion. Dry storage is essential. X-ray shows the metal core to be mineralised with hairline cracks visible. The object appears incomplete with the 'L' shaped section continuing after the right angle. **Recommendation: Investigate to confirm object identification (3 hours). Store dry.**
9242	-	1005	Fe objects in overall good condition. One nail and four fragments/lumps. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the finds indicating the presence of active corrosion. Dry storage is essential. X-ray shows the metal core to range in condition from mineralised and patchy to more robust in places. **Recommendation: No further action. Store dry.**
9242	-	1006	Fe objects in overall good condition. Two incomplete nails and four fragments ranging in sizes. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the finds indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal cores to range from fairly robust to mineralised and patchy. The two smaller fragments are not visible on the x-ray plate indicating there to be little or no metal remaining and that these are dislodged concretions. **Recommendation: No further action. Store dry.**
9242	-	1010	Fe objects in overall good condition. Three separate objects, one appears to be a nail. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of all the finds indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal cores to range from strong and robust to thin and mineralised. **Recommendation: Store dry.**

X-ray	RF	Context	Assessment
9242	-	1020	Fe objects in overall good condition. Two separate objects. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface of the larger finds indicating the presence of active corrosion. Dry storage is essential. The smaller find appears stable with no signs of active corrosion. X-ray shows the metal core of the larger find to be fairly strong and robust although mineralised towards the edges. The smaller find is not visible on the x-ray plate indicating there to be little or no metal remaining and that the find is a section of dislodged concretion. **Recommendation: No further action. Store dry.**
9242	-	1021	Fe object in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface indicating the presence of active corrosion. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be fairly mineralised and indicates the object to be slag or metal working waste. **Recommendation: Refer to an Archaeometallurgist if the context warrants further investigation. Store dry.**
9242	-	2009	Fe nail in overall good condition. Encrusted sand, silt and small stone inclusions cover the surface of the object overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface indicating the presence of active corrosion. An area of blue vivianite is visible amongst the corrosion products at one end indicating an anoxic waterlogged burial environment. Dry storage is essential. Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal core to be fairly robust although slightly mineralised towards the tip and lower edges. **Recommendation: No further action. Store dry.**
9242	-	2026	Fe objects in overall good condition. Three separate objects, one appears to be an incomplete nail. Encrusted sand, silt and small stone inclusions cover the surface of the finds overlying a layer of uneven brown and orange corrosion products. Hairline cracks are present on the surface indicating the presence of active corrosion. Dry storage is essential Small amounts of MPO (possible wood) are present amongst the corrosion products. These however appear incidental, relating to the burial environment rather than the object itself and are not recommended for further investigation. X-ray shows the metal cores to be fairly robust although mineralised towards the edges. The largest find appears to be slag or metal working waste. **Recommendation: Refer to an Archaeometallurgist if the context warrants further investigation. Store dry.**

Appendix 6: Environmental Sample Data

Sample number	Context number	Size (litres)	Context type
1	***2003***	30	Upper fill of ditch [***2006***]
2	***2004***	30	Mid fill of ditch [***2006***]
3	***2005***	20	Lower fill of ditch [***2006***]
4	***2008***	10	Mid fill of ditch [***2011***]
5	***2009***	10	Charcoal fill of ditch [***2011***]
6	***2010***	20	Lower fill of ditch [***2011***]
7	***2012***	5	Charcoal-rich fill of 'fire pit' [***2015***]
8	***2013***	10	Yellowish sandy clay below ***2012*** in 'fire pit [***2015***]
9	***2017***	5	Primary charcoal fill of linear terminus [***2016***]
10	***2018***	10	Secondary fill of linear terminus [***2016***]
11	***2021***	10	Quaternary fill of terminus [***2016***]
12	***2023***	5	Charcoal primary fill of [***2025***], same as ***2005***
13	***2024***	20	Secondary fill of [***2025***], same as ***2003***
14	***2026***	10	Fill of shallow pit or possible ditch terminus [***2027***]
15	***2029***	10	Upper fill of ditch [***2031***]
16	***2030***	10	Lower fill of ditch [***2031***]
17	***1006***	30	Upper fill of ditch [***1009***]
18	***1007***	30	Mid fill of ditch [***1009***]
19	***1008***	5	Base fill of ditch [***1009***]
20	***1010***	20	Upper fill of [***1012***]
21	***1011***	20	Lower fill of [***1012***]
22	***1014***	10	Mottled uppermost fill of ditch [***1018***]
23	***1015***	10	Light grey bulky fill of ditch [***1018***]
24	***1016***	20	Dark charcoal-rich fill of ditch [***1018***]
25	***1017***	10	Lowest light grey fill of ditch [***1018***]
26	***1021***	30	Upper charcoal-rich fill of [***1023***]
27	***2022***	10	Lower fill of [***1023***]

