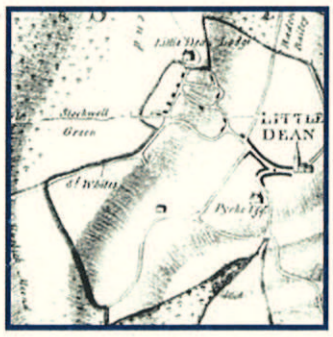
St. White's Farm
Cinderford
Gloucestershire



Archaeological Excavation Report

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St White's Farm, Cinderford
Gloucestershire

NGR SO 6583 1310

ARCHAEOLOGICAL EXCAVATION REPORT

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SUMMARY

In December 2007 and January 2008, Oxford Archaeology (OA) undertook an excavation at St. White's Farm, Cinderford, Gloucestershire (NGR SO 6583 1310) commissioned by Waterman on behalf of the client, Bloor Homes (Western). This preceded the development of new housing and an access road. The excavation was focussed upon part of the access road to the west of St. White's Farm and followed a field evaluation within the whole development boundary by OA in June 2007.

St. White's Farm is believed to be on the site of a medieval chapel and hermitage, once part of the Flaxley Abbey Estate. A Charter of 1158 makes mention of a "grangia" *at Wastadene and an iron forge* (unam forgiam ferrariam) *at Edlond. Wastadene was thought by some antiquarians to be the Flaxley Grange property belonging to the Abbey located south of the village of Little Dean, and the farm on the hill west and above it was "Edlond" (now St. White's Farm), where the iron forge was located. More recent research has suggested that the medieval Grange might actually have been located at St. White's Farm itself.*

The excavation was concentrated on a 12th-13th-century ironworking area partly that was encountered in evaluation Trench 5. The site included stone walls of probable buildings, a possible oven lined with stone, a further possible hearth associated with clay floors, drainage ditches and refuse pits. All of these were directly associated with substantial deposits of ironworking debris. This comprised smelting slag waste and both primary and secondary smithying waste in the form of hammerscale and slag spheres. The artefact assemblages were dominated by pottery of 12th-13th-century suggesting a rather short period of activity. The small quantities of 16th-century material encountered suggests that some later activity did take place at the site although archaeological evidence of this was limited to the few sherds of pottery of this date.

To the north-east of St. White's is a disused hollow-way that may have originally led to this small settlement and latterly to the farm itself, before it was infilled in the 20th century when a new access road was made to the farm off the B4226. This feature was partly excavated in the course of the work, revealing cartwheel ruts in the trackway stone surface.

1 INTRODUCTION

1.1 Location and scope of work

1.1.1 In December 2007 and January 2008, Oxford Archaeology (OA) undertook an archaeological excavation at St. White's Farm, Cinderford, Gloucestershire, which is situated just south and east of the B 4226 (Fig. 1). The investigation was commissioned by Waterman (Consultants) on behalf of the client, Bloor Homes (Western).

1.1.2 The excavation followed recommendations by the Senior Archaeological Officer for Gloucestershire County Council, after a field evaluation by OA in respect of proposals for the construction of a new housing estate and access road found significant archaeological remains at the site.

1.1.3 Prior to the start of the fieldwork OA produced a Written Scheme of Investigation for the excavation (OA 2007c) in accordance with guidelines issued by the Archaeology Service of Gloucestershire County Council.

1.1.4 The development site is centred on NGR SO 6583 1280. The excavation area was confined to the southern 140 m of the access road centred upon NGR SO 6579 1306 and comprised 1180 sq. m (Fig. 2). This incorporated the location of evaluation Trenches 4 and 5 (OA 2007a).

1.2 Geology and topography

1.2.1 The solid geology consists of a series of Lower Carboniferous deposits, collectively known as the Carboniferous Limestone Series (more recently as Dinantian). Haematite deposits are also known to exist through the centre of the site within the Drybrook Sandstone element of the Series (Applied Geology 2007).

1.2.2 The development area occupies the western slope of a ridge of high ground. The high ground along the eastern side of the development boundary lies at 220 m OD and continues to rise to a maximum of 238 m OD at the northern entrance to the site. This slopes down to 195 m OD along the western boundary. The excavation area lay across this slope, ranging from 220 m OD at the south-west to 232 m OD at its north-eastern end where it crosses the existing field boundary and an extant hollow-way (see background section 2.2 below).

1.2.3 At the time of the investigation, the land was under rough pasture enclosed by field boundaries. The targeted excavation area lay at the northern end of the site within the road access corridor and to the west and north-west of St. White's Farm.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Previous work

2.1.1 An archaeological desktop study of the development area was undertaken by Bristol and Region Archaeological Services (BARAS 2004 - SMR ref. 29051) and further supplemented by an additional Sites and Monuments Record search by Oxford Archaeology when preparing the Written Scheme of Investigation for the initial field evaluation (2007a). The evaluation was carried out in June 2007 and reported (OA 2007b). The relevant results are summarised below following the historical background.

2.1.2 This section summarises the relevant parts of the archaeological and historical background presented within these documents and draws on reports produced for *Transactions of the Bristol and Gloucestershire Archaeological Society* and from The Victoria County History (VCH).

2.2 Historical background

Roman

2.2.1 Roman remains are suggested near Cinderford with *'Traces of Roman Paving'* shown on the 1:10,560 series OS map of 1891 and repeated on subsequent OS editions. The paving extends from Sneyd Wood to the south and leads towards the present town, west of St. White's Farm.

2.2.2 The paving probably represents a minor road/lane leading off from a larger Roman road to the east (also mapped on 1891 OS and subsequent editions) that cuts through Abbot's Wood and leads to Little Dean and beyond. Possible boundary stones were also recorded by BARAS along the western side of St White's Farm, though the date of these is unclear.

2.2.3 The village of Little Dean to the north-east of St. White's Farm was once the site of Roman occupation and the remains of a Roman temple can be seen in the grounds of medieval Little Dean Hall.

2.2.4 The hillside to the east of Little Dean was the site of an ancient encampment and the hillside still bears traces of the banks and ditches of the fortifications. Little Dean grew up at the centre of a network of ancient forest tracks (notably the Roman road which led up from the ford and ferry at Newnham by the River Severn - see Fig. 11).

Medieval: St. White's Farm and Flaxley Grange

2.2.5 The history of St. White's Farm (GSMR 20118) is closely tied to that of Flaxley Abbey to the north-east of Cinderford and north of the village of Little Dean (Fig. 11). Within the Abbey Estate was a Grange and an associated farm, a chapel and a hermitage (the latter two thought to be on the site of the present St. White's Farm). These sites have been discussed in detail by Heane (1881-2) and Ellis (1927) and

later in compilation of the Victoria County History of Gloucestershire for the area (1996).

2.2.6 Flaxley Abbey was founded by Roger Earl of Hereford following the death of his father Earl Milo in 1143. Mention of the foundation of the Abbey and its possessions comes in the form of a charter held in the Gloucestershire Record Office, which though not necessarily original, was thought to be at least a contemporary copy (Ellis, 262). The charter was granted by Henry II as duke in *c* 1150 to Cistercian monks and comprised lands at Flaxley and the surrounding area. Also listed were a number of benefactions including "all that land called Wastadene" and "an iron-work at Edlond" also recorded as "Ardlonde".

2.2.7 Henry extended the charter in 1158 to include a *"grangia"* and an iron forge (*unam forgiam ferrariam*). In both charters Edlond is mentioned immediately after Wastadene. Ellis concluded that Wastadene was the Flaxley Grange property belonging to the abbey (situated south of Little Dean) and the farm on the hill above it was Edlond or Ardlonde (now the site of St. White's), where the iron forge was located (Ellis, 263 and see this report Figs 1 and 11; Plate 1). The grant of the iron-work at Edlond was financially of value to Flaxley Abbey and the 1158 charter extended this so that the abbot could set up a forge in the surrounding forest wherever he chose.

2.2.8 The Victoria County History of Gloucestershire (VCH *Vol.V,* 1996, 138-150), however, suggests that the medieval Grange was actually located at St White's (fn. 13) and that after the Dissolution a new house called the Grange (see below 2.2.9), standing south-west of Little Dean, became the principal residence in that part of Flaxley (fn. 16). There are references to iron ore being mined at St. White's *c* 1270, but the abbot of Flaxley as landowner removed the miners and filled in the quarries. Despite the opposition of the abbey, mining was resumed some years later by Grimbald Pauncefoot, the warden of the Forest of Dean and although it yielded little ore, continued in 1287 (VCH V, 138-150).

2.2.9 The later Grange was a three-storied structure dating to the Tudor period, *c* 1540, situated some 350 yards south of the main street in Little Dean and east of the site of Edlond/St.White's. The Tudor building is now gone (demolished in 1962), but the site appears on OS maps from 1891-1953. Ellis noted that no traces of an early building were visible in the above ground buildings, which were in a state of ruin by 1927, a point first noted by Heane in the late 19th century (Heane, 285). However, Ellis speculated that some of the stones appeared reused in the construction of the Tudor Grange, so might have been part of an earlier version, perhaps from a group of farm buildings forming the original medieval Grange (Ellis 264).

2.2.10 Following Ellis' assumptions, she mentions an Elizabethan lease of 1591 pertaining to the Grange that was granted to William Brayne of Little Dean by Sir William Kingston, who acquired the Flaxley Abbey properties long after Dissolution in 1591. In this lease, "the capital messuage called the Grange" is coupled with "the messuage

called St. White's or Arland's Field", just as in the 12th century "Wastadene" is immediately followed by the "ironwork at Edlond" (Ellis, 268). The historic plan of the Forest of Dean (Fig. 11) shows a building to the east of St. White's which, although not indicated, is likely to be the location of the "the Grange".

2.2.11 Despite differences in opinion regarding the actual location of the medieval Grange through the centuries, all documentary sources cite a hermitage and chapel at Edlond/Ardlonde (ie St. White's) from at least the early 12th century and Ellis suggests that there were probably hermits or anchorites there up until the Dissolution. It is recorded that a hermit collected alms for the chapel in 1527 (Ellis, 270). The chapel was dedicated to Saint White. This name (and its actual existence) was the subject of much Antiquarian discussion in the late 19th century (see Heane, 284; Ellis 274), though the *Biographical Dictionary of the Saints* published by Bishop Holweck in 1924 appears to indicate the Saint of the Chapel at Ardlonde as number eight in the list and the lease of 1591 the property here was certainly named as St. White's or Arland's Field.

2.2.12 The VCH records that a chapel or hermitage at St. White's was surrendered to Flaxley Abbey by an anchorite, who was said to have been given the site by Henry II. (fn. 95). Anchoresses lived there in 1225 and 1241 (fn. 96) and an anchorite was collecting alms to repair the building and the road leading to it in 1519, when it bore a dedication to St. White. The chapel was last recorded in 1530 when it was said to be dedicated to SS. White and Radegund (fn. 97).

2.2.13 The current farmhouse dates from the 19th century but Ellis noted that in *c* 1927 the barn was clearly one of the oldest of the farm structures using large blocks of re-used stone at the wall bases. Ellis implies that the stones came from the demolished chapel building (Ellis 271), though does not otherwise corroborate the statement. In the 20th century the farm was used by Cinderford Golf Club.

2.2.14 Other medieval structures in the surrounding area include the remains of a motte-and-bailey castle to the east of Little Dean.

Post-medieval: the development of Cinderford

2.2.15 The town of Cinderford did not fully come into being until the 19th century. Prior to this the surrounding area was occupied by small hamlets and isolated cottages. The creation of the town was a result of large-scale expansion of industrial works that had long been associated with the Forest of Dean area. Iron ore, coal, shale and ochre had all been extracted from the forest since Roman times, with wood fuel for the industry in plentiful supply within the forest.

2.2.16 The town's name is first recorded in 1258 and derives from the fire residues and the iron slag of early ironworking in the valley bottom at or near the place where the Little Dean to Coleford road crossed the Cinderford (or Soudley) Brook. A bridge across the brook had been built here by 1674.

2.2.17 Cinderford furnace was in production in 1797 and was one of the Forest of Dean's main iron production centres. By the middle of the 19th century Cinderford had developed into one of the main centres for iron production with a number of foundries and engineering businesses located within the town. The town continued to develop through the later part of the 19th century and into the 20th century (BARAS, 2004, 3-5).

2.3 Archaeological background

Desktop Study and site walkover by BARAS, 2004

2.3.1 The study was undertaken in 2004 and summarised the archaeological potential of the development site. A walkover survey was also undertaken of the study area. This confirmed the presence in the vicinity of the development site of quarrying activities (GSMR 22918), backfilled scowles (GSMR 25022), stone scatters, linear depressions and arrangements of stones (BRAS 2004).

Evaluation results

2.3.2 The evaluation (OA 2007c) identified a significant area of archaeological deposits surviving within the proposed road corridor to the immediate west of St .White's Farm. In Trench 5 substantial evidence was present for iron production and primary iron working dated initially to the 12th-14th centuries on ceramic grounds. This activity was thought likely to have been associated with the recorded medieval occupation focused upon the property of Edlond, including the chapel and hermitage of St. White.

2.3.3 Platform earthworks noted adjacent to Trench 5 were thought to have been associated with these remains, suggesting that this was part of a small settlement rather than an isolated feature. A hollow-way was partly excavated and recorded in Trench 4 and appeared to have provided the access to this settlement. This gave strong credence to the documentary evidence that suggests the focus of any earlier buildings/settlement was at, or near to the present site of St. White's Farm.

3 EXCAVATION AIMS

3.1 General

3.1.1 The excavation aimed to establish the extent, date, nature, function and phasing of the archaeological remains present within the development boundary and to preserve these by record.

3.1.2 The excavation also aimed to recover artefactual, ecofactual and environmental remains from archaeological deposits and features to provide as much evidence as possible that could be used to understand and interpret the site. The ultimate aim of the investigation was to make available the results through appropriate publication.

3.2 Specific

3.2.1 The excavation specifically targeted the known remains encountered within the evaluation. At the northern end of the site the extant hollow-way and existing field boundary was to be investigated for dating and use.

3.2.2 The excavation of the access road corridor centred on OA Trenches 4 and 5 aimed to:-

- establish the possible outline of a building at this location through either the extent of its floor surface and/or related structural elements such as postholes
- establish the primary function of any building or defined/enclosed area
- establish the type of metalworking being undertaken within this area
- investigate the detailed distribution of the metalworking and arrangement of activities represented by the slag residues.

4 EXCAVATION METHODOLOGY

4.1 General

4.1.1 The main excavation area of the site was stripped of overburden using a tracked mechanical excavator to the top of the first significant archaeological horizon. To characterise the types and stages of metalworking being undertaken at the site, the full extent of the slag debris surface (layer 5002) encountered within evaluation Trench 5 was exposed within the excavation corridor.

4.1.2 Once hand-cleaned, a 1 m grid was established prior to the taking of 1 kg samples at regular intervals across the slag debris for hammer-scale and other metalworking evidence (Fig. 9). Hand-excavated slots were initially excavated through the layers in order to sufficiently characterise and date the deposits prior to their removal by machine down to the underlying archaeological features (Fig. 3).

4.1.3 All machine excavation of deposits was carried out under archaeological supervision. All spoil was stored adjacent to the site and was used to backfill the excavation area.

4.1.4 Feature sample levels followed guidelines set by the Archaeology Service for Gloucestershire County Council. Deposits relating to domestic/industrial activity were 100% excavated and other features were subject to the following sampling levels: 50% excavation of pits and 20% excavation of linear features (ditches and gullies). Monitoring of the excavation was undertaken by Waterman and the Archaeology Service for Gloucestershire County Council.

4.1.5 The hollow-way was investigated by hand-excavated sections adjacent to each baulk section.

4.2 Recording

4.2.1 A comprehensive written, drawn and photographic record was made of the archaeology in accordance with the requirements of OA's Field Manual (Wilkinson 1992), and the Institute of Field Archaeologist's *Standard and Guidance for Archaeological Excavations, 1999.*

4.2.2 A full black and white and colour (35 mm transparency) photographic record was maintained, illustrating in detail and general context the principal features and finds.

4.3 Palaeo-environmental evidence

4.3.1 The area of metal working residue layers was sampled using a 1 m sq. grid system, and a proportion of these samples have been analysed for the purposes of this report (see Appendix 5). Samples were also taken from deposits containing metalworking and charred plant remains from appropriate features.

5 RESULTS: DESCRIPTIONS

5.1 Site description: west end of road corridor

See Fig.4 : site plan (west)

Early deposits (Fig. 5)

5.1.1 The earliest deposit on the site was a layer of reddish-yellow sand and clay (5000) interpreted as the natural surface geology. The clay was concentrated in the middle of the western excavation area, separating deposits of sand at either end of the site. Large sandstone boulders were visible as rock outcrops within the natural.

5.1.2 The natural was overlain by layers of hill-wash material that accumulated prior to human activity. To the centre of site, layer 5131 comprised a reddish-brown silt loam with occasional stones to a depth of 0.1 m. This was overlain by 5130, a mottled grey silty loam with occasional stones that was 0.1 m thick. To the north-east of the site, natural lay beneath layer 5097, a light brown sandy silt with some stones that was 0.08 - 0.10 m in thickness and a similar but substantially thicker deposit of similar material (5099) was observed against the north baulk where it was 0.54 m in depth. To the centre of the site, natural grey-brown silt (5100) overlay 5000.

Early 12th century features and deposits (Fig. 5)

5.1.3 The earliest features on the site were a number of shallow pits filled with burnt deposits likely to have been derived from metalworking and fires. These were concentrated against the northern baulk, interspersed with thin layers of soil.

5.1.4 To the centre of site against the north baulk was part of a feature (5125) cut into natural (5000). Though truncated by later activity, the shape in plan suggests that this was a pit measuring at least 0.95 m in width and 0.28 m in depth. It was filled with a yellow-grey clay deposit (5109) containing stones. This was cut by pit 5111, which

was 2.1 m wide in section and 0.3 m deep, that was also cut into layer 5130, a thin band of silt loam containing a small quantity of iron slag overlying hill-wash layer 5129 to the north.

5.1.5 The basal fill of 5111 comprised charcoal (5110) to a depth of 0.4 m, overlain by a thin band of reddish-yellow clay and charcoal (5127). Above lay 5102, a dark-brown silt with substantial amounts of charcoal and fired clay and which contained pottery of early 12th century date together with part of an unidentified Fe object, and a horseshoe. The upper fill comprised a thin silting deposit of sand and silt (5128) that levelled the shallow remaining hollow of the pit.

5.1.6 West of 5111 was pit 5113 that was cut into the natural (5000) and was oval in plan, measuring 1.88 m in width with a depth of 0.16 m. The lowest fills of this pit comprised thin bands of reddish-black silt (5121 and 5122), both containing charcoal. Fill 5121 was overlain by 5120, a grey-yellow silty loam with clay patches to a depth of 0.08 m. Above lay 5119, the upper fill of the pit: this deposit was near black in colour with frequent charcoal inclusions to a depth of 0.22 m. None of the fills contained finds but the pit is certainly among the earliest of features and the charcoal inclusions within its fills suggest that they are associated with metalworking. Fill 5119 was cut by 5132, a small pit truncated by a later structure and filled with 5123, an undated silt loam with occasional charcoal flecks.

5.1.7 Just south of the baulk and pit 5111 was a small sub-circular cut with vertical sides and a flat base (5112). It was 0.4 m in diameter and 0.52 m deep and interpreted as a posthole (Fig. 7). Its fill (5133) was red-grey sand that contained no finds. To the east of the posthole was a thin band of mottled yellow clay (5117) some 0.04 m thick, possibly the remains of a clay surface.

5.1.8 North-east of this group of features and deposits but only observed against the north baulk was a shallow pit (5070) that was 0.15 m deep and 0.66 m wide in section. Its fill was a near black silt with charcoal flecks and clay patches (5069) but contained no finds. Fill 5069 was overlain by a spread of brown-grey sandy silt (5068) to a depth of 0.28 m, spread over an area some 2.5 m in width. The layer contained charcoal and iron smelting slag waste and produced sherds of early 12th century pottery.

5.1.9 East of layer 5068 was a possible pit or ditch 5091 (Fig. 5) that extended beneath the north baulk of site and was 1 m in length, 0.07 m wide and 0.5 m deep. The feature was apparently rectangular in plan although the profile of this feature is strongly suggestive of it being a ditch with splayed upper edges characteristic of weathering and erosion. It was also truncated by a later ditch (5032), perhaps suggesting that this was a predecessor to the later ditch.

5.1.10 The earliest fills comprised tip lines or silting deposits of silty clay (5092, 5093 and lastly 5094) extending from the west edge of the pit to the pit base. These contained charcoal fragments and occasional fragments of iron slag. At the east edge of the pit base was deposit 5056, a thin band of silt. Above lay 5095, a near black silt loam

some 0.22 m thick containing pottery of early 12th-century date. A nail was also recovered from this deposit that was overlain by a black/red loam with large stones to a depth of 0.28 m (5098). The upper fill of the pit was overlain by 5073 (not shown on plan), a small patch of compacted clay, probably a working floor surface, which contained a significant amount of hammerscale (30 g). This deposit appears distant from any structures known within the excavation area so it seems unlikely that this represents an *in situ* debris scatter that would result from smithing. A smith would require an enclosed and sheltered area both to protect and control the heat source and to help see the heat colour changes of the hot metal that is vital to skilled smithying. It may be possible that this deposit relates to earlier unknown structures outside of the excavation area or that this is a dump of debris resulting from the clearing out of a smithy floor/building.

5.1.11 South-west of pit 5091 was an oval feature (5081) that was cut into the natural. It was 1 m in diameter and 0.24 m in depth (Fig. 8) and was filled with a red-black clay silt (5080) containing fragments of iron slag and from which early 12th-century pottery was recovered. The function of the feature is unclear, it may have been a small refuse pit or the impression left after removal of one of the large sandstone boulders noted within the natural clay.