Table 13: Summary of samples taken

Context			2003	2004	2005	2008	2009	2010	2012	2013	2017
Sample			1	2	3	4	5	6	7	8	9
Feature			Ditch [2006]	Ditch [2006]	Ditch [2006]	Ditch [2011]	Lens of charcoal in ditch [2011]	Ditch [2011]	'Fire pit' [2015]	'Fire pit' [2015]	Linear [2016]
Sample Vol (l)		-	30	30	20	10	10	20	5	10	5
Flot Vol (ml)		-	40	200	150	100	600	100	200	200	150
Sufficient for AMS?		-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Plant remains											
Cereal grain											
Avena sp.	oats	ch	++	++++	++	++	-	+++	-	++	+
Hordeum vulgare	hulled barley	ch	+	-	-	-	-	-	-	-	-
Triticum aestivo-compactum	bread/club wheat	ch	+	-	+	-	-	++	-	-	+
Cereal indeterminate	cereal	ch	-	-	-	-	-	-	-	-	-
Cereal chaff		ch									
Avena sp.	oats; floret base(s)	ch	-	+	-	-	-	-	-	-	-
Glume wheat indeterminate	glume base(s)	ch	+	+	-	-	-	-	-	-	-
Cereal indeterminate	awn fragment(s)	ch	-	+	-	++	-	++	-	-	-
Cereal indeterminate	culm node(s)	ch	-	+	+	-	-	-	-	-	-
Weed seeds		ch									
Anthemis cotula	stinking camomile	ch	-	+	-	-	-	-	-	-	-
Chenopodium sp.	goosefoots	ch	-	-	-	-	-	-	-	-	+
Poaceae	grass family	ch	+	-	-	+	-	-	-	+	+
Polygonum sp.	knotgrasses	ch	-	+	-	-	-	+	-	-	-
Polygonum aviculare	knotgrass	ch	-	+	-	-	-	-	-	-	-
Vicia sp./*Lathyrus* sp.	vetch/pea	ch	-	+	-	-	-	+	+	-	+
Other plant remains											
Corylus avellana	hazel nutshell fragment(s)	ch	-	-	+	+	-	-	-	-	-
Compacted organic concretions		ch	-	-	-	-	-	-	-	-	-
Charcoal											
Charcoal	Qty	ch	++++	++++	+++	++++	++++	+++	++++	++	++++
Charcoal	Max size (mm)	ch	10	10	15	5	25	20	20	5	5
Charcoal	Oak	ch	++++	+++	+++	++++	++++	+++	++++	++	++++
Charcoal	Non-oak	ch	-	+++	-	-	-	-	-	-	-

Table 14: Environmental sample results (samples 1-9)

Key: + = rare (0–5), ++ = occasional (6–15), +++ = common (15–50) and ++++ = abundant (>50)
ch = charred, w/l = waterlogged, u = uncharred
NB charcoal over 10mm is sufficient for identification and AMS dating

Context			2018	2021	2023	2024	2026	2029	2030	1006	1007
Sample			10	11	12	13	14	15	16	17	18
Feature			Linear terminus [2016]	Linear [2016]	Ditch [2025]	Ditch [2025]	[2027]	Ditch [2031]	Ditch [2031] (lower)	Ditch [1009] (upper)	Ditch [1009]
Sample Vol (l)		-	10	10	5	20	10	10	10	30	30
Flot Vol (ml)		-	20	5	200	200	50	100	50	50	200
Sufficient for AMS?		-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Plant remains											
Cereal grain											
Avena sp.	oats	ch	+	+	-	-	+	-	-	-	+
Hordeum vulgare	hulled barley	ch	-	-	-	-	-	-	-	-	-
Triticum aestivo-compactum	bread/club wheat	ch	-	-	-	-	-	-	-	+	+++
Cereal indeterminate	cereal	ch	-	-	-	-	-	-	-	+	-
Cereal chaff		ch									
Avena sp.	oats; floret base(s)	ch	-	-	-	-	-	-	-	-	-
Glume wheat indeterminate	glume base(s)	ch	-	+	-	-	-	-	-	-	-
Cereal indeterminate	awn fragment(s)	ch	-	++	-	-	-	-	-	-	-
Cereal indeterminate	culm node(s)	ch	-	-	-	-	-	-	-	-	-
Weed seeds		ch									
Anthemis cotula	stinking camomile	ch	-	-	-	-	-	-	-	-	-
Chenopodium sp.	goosefoots	ch	-	-	-	-	-	-	-	-	-
Poaceae	grass family	ch	-	-	-	-	-	-	-	-	-
Polygonum sp.	knotgrasses	ch	-	-	-	-	-	-	-	-	-
Polygonum aviculare	knotgrass	ch	-	-	-	-	-	-	-	-	+
Vicia sp./*Lathyrus* sp.	vetch/pea	ch	-	-	-	-	-	-	-	-	-
Other plant remains											
Corylus avellana	hazel nutshell fragment(s)	ch	-	-	-	-	-	-	-	+	-
Compacted organic concretions		ch	-	-	-	-	-	-	-	-	-
Charcoal											
Charcoal	Qty	ch	++++	++	++++	++++	++++	++++	++++	++	+++
Charcoal	Max size (mm)	ch	20	5	20	10	5	10	10	2	10
Charcoal	Oak	ch	++	-	++++	++++	++++	++++	++++	-	+++
Charcoal	Non-oak	ch	++	-	-	-	-	-	-	-	-