5.1.12 A similar feature was noted to the centre-west of the site. Possible pit or boulder hole 5075 (Fig. 7) was filled with sand (5076) and then a dark grey silt with charcoal inclusions (5085). The feature contained no finds.

Mid - Late 12th century features, structures and deposits

Building/room 5137 and clay floor 5084 (Figs 4 and 5; plate 2)

5.1.13 To the centre north of site, the fills of earlier pits 5123, 5109 and layer 5129 were cut by 5082, the construction cut for a wall (5083). The construction cut was 1.1 m wide, 0.3 m deep and had vertical sides and a flat base. Within this two courses of roughly hewn sandstone facing blocks were laid and constructed in an irregular dry stone bond with a rubble core infill. The facing stones measured on average 0.7 m by 0.6 m by 0.3 m, with some notably larger blocks. The wall was aligned NW-SE and was at least 2.8 m in length, 0.3 m in height and 1.1 m in width.

5.1.14 Wall 5083 was abutted by NE-SW wall 5089 that formed a right angle with the south end of the first structure. Wall 5089 lay within a vertically sided construction cut (5134) that was 0.65 m wide and had a flat base. The wall was composed of sandstone blocks that were roughly hewn of similar average size and dimensions to wall 5083, though only one course of stones remained *in situ*. The wall was 5.7 m in length and 0.65 m in width and formed part of a building or small room/enclosure with 5083.

5.1.15 Within the limits of the structure formed by walls 5083 and 5089 was a layer of reddish-yellow clay (5084), probably the remains of a floor, which exhibited signs of scorching. The layer was 0.12 m thick, 2 m in extent and overlay the fills of earlier

pit 5111 and posthole 5112. A small quantity of redeposited tap slag (84g) and some hammerscale and slag spheres were incorporated into the surface suggesting that secondary smithying was undertaken close by within the building.

5.1.16 Surface 5084 was overlain by 5126, a 0.11 m thick layer of grey silt and small stones, probably a trampled working deposit formed on the underlying floor.

5.1.17 Wall 5083 was abutted on its internal face by a layer of clay and mixed redeposited ironworking slags (5101) that also overlay earlier pit fill 5102 and part of floor 5084. The material had been disturbed later, so that in section it appeared to spread across the remains of wall 5083.

Drainage gully 5071

5.1.18 To the south-east of structure 5137 was a NE-SW aligned drainage gully (5071, consisting of contexts 5077 = 5060 = 5067 = 5057) positioned parallel to wall 5089 (Figs 4, 7 and 8). The north-east end of gully (5077) ended with a shallow concave profile, the sides of the feature sloped gradually. Here the gully cut earlier soil layer 5068. The gully terminus (5077 - Fig. 8) was 0.9 m in width and a maximum of 0.36 m in depth. Pottery of late 12th-century date was recovered from the fill of the terminal (5078 and 5079 above) that comprised silty sands with moderate quantities of iron tap slag debris.

5.1.19 The centre part of the gully (5060 = 5067) maintained its concave profile and varied in depth between 0.2 m - 0.4 m. Late 12th-century pottery was recovered from fills 5059 (in 5060) and 5064 (in 5067), both silty deposits with occasional charcoal inclusions. Pottery of 12th-century date was recovered from fill 5061 in 5057, which represented the south-west end of the feature. A layer of grey/black silty clay and iron slag debris (5116) accumulated above fill 5061, indicating that the feature had perhaps gone out of use by this time. At the south-west end of the gully there was the suggestion of an earlier gully (5058) that extended for a length of 1.1 m before its fill was cut by the later feature (5057).

Structure group: stone drain 5108 and capping 5087; hearth 5105/5106 and wall 5104 (Figs 4 and 5; plates 3, 4)

5.1.20 West of the building represented by walls 5083 and 5089 was a further group of structural elements that appear to have post-dated the construction of the original building 5137 and its associated drainage gully 5071, though it seems very likely that these were part of a contemporary arrangement.

5.1.21 Layer 5116, that had accumulated over the south-west limit of drainage gully 5071, was cut by 5096, the construction cut for a stone lined drain (5108). The continuation of the drain from the limit of the gully does not appear to be coincidental and it appears likely that the drainage gully (5071) remained in some form of functioning state such as a shallow undulation that channelled water towards the stone lined drain. The stone drain's east end lay 1.2 m distant from the corner of structure 5137

and extended to the south-west for a distance of 6.2 m, before returning to the north-west for a length of 2.7 m, where it continued under the northern site baulk (Plate 3). The drain was 0.4 m wide and 0.2 m deep with natural clay acting as bonding material between the drain stones. The fill of the drain (5135) was a loose light brown silty sand, which produced no dating material.

5.1.22 The drain was overlain by the remnants of a stone structure (5087) that followed the same alignment and also returned to the north-west and under the site baulk. The stonework was irregularly spaced, possibly the result of later demolition activity. Structure 5087 was built within a shallow construction trench (5088) and the surviving stones overlay the outer edge of the stone drain, with some stones covering the centre of the drain. Structure 5087 had a maximum width of 0.9 m and was constructed of sandstone blocks, the largest of which measured 0.7 m x 0.35 m by 0.2 m. It was unclear whether 5087 was a capping for the drain below, or a later additional superstructure, or possibly both. Although the fact that the larger stones follow the curvature of the underlying drain does suggest that they acted as a capping.

5.1.23 Within the limits of the drain was a circular feature (5105) that was situated adjacent to and extending under the north baulk (Figs 4 and 8; plate 4). The feature was 3 m wide (NE-SW) and had an exposed dimension of 1.55 m (NW-SE). The outer edge of the cut was lined with sandstone rubble (5106), possibly forming a retaining wall or a firm foundation. Structure 5106 was 0.4 m to 0.5 m wide and a single course of stones survived *in situ*, bonded with clay. A single sherd of early 12th-century pottery was recovered from between the stones. Little evidence remained for the possible superstructure and it is unclear if this was raised above ground in stone or if this represented a floor level construction.

5.1.24 The basal fill of 5105 was a 0.1 m thick deposit of near black silt loam with charcoal flecks. Although certainly fired material, no evidence of ironworking waste was recovered from the deposit and the lack of surrounding scorching suggests that this material was imported. Fill 5115 abutted stonework 5106 at the edge of the feature and was overlain by a 0.25 m thick brown silt loam (5114) containing pockets of sand and a few large pieces of sandstone.

5.1.25 This deposit was probably a base for 5107, a stony layer mixed with brownish-black loam to a depth of 0.16 m. This material appears to have been the floor of the structure. The absence of substantial quantities of burning in the form of charcoal or recognisable scorching suggests that this was not the primary surface of a possible hearth or that the parts of the structure that would have been affected by heat were at a higher level.

5.1.26 To the immediate north-east of the possible hearth was a short length of wall (5104) that extended beneath the north baulk. A 1.5 m length of this wall extended into the site and was set in a construction cut (5124) that cut the fills of pit 5113. Wall 5104 comprised two surviving courses of sandstone rocks laid in irregular bond and was

0.9 m wide. The wall could have formed a small room with stonework/drain 5087/5108.

5.1.27 To the north-east of wall 5104 and overlying earlier pit 5113 was a compacted patch of clay floor (5086) containing pottery of late 12th-century date and a concentration of relatively unbroken flake hammerscale. The intact preservation of the hammerscale flakes suggests that this was the location of smithing activity with an anvil positioned close by.

Eastern ditches 5012 = 5032 and 5040 (Figs 4, 5 and 6)

5.1.28 To the north-east of all the structural elements were two large ditches aligned NW-SE. The more westerly, nearest the metalworking area (5012 = 5032), cut an earlier metalworking deposit in ditch/pit 5091 and the natural (5000) at the southern baulk. The ditch had a broad 'U'-shaped profile that had broadly splayed upper edges consistent with weathering erosion and was 2.6 m wide at the top and 0.7 m wide at the base. The primary fill (5051) comprised a red/brown sandy clay containing pottery of late 12th-century date. Successive bands of sandy silt and sandy clay (5033, containing early 12th-century pottery - then 5034 and 5050) accumulated as a result of natural erosion into the feature. The final ditch fill comprised a distinctive mixture of loose charcoal and ironworking debris (5049), which appeared to have been deliberately dumped into the partially silted feature.

5.1.29 At the southern baulk the ditch (here numbered 5012 - see Fig. 6, section 5001) exhibited a slightly narrower profile and was filled with broadly similar deposits. The upper ditch fills (5047, 5015 and then 5014) contained large quantities of charcoal as had the fills at the north end of the site. A 'U'-shaped deposit (5016) seen in section may represent a separate individual feature and consisted almost exclusively of smelting slag waste.

5.1.30 North-east of 5032 and some 9.5 m distant was a second ditch on a near parallel alignment. Ditch 5040 (Figs 4 and 7) was 2.05 m in width and 0.86 m in depth with a steep-sided concave lower profile cut into the natural and with a slightly uneven base. The upper 0.25 m of the ditch profile was slightly splayed indicating a small amount of erosion to the ditch cut. The fills comprised natural silting deposits (5041 below 5042 and 5043) deriving from these upper parts of the ditch with the upper fill (5044) combining silty loam and large quantities of tap slag and other hearth derived slag waste with charcoal, together with three pieces of fired clay from a hearth of possibly an oven floor (see Appendix 3). Both ditches 5032 and 5040 may have been opened in order to aid drainage downslope at the side of the metalworking zone away from the buildings or even acted as significant boundaries to the metalworking zone.

Layers associated with metalworking/fire area south-centre of site: late 12th century

5.1.31 Towards the south-centre of site was an extensive layer of light brown sandy silt (5074) some 0.11 m thick and covering an area measuring 4 m by 3.7 m. The layer overlay natural (5000) and probably represents a former topsoil. Pottery dated to the

late 12th century was recovered from the layer, which was overlain by 5025 (Fig. 4), a compact yellow-white clay with charcoal inclusions, measuring *c* 4 m by 3 m in area (Plate 5). The layer was compact enough to suggest a deliberately laid rammed clay surface. This included a moderate quantity (9 g) of hammerscale.

5.1.32 Layer 5025 was overlain by 5054 (Fig. 4), a very dark area of sandy silt with up to 60% charcoal inclusions, again indicative either of burning refuse or possibly a storage area of raw material for fires. On the eastern side of the layer were a number of sandstones arranged in a linear pattern that could have formed part of a wall, though they were too fragmentary to be certain. Pottery of 12th-century date was recovered from the layer. Above was layer 5055, a compact dark red-brown silty clay with yellow patches of clay up to 0.1 m thick (Fig. 4). This deposit lay beneath a distinct spread of mixed iron slag debris (5072, Fig. 4) mixed with stones and lumps of clay. Collectively this area of deposits appears to represent an area of surfaces and debris from metal working, perhaps with structural elements including parts of walls.

5.1.33 Layers 5072 and 5055 were overlain by an area of reddish brown silt and charcoal (5046) that contained iron slag and pottery of mid-13th century date. Above was a shallow burnt deposit of clay (5045) that just encroached into the site from the south baulk in turn covered by 5027 = 5023 (Fig. 6), a more extensive patch of burning that could indicate the site of a hearth. However, not enough of either deposit was revealed within the site to establish this for certain. A rod or bar of iron was recovered from layer 5027.

End of site activity: early - mid 13th century (Figs 5 and 6)

5.1.34 At the north baulk, wall 5104 was abutted by layer 5118, a dark grey-black silt loam that was up to 0.4 m in thickness. This layer overlay the upper fill of hearth 5105 including the outer stonework (5106), suggesting that the hearth had gone out of use by this time. Layer 5118 was overlain by 5030, a silt loam spread that contained one fragment of burnt animal bone, mixed iron smelting/working slag, two iron nails and one unidentified Fe object and which sealed walls 5104 and 5083, indicating that they had been demolished by this time and thus the building(s) they represented had gone out of use.

5.1.35 To the north-east, ditch 5032 had completely infilled and its top fill (5049) was overlain by 5035 = 5038, a very dark spread of silt and charcoal that contained two iron nails. Both 5035 and 5030 were covered in turn by layer 5029, a similar dark grey silt with charcoal that contained an iron nail, pottery of mid 13th-century date together with late 12th-century material and two pieces of fired clay perhaps deriving from a hearth or oven wall (see Appendix 3). The silty deposits that overlay most of the structural elements and infilled features across the site had the appearance of hill-wash suggesting that by *c* 1250, the whole area represented by the building(s) and its associated ditches and oven had been abandoned.

5.1.36 Layer 5029 was overlain by 5031 = 5065 a thin layer of silt that produced pottery of late 12th-century date and four iron nails, in turn overlain by 5028, a similar silt

material that contained quantities of metalwork debris and represented the final layer at the north of the site prior to the deposition and stabilisation of the current topsoil (5001).

5.1.37 Against the south baulk of the site, was a similar accumulation of silt layers rich in iron working waste (Fig. 6, section 5001): layer 5018 covered the final fill of drainage ditch 5012 and contained late 12th-century pottery and to the east equivalent layers 5019 = 5021 = 5022 sealed the underlying ironworking area against the south baulk. Layer 5019 contained 16th-century pottery and an iron bar or rod and layer 5021 contained a horseshoe. These deposits also had a clear hill-wash origin or at least in part. Therefore, the artefacts and slag debris included in these may have derived from the immediate up-slope area bordering the site.

'Layer' 5002 and later activity on site (Figs 6 and 9)

5.1.38 Context 5002 was assigned for the grid sampling of the top of the archaeological sequence across the centre of the site for metalwork deposits (hammerscale and slag) and as such includes layers 5028, 5018, 5019, 5021, 5022 etc. One horseshoe of uncertain date was recovered from layer 5002. Large quantities of run/tap slag, hammerscale, slag spheres and charcoal were recovered. The very mixed appearance of the assemblage and the deposits stratigraphic position suggest that this does not represent *in situ* smithying deposits but redeposited debris either as a result of clearing out structures immediately up-slope or through water erosion of waste tips down-slope.

5.1.39 An undated pit (5036) situated against the north baulk and cut from just below the topsoil and through layers 5035 and 5038 was the latest feature on the site. It was some 2 m wide and excavated to a depth of 1 m but the base was not reached. The fills comprised redeposited natural sand and clay, together with large sandstone rocks, and ironworking debris. Fill 5052 contained three pieces of fired clay either from a hearth or oven floor, suggesting that there had been a structure of this type nearby, and one iron horseshoe. The pit may have been an exploratory hole dug by quarry workers, though all that can be said for certain is that the pit post-dates the mid 13th century.

5.1.40 A few sherds of mid 16th-century pottery were recovered from late contexts (topsoil/ploughsoil) on the site. This could suggest that domestic activity continued in the vicinity and/or that the material arrived on the site by manuring above the metal working site. There is little indication that the field had ever been subject to ploughing so it seems unlikely that this could explain the presence of the mid 16th-century pottery.

5.2 Site description: east end of road corridor

Medieval/ post-medieval: the Hollow-Way 5136 (Fig. 10; plate 6)

5.2.1 An extant hollow-way (5136) was visible at the north-eastern end of the site extending uphill on a NW-SE alignment (Fig.10; plate 6).

5.2.2 The natural (5000) was cut by a 5.6 m wide hollow (5007) that was 0.7 m deep where excavated. The base fill of the hollow was an undated 0.28 m thick deposit of dark grey-brown sandy clay (5011). The clay was overlain by a layer of roughly-laid stones and cobbles (5006). The stones were on average 0.2 m by 0.05 m in size and traces of wheel ruts could clearly be seen within the paving. At the edges of the surface, superimposed layers of stones hinted that the trackway may have been flanked by walls at one time or that the larger stones had been 'thrown' to the edge of the track by the passing traffic.

5.2.3 Stone surface 5006 was overlain by a layer of brown clay silt (5005) that had accumulated in the centre of the hollow-way. This deposit contained twelve sherds of pottery of 18th-century date and bricks dated to the middle of the 18th century. Above lay 5004, a layer of brown/near black clay silt with occasional cobbles and small stones. Mixed with this deposit were substantial quantities of animal bones, glass bottles, metal and pottery dated to the 20th century, and modern cooking pots/handles. Layer 5004 was overlain by 5003, a light brown silty clay that appeared to be re-deposited topsoil used to infill the remainder of the hollow. Modern 20th-century pottery was recovered from this layer, suggesting that the hollow-way ceased to be in use by this time and had been deliberately backfilled, presumably around the time that a new access road from St. White's Road (the B 4226) to the east of St. White's Farm was constructed.

5.2.4 To the north-east of the hollow-way and some 7.75 m distant was a steep bank that had been reinforced with large boulders (5010) and had the existing hedgeline field boundary upon it. To the south-west of the hollow-way and extending parallel to it was a linear feature (5009) that was 1.12 m wide and 0.3 m deep with sloping sides and a flat base. It was filled with 5008, a red/brown clay silt with occasional stones but produced no dating evidence. This feature seems most likely to have added additional drainage at the side of the hollow-way.

5.3 Finds summaries

Pottery by Paul Blinkhorn

5.3.1 The pottery assemblage from the excavation comprised 565 sherds with a total weight of 9832 g. Full details are presented in Appendix 2. The assemblage is dominated by local sandstone-tempered wares, but there are also small quantities of pottery from the Bristol area in the form of Ham Green ware and Bristol Redcliffe ware.

5.3.2 The bulk of the vessel types are plain jars in the local ware, but jugs in both this fabric and the Bristol area wares were also present. All the fragments of the local Forest of Dean Sandstone tempered ware (FDSW) jugs occurred in CP2 (CP = Ceramic Phase) contexts, suggesting very strongly that they are of late 12th–13th-century date, and thus have the potential to be a useful dating tool for future assemblages of this type in the region.

5.3.3 The medieval pottery occurrence per ceramic phase with dates is shown in Table 1. It shows that the medieval pottery assemblage is dominated by Forest of Dean wares, with Ham Green/Bristol types present in lesser quantities. The data for CP2 is distorted by the presence of a near-complete Ham Green ware jug.

Table 1: Pottery by ceramic phase/date/wt as a % of the assemblage.

	F1	F2	F4	Total Wt (g)
CP1 - E-Late 12thC	-	100%	-	2978
CP2 - LC12th-MC13th	25.1%	74.9%	-	4367
CP3 - MC13th-14thC	-	90.2%	9.8%	692

5.3.4 The medieval assemblage is dominated by jars of Forest of Dean wares (total EVE = 5.46), but rim sherds from six jugs were also present, two in Ham Green ware, the rest FDSW. All the jugs of the latter type occurred in CP2 contexts, suggesting that they are generally of late 12th–13th-century date. This is given some support by the fact that both of the two jug handles in that fabric were also in contexts of that date. A small quantity of early post-medieval material was recovered together with pottery of mid 18th to 20th-century date.

Iron slag and hammer-scale by Lynne Keys

5.3.5 A large assemblage weighing almost 35kg was examined for this report. It was recovered by hand on site and from soil samples processed after excavation. There was only one complete smithing hearth bottom. This was re-deposited in drainage ditch 5040. Two incomplete examples were found in context 5044 (the same drainage ditch as the complete example) and in metalworking dump 5072. Hammerscale flake and spheres were also among the fragments identified and indicate both primary and secondary smithing. A significant quantity (3071g) of the slag was undiagnostic, i.e. could not be assigned to either smelting or smithing either because of its morphology or because it had been broken up during deposition, re-deposition or excavation. A further quantity (1070g) of undiagnostic slag was iron rich (very magnetic).

5.3.6 The bulk of the slag assemblage represents re-deposited material from smelting but no focus for this can be postulated. Fired clay was very scarce in the assemblage and was found as tiny pieces in the large layer (5002) and in even tinier fragments and amounts in other layers.

5.3.7 Several key groups were identified, including clay floor layers 5073, 5086 and 5084. These areas are likely to have been the focus for smithing activity, indicated by the amount of hammerscale present.

5.3.8 Only 266 g of vitrified hearth lining was present in the assemblage, 263g of this from the ditch or terrace draining 5033. This small amount almost certainly indicates the smiths were using one or more raised firebeds and worked standing up (like the forges and in the manner we are familiar with in modern times). Once the raised firebed was demolished, as it might be if it were made of stone blocks or reusable material, there would be no trace of the activity apart from hammerscale and charcoal staining or flecks.

Metalwork by Ian Scott

5.3.9 The metalwork from Cinderford comprises 20 pieces, including 19 iron objects and 1 non-ferrous object . The material includes 9 nails and 2 bar or rod fragments from medieval or early post-medieval contexts and 3 horseshoes or parts of horseshoes, one of which was from an early 12th century context, the other two are from contexts of post 13th-century date. Two unidentified objects were recovered, one from an early 12th-century context and one from a 16th-century context. The assemblage is completed by a number of relatively modern finds: the frame of a bicycle saddle, an enamel saucepan, a painted wooden handle from a kitchen utensil, and a small non-ferrous lid, all from context 5004.

Ceramic building material and fired clay by Cynthia Poole

5.3.10 A small assemblage of fired clay (8 fragments, 325 g) and 4 fragments of brick (2029 g) were recovered. The fired clay was made in sandy fabrics probably utilising the local natural clay and sand deposits. The characteristics of the fired clay are typical of hearths or oven floors/material from an oven superstructure supported on a wattle framework. All the fired clay was found in deposits containing ironworking waste and it is likely that the clay represents parts of structures used in processing the iron, either by smelting or smithing. Although the fired clay is not datable by its intrinsic characteristics, it all appears to be associated with contexts of 12th-13th-century date. The brick fragments are of broadly 18th-19th-century type and appear to have been re-used as metalling in the nearby hollow-way.

Glass by Ian Scott

5.3.11 The bulk of the glass comprises eighteen complete bottles and jars of early-mid 20th-century date, all from context 5004, the fill of the hollow-way. In addition there is a broken modern decorative vessel in orange and red glass, a complete glass stopper and a jar rim fragment also from 5004. The only other glass sherd is a fragment of the push up from a wine bottle base in dark green glass from context 5005.