Table 15: Environmental sample results (samples 10-18)

Key: + = rare (0–5), ++ = occasional (6–15), +++ = common (15–50) and ++++ = abundant (>50)
ch = charred, w/l = waterlogged, u = uncharred
NB charcoal over 10mm is sufficient for identification and AMS dating

Context			1008	1010	1011	1014	1015	1016	1017	1021	1022
Sample			19	20	21	22	23	24	25	26	27
Feature			Ditch [1009]	Ditch [1012]	Ditch [1012]	Ditch [1018]	Ditch [1018]	Ditch [1018]	Ditch [1018]	Pit [1023]	Pit [1023]
Sample Vol (l)		-	5	20	20	10	10	20	10	30	10
Flot Vol (ml)		-	220	200	200	100	50	200	50	400	300
Sufficient for AMS?		-	Y	Y	Y	Y	Y	Y	N	Y	Y
Plant remains											
Cereal grain											
Avena sp.	oats	ch	+++	-	-	-	-	-	-	-	-
Hordeum vulgare	hulled barley	ch	-	+	-	+	-	-	-	-	-
Triticum aestivo-compactum	bread/club wheat	ch	+++	-	-	+	-	-	-	-	-
Cereal indeterminate	cereal	ch	-	-	-	-	-	-	-	+	-
Cereal chaff		ch									
Avena sp.	oats; floret base(s)	ch	-	-	-	-	-	-	-	-	-
Glume wheat indeterminate	glume base(s)	ch	-	-	-	-	-	-	-	-	-
Cereal indeterminate	awn fragment(s)	ch	-	-	-	-	-	-	-	-	-
Cereal indeterminate	culm node(s)	ch	++	-	-	-	-	-	-	-	-
Weed seeds		ch						-	-	+	-
Anthemis cotula	stinking camomile	ch	-	-	-	-	-	-	-	-	-
Chenopodium sp.	goosefoots	ch	-	-	-	-	-	-	-	-	-
Poaceae	grass family	ch	+	-	-	+	-	-	-	-	-
Polygonum sp.	knotgrasses	ch	+	-	-	-	-	-	-	-	-
Polygonum aviculare	knotgrass	ch	-	-	-	-	-	-	-	-	-
Vicia sp./*Lathyrus* sp.	vetch/pea	ch	-	-	-	-	-	-	-	+	-
Other plant remains											
Corylus avellana	hazel nutshell fragment(s)	ch	+	-	-	-	-	-	-	-	-
Compacted organic concretions		ch	++	-	-	-	-	-	-	-	-
Charcoal											
Charcoal	Qty	ch	++	+++	++++	++	++++	++++	++	++++	++++
Charcoal	Max size (mm)	ch	5	10	25	10	10	25	5	20	35
Charcoal	Oak	ch	++	+++	++++	++	++++	++++	++	++++	++++
Charcoal	Non-oak	ch	-	-	-	-	-	-	-	-	-

Table 16: Environmental sample results (samples 19-27)

Key: + = rare (0–5), ++ = occasional (6–15), +++ = common (15–50) and ++++ = abundant (>50)
ch = charred, w/l = waterlogged, u = uncharred
NB charcoal over 10mm is sufficient for identification and AMS dating

Appendix 7: Animal Bone Data

Context	Feature	Mammal	Fish	Bird	Total
1009	Ditch 1009	8	1		**9**
1014	Ditch 1018	1			**1**
2003	Ditch 2006	6			**6**
2004		244	6		**250**
2024		4			**4**
2007	Ditch 2011	5			**5**
2008		10			**10**
2010			57		**57**
2012	'Fire pit' 2015	80	27		**107**
2013		189	78	2	**269**
2017	Terminus 2016	5			**5**
2018		4			**4**
2021			1		**1**
2026	Terminus 2027	6			**6**
2030	Ditch 2031	4			**4**
	Total	**566**	**170**	**2**	**738**

Table 17: Summary of animal remains by context and class (count)