5.4 Palaeo-environmental remains summaries

Charcoal by Wendy Smith

5.4.1 Burnt layers associated with metalworking were specifically sampled for the recovery of charcoal. Five bulk soil samples were collected. One sample (sample 5261, context 5085) was from pit 5075 and all of the remaining samples were from

floor layers. Analysis of charcoal was carried out in order to establish the range of wood fuels in use and whether there was evidence for woodland management. The deposits produced abundant oak (*Quercus* sp.) charcoal, as is common from metalworking sites. Most of the samples produced highly fragmented charcoal, which is likely to be primarily oak, but were technically too small for analysis. However, one deposit (pit sample 5261) produced larger fragments. The majority of charcoal identified was oak heartwood, but some roundwood (branch/ stem) fragments were also recovered. These may simply represent fragments of branches/ stems which were not fully removed from cord wood; however, they may also be indicative of coppicing as was the age of the roundwood fragments (7 years). Two tentative identifications of possible beech (cf. *Fagus sylvatica* L.) and possible hazel/ willow (cf. *Corylus avellana* L./ *Salix* spp.) charcoal were made from pit sample 5261.

Animal bone by Lena Strid

5.4.2 The faunal remains derive from two contexts, 5004 and 5030. Context 5004 was a late post-medieval to modern fill of the hollow-way (5007) and contained 38 bone fragments of butchery waste mixed with 20th-century glass and pottery. The species present among the animal bones were cattle, sheep/goat and pig. Context 5030, dated to the 12th-13th century, contained one burnt bone fragment of an unidentified mammal (weight: 3g). No other contexts produced animal bone.

6 DISCUSSION AND INTERPRETATION

6.1 Project aims

6.1.1 No evidence was recovered for the prehistoric, Roman or Saxon periods from the investigation. The excavation targeted and expanded upon the results of the 2007 evaluation in the area of Trenches 5 and 4 that were excavated west and north-east of St. White's Farm respectively, in accordance with the aims set out for the project in the WSI (OA 2007c, 3-4). The discussion below assesses the original project aims in the light of the excavation results.

6.2 Site development and buildings

6.2.1 The site topography between evaluation Trench 5, the recent excavation area and St. White's Farm displays several clear rectangular platforms terraced into and/or slightly built up upon the hill slope. These lay outside the access road corridor and the excavation area, so no formal survey of these was undertaken. It is nonetheless clear that taken with the buildings and industrial areas discovered, the settlement at St. Whites was the size of a small hamlet, probably accessed by the lane/hollow-way to the north.

6.2.2 The dating evidence indicates that metalworking began in the early 12th century, with a number of pits filled with charcoal and metalworking residues predating later structures. The function of the pits is unclear, they may have been originally dug for

the preparation of charcoal, the disposal of ash and/or cinders, were excavated for the clay that lay beneath the surface or represent boulder holes within the natural.

6.2.3 Whether there were structures on site prior to the construction of the building in stone is unclear as only a single posthole was found. Not enough of building 5137 was revealed within the trench to be certain of its function, but it is most likely to have been a building used as a smithy and less likely a domestic building. The building appears to have had a clay floor. The structure interpreted as a smithing hearth against the north baulk and adjacent to building 5137 was probably a raised fire bed used at waist height, similar to those still used today (Keys, Appendix 5). These types of smithing hearths used to heat and reheat bloom and objects for working during primary and secondary smithing, often leave little in the way of metalworking residue, concurrent with the evidence from this site, where little debris was recovered from within the structure. It appears to have been enclosed by a wall, at least to the east, and the stone drain also suggests a structural element, but it is unclear how it, or building 5137, were roofed.

6.2.4 The buildings evidently required drainage, as shown by the large ditches to the north-east. Building 5137 had a substantial gully to the south-east to counter the effects of water coming downslope. This was continued down-slope by the stone drain surrounding the hearth and this may have been utilised to channel an intermitent water supply to the forge that could be stored for tasks such as quenching of the hot iron during working.

6.2.5 By the late 12th century water power was being used in England to drive the tilt hammer and bellows in use in forges (Foard 2001, 80). Given that the site represented a significant investment by the abbey, if the geography of the site had allowed it, it seems likely that one would have been built. However, the hillside location and its position near the top of the watershed means that this was not practical. The scale of iron smelting and working was, therefore, probably on a smaller scale than that which could be expected through the use of a water powered mill.

6.3 Evidence of metalworking

6.3.1 The remains almost certainly represent a forge undertaking production from raw ore through to saleable iron. The stages of production (primary smelting, primary smithying and secondary smithying) were all represented in quantity across the area of the stone building which appears to be the primary forge structure that housed the smithying hearth(s) and anvils. It is not clear whether several anvil locations were used at once or whether the location of one of these secondary smithing areas changed over the life of the forge. No *in situ* remains of smelting furnaces were encountered although these would have been located outside of the building due to the intense heat and fumes expelled.

6.3.2 Metalworking residues and fired deposits over probable clay floors and similar deposits within pits or boulder holes and ditches confirms that both iron smelting and primary and secondary smithing were being undertaken. Although no focus for smelting was identified, there was a significant amount of tap slag recovered to indicate that there was a smelting furnace nearby. Primary smithing (hotworking of the iron lump by a smith using a hammer) is indicated by the presence of the probable smithing hearth against the south baulk and the presence of a smithing hearth bottom discarded into a ditch to the north-east of the building.

6.3.3 Patches of clay mixed with metalwork debris and charcoal are characteristic of both ground level and waist level hearths, where charcoal is fired to extreme temperatures using bellows, before the iron is worked into a usable form and then hammered into shape on an anvil. Fragments of fired clay indicative of hearth/oven flooring and even oven walling from a sequence of layers to the south-centre of the site (layers 5029, 5044, 5052) suggest that fire pits with raised walls may have been the preferred method of heating the charcoal .

6.3.4 The locations of working anvils is inferred by patches of apparently deliberately laid clay to the east of the likely smithing hearth constructed to provide stable working platforms on the sloping hillside, and the hammerscale that is a by-product of working the iron. The clay was usually covered with spreads of charcoal and exhibited signs of burning. These areas of secondary smithing appear to have been separated from the hearth by walls, although the small portion of the building revealed within the excavation area means that the layout of the building is not clear. Another possible smithing area was identified to the east of the building and hearth where another patch of clay floor and a concentration of hammerscale was identified.

6.3.5 Pit 5111, to the east of the hearth and dated to the early 12th century, contained a layer of clay with stones overlain with a thick deposit of charcoal but with no ironworking debris. This appears to have been a 'charcoal pit' similar to one found adjacent to a circular hearth at Potters Lyveden, Rockingham Forest, Northamptonshire dated to the mid 11th to mid 12th-century "likely to be related to the preparation of the charcoal for its mixing with the ore" (Foard 2001, 74). This pit was later overlain by a likely smithing area represented by a clay floor and hammerscale debris, suggesting that the anvil locations did move over time, and that the pit was contemporary with another of the secondary smithing areas. Less conclusively, pit 5113 was also devoid of metalworking debris and contained charcoal-rich fills. It was also overlain by a clay floor with smithing debris and may have had a similar function to pit 5111.

6.3.6 Several metal finds were recovered from contexts ranging from early 12th - mid 13th-century date, including 7 nails, one bar/ rod fragment and one horseshoe. Notably, the horseshoe was worn, suggesting that it had been used and was not manufacturing waste. The extensive evidence for primary and secondary smithing activity on site suggests that some objects may have been made here. If not, saleable iron was certainly produced. Context 5030, dated to the 16th century produced an item that,

although could not be clearly identified, appeared to be unfinished and therefore may have been residual and a product of the industry here.

6.4 The hollow-way

6.4.1 The extant hollow-way partly investigated within evaluation Trench 4 may have been the main access to this ironworking settlement and the chapel and hermitage, and may even have formed a boundary to the north of the main occupation and activities. However, there is no artefactual evidence that this was a medieval access route, and may instead date to the post-medieval period. Its alignment directed towards the northern side of the current farm buildings is of interest as this could reflect the presence of significant earlier buildings being located within the area of St. White's, as suggested in the SMR entry.

6.4.2 No medieval or 16th-17th-century finds were recovered from the hollow-way fills. Bricks from fills of the feature date to the mid-18th century or perhaps slightly earlier, so may have been incorporated into the structure, as Poole notes (this report - Appendix 3). The vast quantity of modern glass bottles recovered show that the hollow was filled in the middle of the 20th century. Air photographs held by the NMR at Swindon taken by the RAF after the war show the hollow-way as extant in 1946, but only surviving as a curving hedgerow by 1969 (not illustrated here).

6.5 The ceramic and other finds evidence

6.5.1 The pottery from the site is dominated by local sandstone-tempered wares, mainly plain jars suggesting low status domestic and functional vessels were used here. There is limited evidence of trade, however, as shown by small quantities of pottery from the Bristol area (Ham Green ware and Bristol Redcliffe ware).

6.5.2 Only a single animal bone fragment was recovered from all of the excavated medieval contexts; the remainder came from a securely stratified 20th-century context in the hollow-way. This a curiously small number given the amount of apparently domestic pottery (including several jugs) of medieval date from the site. It should also be noted that no animal bone was reported from the evaluation trenches, which covered a much wider area.

6.5.3 Similarly, no plant remains other than charcoal were recovered from either the evaluation or excavation samples.

6.5.4 The underlying geology of Carboniferous Limestone means that it is unlikely that the soil conditions were too acidic for the preservation of bone, and the alkaline conditions would actually be favourable for bone preservation. Therefore the absence of animal bone and plant remains suggests that this was a building with a primarily industrial focus, and not also a domestic area. The pottery is most likely representative of vessels used for drinking while working in the forge.

6.6 Abandonment of the metalworking site

6.6.1 The stratigraphy and pottery dates suggest that by the mid 13th century the buildings constructed in stone had ceased to exist and were overlain by hill-wash/colluvial soil, so it seems clear that they had gone out of use by *c* AD 1250-75.

6.6.2 Whether this indicates the complete end of the occupation on the site or that the inhabitants had moved location is unclear. There is, however, no pottery from the 14th-15th centuries from the excavation and only a few sherds of 16th century material, mostly from layers at the top of the stratigraphic sequence. The implication therefore is that the site had been abandoned.

6.6.3 There are references to iron ore being mined at St. White's to around 1270, but at that time the abbot of Flaxley as landowner removed the miners and filled in the quarries. Despite the opposition of the abbey, mining was resumed some years later by Grimbald Pauncefoot, the warden of the Forest of Dean and, although it yielded little ore, continued from at least 1287 (VCH V, 138-150). No certain evidence for iron ore mining was encountered within the excavation area, but the dates from the documentary sources correspond with the cessation of activity suggested by the archaeological evidence. Possible mine pits (or `scowles') located within the evaluation area by geotechnical investigations were considered to be undulations in the surface geology (OA 2007).

6.6.4 The hillside location of the site necessitated the excavation by the inhabitants of drainage ditches and gullies, to counter the effects of rainfall and consequent hill-wash from up-slope, so the abandonment of the site could also be partly explained by excessive hill-wash and colluvium deposition making the site unusable.

6.6.5 It is notable that the during the 2007 evaluation (24-25th June), heavy rain significantly affected the site. Trenches on poorly drained clay flooded and Trench 2 (north-east of the excavation area) remained almost fully submerged for the remainder of the field investigation.

6.7 The status of St. White's and Littledean Grange: the Flaxley properties

6.7.1 The evidence from this excavation is strong support for this being the site of the documented forge at Edlond. However, no direct evidence at this site was recovered for either the religious site of St. White's (the hermitage and chapel) nor a Grange as suggested by the VCH.

APPENDICES

APPENDIX 1 ARCHAEOLOGICAL CONTEXT INVENTORY

Ctx	Type	Width - m	Thick - m	Comment	Finds	Date
5000	Layer			Natural sand/clay with boulders		
5001	Layer		0.5	Topsoil	Pottery	C19
5002	Layer	10	0.1	Top of metalwork layer grid sampled for slag and hammer-scale	Pottery, metal	eC12
5003	Layer		0.1	Modern levelling		
5004	Layer		0.3	Burnt upper layer in hollow-way	1950s pottery, glass, & animal bone	C20
5005	Layer/fill		0.8	Silt in hollow-way	Pottery	mC18
5006	Layer		0.2-0.4	Paving in hollow-way; 1950s date		
5007	Cut	5.6	1.6	Cut for paving 5006		
5008	Fill		0.3	Ditch/hedge cut beside hollow-way		
5009	Cut	1.12		West edge of hollow-way		
5010	Layer			Stone bank east side of hollow-way		
5011	Layer	1.2	0.28	Fill below paving 5006		
5012	Cut	2.3	0.6	Ditch/boundary or drainage		
5013	Fill		0.1	Fill of 5012		
5014	Fill		0.32	Fill of 5012		
5015	Fill		0.16	Fill of 5012		
5016	Fill		0.18	Fill of 5012		
5017	Fill		0.18	Fill of 5012		
5018	Layer	3	0.26	Layer over fills in ditch 5012	Pottery	lC12
5019	Layer	5.3	0.2	Iron working derived layer	Pottery	mC16
5020	Not used			Not used		
5021	Layer		0.3	Iron working derived layer	Pottery	eC12
5022	Layer		0.42	Modern levelling? Incl. metalwork	Pottery	lC12
5023	Layer		0.14	same as 5027		
5024	Not used			Not used		
5025	Layer		0.08	Clay floor/stones with charcoal		
5026	Not used			Not used		
5027	Layer		0.15	Iron working derived layer	Pottery	eC12
5028	Layer		0.2	Iron working derived layer		
5029	Layer		0.34	Iron working derived layer	Pottery	mC13
5030	Layer		0.19	Hill-wash/iron working materials	Pottery, one animal bone	mC16
5031	Layer		0.7	Iron working derived layer		
5032	Cut	3.8		Ditch, C13, terrace drainage		
5033	Fill		0.14	Fill of 5032	Pottery	eC12
5034	Fill		0.24	Fill of 5032		
5035	Fill		0.27	Fill of 5032	Pottery	eC12
5036	Cut	0.94	1.3	Pit/ditch terminus		
5037	Fill		0.8	Fill of 5036	Slag	
5038	Layer		0.21	Iron working derived layer		
5039	VOID			VOID		
5040	Cut	2.04	0.86	Ditch/boundary or drainage		
5041	Fill		0.28	Fill of 5040		
5042	Fill		0.28	Fill of 5040		
5043	Fill		0.51	Fill of 5040		
5044	Fill		0.6	Fill of 5040	CBM, slag	
5045	Layer/fill	2.2	0.2	Compact sand and charcoal		
5046	Layer		0.18	Medieval silt layer	Pot, slag	mC13
5047	Fill		0.18	Fill of 5012		
5048	Fill		0.28	Fill of 5012		

Ctx	Type	Width - m	Thick - m	Comment	Finds	Date
5049	Fill		0.48	Fill of 5012		
5050	Fill		0.1	Fill of 5032		
5051	Fill		0.18	Fill of 5032	Pottery	lC12
5052	Fill		0.8	Fill of 5036		
5053	Fill		0.4	Fill of 5036		
5054	Layer		0.02	Charcoal layer over 5074	Pottery	eC12
5055	Layer		0.1	Surface? Clay and sandstone		
5056	Fill		0.18	Fill of 5091	Pottery	eC12
5057	Cut	1.14	0.38	Gully parallel to wall 5083		
5058	Cut	0.54	0.16	Gully parallel to wall 5083		
5059	Layer		0.4	Iron working derived layer	Pottery	lC12
5060	Cut	1.76	0.4	Ditch, medieval		
5061	Fill		0.38	Fill of 5057	Pottery	eC12
5062	Fill		0.16	Fill of 5058		
5063	Layer		0.12	Spread over ditch 5064		
5064	Fill		0.18	Fill of 5067	Pottery	lC12
5065	Layer		0.25	Same as 5031	Metal, pottery	lC12
5066	Layer		0.3	Hill-wash		
5067	Cut	0.98	0.2	Ditch next to wall 5089; drainage		
5068	Layer		0.2	Iron working derived layer	Pottery, slag	eC12
5069	Fill		0.12	Fill of 5070		
5070	Cut	0.28	0.15	Pit/ditch terminus (?)		
5071	Group [gully]			Ctx 5057, 5060, 5067, 5077		
5072	Layer		0.15	Iron working derived layer		
5073	Layer		0.04	Clay floor		
5074	Layer		0.1	Make-up layer on natural	Pottery	eC12
5075	Cut	0.44	0.14	Pit/boulder hole		
5076	Fill		0.11	Base fill of 5075		
5077	Cut	0.9	0.36	Gully terminus, Group 5071		
5078	Fill		0.06	Base fill 5077	Pottery	lC12
5079	Fill		0.31	Upper fill of gully terminus 5077	Pottery, slag	lC12
5080	Fill		0.24	Fill of 5081	Pottery, slag	eC12
5081	Cut	0.76	0.24	Pit/boulder hole		
5082	Cut	1.1	0.3	Construction. Cut wall 5083		
5083	Structure	1.1	0.3	Sandstone wall; medieval		
5084	Layer		0.1	Surface within limits of walls 5083 & 5089 - clay floor		
5085	Fill		0.2	In 5075		
5086	Layer		0.09	Floor surface associated with 5087	Pottery	lC12
5087	Structure		0.8	Wall of building		
5088	Cut		0.8	Construction Cut wall 5087		
5089	Structure		0.8	Wall abutting 5083		
5090	Layer		0.08	Iron working derived layer		
5091	Cut	0.7	0.28	Pit?		
5092	Fill		0.1	Lower fill of 5091		
5093	Fill		0.08	Fill of 5091		
5094	Fill		0.3	Fill of 5091		
5095	Fill		0.22	Fill of 5091		
5096	Cut	0.6	0.1	Medieval drain cut		
5097	Layer		0.1	Hill-wash		
5098	Layer		0.28	Iron working derived layer		
5099	Layer		0.54	Hill-wash		
5100	Layer		0.1	Silt over natural below floor 5025		
5101	Layer		0.05	Iron working derived layer		
5102	Layer		0.3	Burnt layer inside wall 5083	Pottery	eC12
5103	Group Ctx			Ctx's 5012; 5032		
5104	Structure	0.9	0.5	Sandstone wall; medieval		

Ctx	Type	Width - m	Thick - m	Comment	Finds	Date
5105	Cut	1.5	0.43	Construction Cut possible oven wall 5106		
5106	Structure	0.5	0.18	Semi-circular stone structure	Pottery	eC12
5107	Fill		0.16	Within 5106, stone floor?		
5108	Structure	0.4	0.2	Stone drain SW of site		
5109	Fill		0.28	Pit fill in 5125		
5110	Fill		0.4	Fill of pit 5111		
5111	Cut	0.75	0.3	Pit, medieval?		
5112	Cut	0.4	0.52	Posthole? Under floor 5084		
5113	Cut	1.88	0.16	Pit?		
5114	Fill		0.25	Fill of 5105		
5115	Fill		0.1	Fill of 5105		
5116	Layer		0.7	Slag layer under wall 5087		
5117	Layer		0.3	Clay floor, earlier than wall 5089		
5118	Layer		0.4	Iron working derived layer		
5119	Fill		0.22	Upper fill of 5113		
5120	Fill		0.08	Fill of pit 5113		
5121	Fill		0.08	Fill of pit 5113		
5122	Fill		0.06	Fill of pit 5113		
5123	Fill		0.2	In 5132		
5124	Cut	0.8	0.22	Cut for wall 5104		
5125	Cut	0.95	0.28	Pit		
5126	Layer		0.1	Over 5084		
5127	Fill		0.8	In 5111		
5128	Fill		0.06	In 5111		
5129	Layer		0.12	Iron working derived layer		
5130	Layer		0.1	Hill-wash with metal debris		
5131	Layer		0.1	Hill-wash		
5132	Cut	0.4	0.2	?Pit		
5133	Fill		0.52	In ?posthole 5112		
5134	Cut	0.8	0.22	Cut for wall 5089		
5135	Fill		0.08	In 5096		
5136	Grp Ctx			Ctx's5007, 5009, 5010		
5137	Grp Ctx			Ctx's 5083, 5084, 5089		
5138	Grp Ctx			Ctx's 5087, 5105, 5018		

APPENDIX 2 POTTERY

By Paul Blinkhorn

Introduction

The pottery assemblage comprised 565 sherds with a total weight of 9832 g. The estimated vessel equivalent (EVE) by summation of surviving rim-sherd circumference was 8.36. It comprised a range of mainly medieval wares dominated by local wares from the Forest of Dean area.

Analytical methodology

The pottery was initially bulk-sorted and recorded using DBase IV software. The material from each context was recorded by number and weight of sherds per fabric type, with featureless body sherds of the same fabric counted, weighed and recorded as one database entry.

Feature sherds such as rims, bases and lugs were individually recorded, with individual codes used for the various types. Decorated sherds were similarly treated. In the case of the rim-sherds, the form, diameter in mm and the percentage remaining of the original complete circumference was all recorded. This figure was summed for each fabric type to obtain the estimated vessel equivalent (EVE).

The terminology used is that defined by the Medieval Pottery Research Group Guide to the Classification of Medieval Ceramic Forms (MPRG 1998) and to the minimum standards laid out in the Minimum Standards for the Processing, Recording, Analysis and Publication of post-Roman Ceramics (MPRG2001).

All the statistical analyses were carried out using a Dbase package written by the author, which interrogated the original or subsidiary databases, with some of the final calculations made with an electronic calculator. Any statistical analyses were carried out to the minimum standards suggested by Orton (1998-9, 135-7).

Fabrics

The following were present:

F1: *Ham Green Ware*. Hand-built, pale buff orange sandy fabric with a grey core. Early 12th–mid 13th century (Vince unpub.). 9 sherds, 1144 g, EVE = 1.15.