Context	*Equus*	*Bos*	Large ungulate	Small ungulate	Large/ medium mammal	Medium mammal	Unidentified mammal	Total
1009							8	**8**
1014							1	**1**
2003							6	**6**
2004	200		28				16	**244**
2007						2	3	**5**
2008		7					3	**10**
2012				4	1	2	73	**80**
2013				1		1	187	**189**
2017			1				4	**5**
2018							4	**4**
2024							4	**4**
2026							6	**6**
2030							4	**4**
Total	**200**	**7**	**29**	**5**	**1**	**5**	**319**	**566**

Table 18: Mammal remains by context (count)

Context	*Clupea harengus* Atlantic herring	*Gadus morhua* Atlantic cod	*Salmo* Salmon/trout	Flatfish	Unidentified fish	Total
1009	1					**1**
2004	1				5	**6**
2010			2		55	**57**
2012	14	1		2	10	**27**
2013	55	2		5	16	**78**
2021					1	**1**
Total	**71**	**3**	**2**	**7**	**87**	**170**

Table 19: Fish remains by context (count)

Fragmentation Dobney and Rielly 1988 1/0

Sample	Fraction	Context	RF/SF	Element	Count	MNE	Side	1	2	3	4	5	6	7	8
9	Retent	2017		Tooth	1	1	\	Frag							
16	Retent	2030		Unidentified fragment	4	\	\	\							
HC		2004		Tooth	200	1	\	Frag							
3	Retent	2004		Unidentified fragment	1	1	\	Frag							
4	Retent	2008		Tooth	7	1	\	Frag							
13	Retent	2024		Unidentified fragment	4	\	\	Frag							
6	Retent	2010		Unidentified fragment	55	\	\	Frag							
6	Retent	2010		Vertebra	2	1	\	Frag							
4	Retent	2008		Unidentified fragment	3	\	\	Frag							
14	Retent	2026		Unidentified fragment	6	\	\	Frag							
19	Retent	1009		Unidentified fragment	8	\	\	Frag							
19	Retent	1009		Vertebra	1	1	\	80%							
22	Retent	1014		Unidentified fragment	1	1	\	Frag							
HC		2012		Unidentified fragment	9	\	\	Frag							
HC		2012		Rib	1	1	\	0	1	0					
HC		2012		Vomer	1	1	\	20%							
HC		2012		Skull	1	1	\	Frag							
10	Retent	2018		Unidentified fragment	4	\	\	Frag							
11	Retent	2021		Unidentified fragment	1	1	\	Frag							
9	Retent	2017		Unidentified fragment	4	\	\	Frag							
3	Retent	2004		Unidentified fragment	4	\	\	Frag							
3	Retent	2004		Rib/spine	1	1	\	Frag							
2	Retent	2004		Unidentified fragment	11	\	\	Frag							
2	Retent	2004		Rib/spine	1	1	\	Frag							
2	Retent	2004		Unidentified	1	1	\	Frag							

Sample	Fraction	Context	RF/SF	Element	Count	MNE	Side	1	2	3	4	5	6	7	8
				fragment											
2	Retent	2004		Vertebra	1	1	\	90%							
2	Retent	2004		Tooth	28	1	\	Frag							
2	Retent	2004		Rib/spine	2	1	\	Frag							
1	Retent	2003		Unidentified fragment	6	\	\	Frag							
7	Retent	2012		Metapodial	1	1	\	0	0	1	0	0	0	0	0
7	Retent	2012		Vertebral plate	1	1	\	Frag							
7	Retent	2012		Phalanx	3	1	\	Frag							
7	Retent	2012		Unidentified fragment	5	\	\	Frag							
7	Retent	2012		Vertebae	14	14	\	complete							
7	Retent	2012		Vertebra	2	2	\	complete							
7	Retent	2012		Rib/spine	5	\	\	Frag							
7	Retent	2012		Unidentified fragment	64	\	\	Frag							
HC		2007		Scapula	1	1	\	Frag							
HC		2007		pelvis	1	1	\	Frag							
HC		2007		Skull	1	1	\	Frag							
HC		2007		Unidentified fragment	2	\	\	Frag							
8	Retent	2013		vertebra	54	52	\	complete							
8	Retent	2013		Dentary	1	1	L	80%							
8	Retent	2013		Articular	1	1	L	50%							
8	Retent	2013		Rib/spine	16	\	\	Frag							
8	Retent	2013		vertebra	3	3	\	complete							
8	Retent	2013		Dentary	1	1	L	40%							
8	Retent	2013		Vomer	1	1	\	Frag							
8	Retent	2013		Otic bulla	1	1	\	complete							
8	Retent	2013		Unidentified fragment	187	\	\	Frag							
8	Retent	2013		Metapodial	1	1	\	0	0	0	1	0	0	0	0
8	Retent	2013		Vertebral plate	1	0	\	Frag							
8	Retent	2013		Tibiotarsus	1	1	R	Distal							
8	Retent	2013		Phalanx	1	1	\								

Table 20: Animal bone data