F2: *Forest of Dean Sandstone-tempered ware (FDSW)*. Range of coarse-and glazed wares, probably from a number of sources around the Forest of Dean (Vince, unpub.) Coarsewares early 12th century-14th century, glazed wares late 12th –14th century. 504 sherds, 7108 g, EVE = 7.05.

F4: *Bristol Redcliffe ware*. Wheel-thrown, pale yellow to pale pink fabric with grey core. Mid-late 13th–15th century (ibid.). 7 sherds, 86 g, EVE = 0.16.

F404: *Cistercian Ware*: Late 15th–17th century. Hard, smooth fabric, usually brick-red, but can be paler or browner. Few visible inclusions, except for occasional quartz grains. Range of vessel forms somewhat specialized, and usually very thin-walled (c. 2mm). Rare white slip decoration. 1 sherd, 11 g, EVE = 0.

F416: *Bristol Slipware*. AD 1650-1750. Fine cream fabric with white slip and pale yellow lead glaze, commonest decoration is feathered dark brown trailed slip. Chiefly press-moulded flat wares, although small bowls and mugs etc are known. 6 sherds, 109 g.

F418: *Creamware. c* 1740-1880. A cream-coloured earthenware, made from a calcinated flint clay, and with a lead glaze, resulting in a rich cream colour. Range of tableware forms. 4 sherds, 27 g.

F425: *Fine Red Earthenwares*: Mid 16th – 19th century. Fine sandy earthenware, usually with a brown or green glaze, occurring in a range of utilitarian forms. 8 sherds, 319 g.

F426: *Iron-glazed Earthenware* Late 17th– 8th century. Range of large, heavy utilitarian vessels, mainly pancheons, with a thick, black, internal glaze. 3 sherds, 164 g.

F1000: Miscellaneous 19th and 20th century wares. 23 sherds, 864 g.

The pottery occurrence by number and weight of sherds per context by fabric type is shown in table 1 below. Each date should be regarded as a *terminus post quem*. The medieval assemblage is dominated by local wares from the Forest of Dean, with the rest of the pottery being types well-known in Bristol. All the stratified medieval material is of 12th-13th-century date.

Chronology

Each context specific assemblage was given a seriated phase-date, based on the range of wares present. The scheme, and the occurrence per medieval phase, is shown in Table1.

Table 1: Ceramic dating scheme, and pottery occurrence per phase

Ceramic Phase	Date	Defining Wares	No Sherds	Wt. Sherds (g)	EVE	Mean Sherd Wt
CP1	E–L 12thC	F2	202	2978	2.03	14.7 g
CP2	L 12th –M13th	F1, F2 Glazed	220	4367	4.83	19.9 g
CP3	M13th–14th C	F4	79	692	0.45	8.8 g
Total			**501**	**8037**	**7.31**	

The assemblage is somewhat fragmented, but this appears due to the somewhat friable nature of the local pottery rather than depositional factors. The mean sherd weight is average for an assemblage of the period for CP1 and CP2, although somewhat low for CP3.

Pottery occurrence

The medieval pottery occurrence per ceramic phase is shown in Table 2. It shows that the medieval pottery assemblage is dominated by Forest of Dean wares, with Ham Green/Bristol types present in lesser quantities. The data for CP2 is distorted by the presence of a near-complete Ham Green jug.

Table 2: Pottery by ceramic phase, as a percentage of the phase assemblage, by wt.

	F1	F2	F4	Total Wt (g)
CP1	-	100%	-	2978
CP2	25.1%	74.9%	-	4367
CP3	0	90.2%	9.8%	692

Vessel use

The medieval assemblage is dominated by jars in Forest of Dean wares (total EVE = 5.46), but rim sherds from six jugs were also present, two in Ham Green ware, the rest are FDSW. All the jugs of the latter type occurred in CP2 contexts, suggesting that they are generally of late 12th–13th century date.

This is given some support by the fact that both of the two jug handles in that fabric were also in contexts of that date.

Conclusion

This assemblage is a useful addition to the corpus of medieval pottery assemblages from the Forest of Dean. It is dominated by the local sandstone-tempered ware, but there are also small quantities of pottery from the Bristol area in the form of Ham Green ware and Bristol Redcliffe ware.

The bulk of the vessel types were plain jars in the local ware, but jugs in both this fabric and the Bristol area wares were also present. All the fragments of the FDSW jugs occurred in CP2 contexts, suggesting very strongly that they are of late 12th–13th century date, and thus have the potential to be a useful dating tool for future assemblages of this type in the region.

Table 3: Pottery by nos. and wt(g) of sherds per context by fabric type

	F1		F2		F4		F404		F416		F418		F425		F426		F1000		
Ctx	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	Date
5001	1	10	3	19	1	18	1	11	1	11			4	209			2	9	19thC
5002			8	100															E12thC
5004																	21	855	20thC
5005									5	98	4	27			3	164			M18thC
5018	1	45	1	7															L12thC
5019			1	11									2	16					M16thC
5021			5	14															E12thC
5022	2	26	17	361															L12thC
5027	1	36	8	313															E12thC
5029			33	300	3	23													M13thC
5030			17	243									2	94					?M16thC
5033			30	344															E12thC
5035			78	486															E12thC
5046			36	324	3	45													M13thC
5051	1	943	23	684															L12thC
5054			5	86															E12thC
5056			10	270															E12thC
5059	2	59	33	365															L12thC
5061			1	101															E12thC
5064			2	13															L12thC
5065	1	25	115	1568															L12thC
5068			63	1091															E12thC
5074			1	9															E12thC

	F1		F2		F4		F404		F416		F418		F425		F426		F1000		
Ctx	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	Date
5078			4	41															L12thC
5079			10	59															L12thC
5080			5	70															E12thC
5086			8	171															L12thC
5102			6	125															E12thC
5106			1	17															E12thC
Total	**9**	**1144**	**524**	**7192**	**7**	**86**	**1**	**11**	**6**	**109**	**4**	**27**	**8**	**319**	**3**	**164**	**23**	**864**	

APPENDIX 3 CERAMIC BUILDING MATERIAL

The Fired Clay and Ceramic Building Material
By Cynthia Poole

Introduction

The assemblage (see Table 1 above) amounted to eight fragments of fired clay weighing 325 g and four fragments of brick weighing 2029 g. It was recovered from four contexts comprising two ditch fills, a pit fill and a the soil within the hollow-way. The fired clay was poorly preserved and had all fragmented since excavation into 21 pieces (since refitted). The brick comprised four fragments weighing 2029 g. The material has been visually examined and fully recorded on an Excel file, which will form part of the archive. Fabrics were characterised with the use of a binocular microscope at magnifications of x15-x25 and is thought to derive from small oven or hearth type structures.

Fabrics
Two fired clay and two brick fabrics were identified. The brick fabrics are similar and are likely to derive from closely related clay sources, possibly reflecting variations in the material exploited at different periods of production.

Fabric: A was light orange colour with lighter yellowish mottles. It was composed of a silty clay matrix containing a high density of fine - medium rounded quartz sand plus rare coarse sand and coarser grits including angular sandstone 3-7 mm, rounded grey grog 9 mm and angular ironstone 20 mm.

Fabric: B was a light orange or light reddish yellow slightly laminated clay containing a high density of coarse sand 1-2 mm, composed of rounded - sub-rounded, clear/white or pinkish brown quartz (some clearly remnants of crushed sandstone grit). The fabric contained additionally rare sandstone and ironstone grits 3-6 mm and occasional small chopped straw/organic temper surviving as impressions <10 mm.

CBM: C was a very uniform orange fine silty powdery clay with fine pores, containing a moderate density of fine quartz sand and rare coarse sand grains of quartz and ferruginous grits.

CBM: D was a hard and uniform, red micaceous clay with oval – elongated pores 0.3-3 mm and containing frequent fine quartz sand, frequent dark maroon rounded ferruginous grits 0.5-3 mm.

The fired clay fabrics are likely to derive from the local natural clay deposits on which the site is situated, with fabric B incorporating the associated sands, added either deliberately or incorporated accidentally. Samples of the natural deposits were not available so direct comparison has not been possible.

Function and form

Fired clay: The fragments from 5029 in Fabric A had a flat even surface with a possible straight edge and evidence of two small roundwood wattle impressions 11-13 mm in diameter. The evidence though slight suggests the material derives from a clay structure reinforced with wattles c 25-30 mm thick. The pieces from contexts 5044 and 5055 were similar, though varied in the intensity of firing. They had evidence of a single smooth flat

surface with a more irregular underside forming a lentoidal cross-section between 32 and 45 mm thick. The shape on the underside possibly reflects the surface of natural or subsoil on which the structure was laid in a shallow hollow, suggesting this derives from an oven or hearth floor.

Brick: Two partial bricks measuring 65-67 mm (2 ½ in - 2 ⅝ in) thick by 110 mm (4 ½ in) wide were well made with even surfaces and sharp angular corners. The size is typical British standard size bricks and the general quality suggests they are of 18th-19th century date. They are made in similar though slightly differing fabrics, which may reflect different periods of production rather than significantly different clay sources. The more complete brick had part of a corner chiselled away apparently to enable it to fit with some other fixture.

Discussion

The fired clay assemblage cannot be dated on intrinsic characteristics though the fragments with wattle impressions derive from a layer of 13th-century date associated with ironworking. The other pieces came from ditch fills rich in slag and metalworking waste, which are also associated with the 12th-13th-century iron working activity. The character and associations of the fired clay suggests it all derives from structures used for ironworking. These could be either smithing hearths or smelting furnaces (or both). The pieces with wattles are indicative of superstructure from some form of enclosed oven-type structure. Some form of furnace may be postulated.

The brick fragments belong to a later phase of activity. They are of broadly 18th-19th century type in terms of size and finish, though a later 17th-century date would be possible. They have been reused either as metalling or for kerbs in the hollow-way and are likely to have been originally used in nearby buildings of late 17th-mid 18th-century date.

Table 1: CBM by context, fabric and form

Ctx	No	Wt (g)	MFW	Material	Form	Description	Th (mm)	W (mm)	L (mm)	Fab Col	Fab description	Obj date	Date
5005	1	1105	1105.0	CBM: C	Brick	Brick 1: c. 50% complete. Smooth flat surfaces, few slight irregularities. Unfrogged. Fine lengthwise striations on top from smoothing. Hint of reddening on top. Sharp angular arrises. ?hint of diagonal pressure mark (skintling). One end surface abraded, sheared off by ?weathering/?burning. Base broken off, squarish area at a corner worked by ?curved chisel, removing part of brick for fitting). 2 corners	67 , (2" 5/8)	110 (4" 1/2)	>120 (>4" 3/4)	orange	Fine silty powdery ?micaceous clay with fine pores & one large irregular void (from clay preparation), containing common fine quartz sand and rare coarse sand grains of quartz and ferruginous grits. Very uniform.	C18-C19	mC18
5005	3	924	308.0	CBM: D	Brick	Brick 2: very smooth flat surfaces and sharp angular square arrises and corners. Unfrogged. The three fragments do not join, but are so similar could be from the same brick, or certainly from the same batch or source. The quality of this brick suggests it may be slightly later later in date within the suggested range than brick 1. 1 x corner	65 -67 (2" 1/2-5/8)	~	~	red	Fine sandy micaceous clay containing frequent fine quartz sand. Common oval – elongated pores 0.3-3 mm & occ.larger irregular void up to 12 mm. Frequent maroon ferruginous grits 0.5-3 mm. Hard & uniform.	C18-C19	mC18
5029	2	65	32.5	FC: A	Oven wall	One piece has one even flat worn surface, with a possible second at right angles form an edge or kerb of a structure. A possible wattle impression 11-12 mm diam on the back. The second fragment has little in the way of any surfaces, but has part of a linear groove, possibly a wattle impression c 13 mm dia. Very worn and abraded.	25-30	~	~	light orange with lighter yellowish mottles	Silty clay matrix with high density of fine-med. rounded quartz sand &coarse sand & grits incl. angular sandstone 3-7 mm, rounded grey grog 9 mm & angular ironstone 20 mm.		mC13
5044	3	160	53.3	FC: B	Hearth / oven floor	All 3 fragments have one fairly smooth even flat surface. The underside is irregular, though not just broken or worn, but possibly a rough surface reflecting the material over which it was laid, possibly stones but more likely a roughly cut/worn hollow in the subsoil or natural which formed the base of the structure. The underside forms a wedge-shaped profile converging with the flat top suggesting a lentoidal cross-section overall for the floor. The surface has been partly burnt light grey.	32-40	~	~	light orange, light reddish yellow	Slightly laminated clay (or possibly reflecting layering of construction or relining) v. sandy containing a high density of coarse sand 1-2 mm, rounded - subrounded, clear/white or pinkish brown quartz and some clearly grouped as remnants of crushed sandstone grit. Occ. small chopped organic impressions <10 mm.		
5052	3	100	33.3	FC: B	Hearth / oven floor	Can refit 2 and possibly all originally one fragment. Roughly smoothed undulating flat surface. Heavily burnt - fired.	45	~	~	Grey, 1 edge pink/ brown	same fabric as 5044, but with quite powdery fragile feel from heavy firing.		

APPENDIX 4 METALWORK

By Ian Scott

The metalwork from Cinderford comprises 20 pieces, including 19 iron objects and 1 non-ferrous object (Table 1).

The material includes 9 nails and 2 bar or rod fragments from medieval or early post-medieval contexts. There are 3 horseshoes or parts of horseshoes, of a form that Clark labels Type 3 or 'Transitional' (Clark 1995, 86-7, & fig. 65). In London Type 3 shoes are found in 13th and 14th century contexts (Clark 1995, 96 & fig. 74). The Cinderford examples have narrow tapered heels with thickened or 'upset' calkins, broad webs pierced by sub-rectangular nail holes with characteristic rectangular countersunk slots. The most complete example (context 5021, sf 5000) is worn at the toe and is from an early 12th-century context. An almost complete example (context 5052, sf 5011) of similar form comes from a post 13th-cenury context. The final fragment, comprises a single branch from a similar form of shoe (context 5002, sf 5002) and is from context with mixed dating material. It is certainly residual or re-deposited in this context.

Table 1: Summary quantification of metalwork assemblage by context

		Identification								
Ctx	Ctx date	Horseshoes	Bicycle saddle	Utensil handle	Enamel saucepan	Vessel lid	Nails	Bar/rod fragts	Query	Totals
5021	early C12th	1								1
5027	early C12th							1		1
5035	early C12th						2			2
5102	early C12th								1	1
5065	late C12th						4			4
5029	mid C13th						1			1
5052	No finds but post 13thC	1								1
5019	mid C16th							1		1
5030	mid C16th						2		1	3
5002	Mixed date C12 to C20, ploughed	1								1
5004	C20th		1	1	1	1*				4
Total		3	1	1	1	1*	9	2	2	20

* = non ferrous

Context 5030, which is dated to the mid 16th century, produced a roughly V-shaped object formed from heavy bar of square section cut almost completely through at the centre and bent into a V-shape (sf 5016). The x-ray shows that the two arms of the object tapered and are narrowest at their outer ends, which both appear to be notched. One notch is on the outside edge of the bar, the other on the inside edge. The purpose of the object is unclear. Possibly it is unfinished. A second unidentified object (sf 5018) comes from context 5102, which is dated to the early 12th century. This object comprises a curved bar or handle with an incomplete loop or eye at one end. The other end is finished by a slight but distinctive curved terminal. The purpose of this object is again uncertain.

The assemblage is completed by a number of relatively modern finds - the frame of a bicycle saddle, an enamel saucepan, a painted wooden handle from a kitchen utensil, and a small non-ferrous lid - all from context 5004.

APPENDIX 5 IRON SLAG

By Lynne Keys

Introduction and methodology

A large assemblage weighing almost 35 kg was examined for this report. It was recovered by hand on site and from soil samples processed after excavation. The entire slag assemblage was examined by eye and categorised on the basis of morphology; each slag or other material type in each context was weighed. Layer 5002 had been extensively sampled using different sample numbers; each processed sample was quantified individually. The few smithing hearth bottoms recovered were individually weighed and measured to obtain statistical information. Quantification data are given in the table below in which weight is shown in grams, and length, breadth and depth (where relevant) in millimetres. The abbreviation for pieces (pcs) indicates number of fragments where this was considered significant for weight interpretation.

Table 1: Quantification

Context	Sample	Identification	weight	comment	pcs
5002	5003	sample residue	341	tiny undiagnostic, charcoal flecks, gravel & sand	
5002	5003	stones	30		
5002	5003	tap slag	29		
5002	5003	undiagnostic	23	very small	
5002	5005	hammerscale	1	only a tiny amount of spheres & broken flake	
5002	5005	sample residue	176	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5005	sandstone	31		
5002	5005	tap slag	350		5
5002	5005	undiagnostic	93		
5002	5007	iron-rich undiagnostic	49		
5002	5007	run slag	35		
5002	5007	sample residue	334	very tiny amount broken hammerscale flake, some spheres, charcoal flecks, tiny undiagnostic, sand	
5002	5007	sandstone	53		
5002	5009	fired clay	7		
5002	5009	hammerscale	1	some broken flake, only occ. tiny spheres	
5002	5009	sample residue	379	charcoal flecks, tiny fired clay, ash	
5002	5009	stone	14		
5002	5009	undiagnostic	48		
5002	5011	hammerscale	4	occ. flake, very occ. tiny spheres	
5002	5011	sample residue	212	**broken charcoal, small undiagnostic, only very occ. sand & stone	
5002	5022	hammerscale	1	not much flake, very occ. sphere	
5002	5022	sample residue	333	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5022	sandstone	7		

Context	Sample	Identification	weight	comment	pcs
5002	5022	tap slag	96		
5002	5022	undiagnostic	15		
5002	5024	hammerscale	3	very occ. broken flake, very few tiny spheres	
5002	5024	sample residue	292	charcoal flecks, tiny undiagnostic, dribbles, fired clay, sand	
5002	5024	stone	17		
5002	5024	tap slag	41		
5002	5024	undiagnostic	14		
5002	5026	hammerscale	4	very occ. broken flake, couple tiny spheres	
5002	5026	sample residue	264	charcoal flecks, tiny undiagnostic, sand	
5002	5026	tap slag	67		
5002	5026	undiagnostic	94		
5002	5028	charcoal	0	pieces larger than in other samples	
5002	5028	hammerscale	11	occ. tiny spheres & very occ. tiny spheres	
5002	5028	pot	8		1
5002	5028	run slag	10		
5002	5028	sample residue	271	**larger burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5028	tap slag	12		
5002	5028	undiagnostic	53		
5002	5040	iron-rich undiagnostic	28		
5002	5040	run slag	115		
5002	5040	sample residue	260	tiny quantities broken hammerscale flake & tiny spheres, tiny undiagnostic, charcoal flecks, sand	
5002	5042	charcoal	1	*quercus* (oak) - I.D. Wendy Smith	1
5002	5042	hammerscale	2	very broken flake, some spheres	
5002	5042	sample residue	244	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5042	stone	6		
5002	5042	tap slag	73		
5002	5042	undiagnostic	29		
5002	5044	hammerscale	0	tiny amount very broken flake & spheres	
5002	5044	sample residue	133	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5044	tap slag	184		
5002	5046	sample residue	350	tiny amount broken hammerscale flake & spheres, tiny undiagnostic slag, charcoal flecks	
5002	5046	tap slag	42		
5002	5046	undiagnostic	47		
5002	5048	hammerscale	14	very broken flake, only occ. tiny spheres	
5002	5048	sample residue	458	charcoal flecks, tiny undiagnostic	
5002	5048	stones	16		
5002	5062	hammerscale	1	only a tiny amount of spheres & very broken flake	

Context	Sample	Identification	weight	comment	pcs
5002	5062	sample residue	199	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5062	tap slag	186		
5002	5062	undiagnostic	103	probably smelting slag	1
5002	5064	charcoal	1	*quercus* (oak) - I.D. Wendy Smith	
5002	5064	hammerscale	1	very broken flake, tiny spheres	
5002	5064	sample residue	273	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5064	sandstone	5		
5002	5064	tap slag	242		
5002	5066	hammerscale	10	broken flake, tiny spheres	
5002	5066	sample residue	320	tiny undiagnostic, dribbles, charcoal flecks, fired clay	
5002	5066	tap slag	23		
5002	5066	undiagnostic	61		
5002	5068	hammerscale	5	flake & occ. tiny spheres	
5002	5068	sample residue	245	charcoal flecks, tiny undiagnostic	
5002	5068	tap slag	140		
5002	5082	fired clay	12		
5002	5082	hammerscale	2	very broken flake, tiny spheres	
5002	5082	sample residue	181	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5082	sandstone	9		
5002	5082	tap slag	313		
5002	5084	fired clay	42		
5002	5084	hammerscale	0	very occ. broken flake, tiny spheres	
5002	5084	sample residue	253	flecks burnt charcoal, cinder, fired clay, tiny undiagnostic, sand	
5002	5084	tap slag	33		
5002	5084	undiagnostic	88		
5002	5086	magnetic residue	12	hammerscale flakes & spheres, tiny iron-rich undiagnostic	
5002	5086	sample residue	272	flecks burnt charcoal, cinder, fired clay, tiny undiagnostic, sand; occ. large non-magnetic spheres	
5002	5086	tap slag	51		
5002	5086	undiagnostic	25		
5002	5088	charcoal	3	larger fragments	
5002	5088	hammerscale	11	lots of flake & spheres	
5002	5088	pot	5		
5002	5088	sample residue	211	**larger flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5088	stone	65		
5002	5088	undiagnostic	7		
5002	5090	hammerscale	5	some broken flake & tiny spheres	
5002	5090	sample residue	266	charcoal flecks, tiny undiagnostic, gravel, sand	
5002	5090	stone	25		
5002	5090	tap slag	83		
5002	5090	undiagnostic	93		
5002	5104	magnetic residue	3	only very rare flecks broken flake in it	

Context	Sample	Identification	weight	comment	pcs
5002	5104	sample residue	298	charcoal flecks, tiny undiagnostic, dribbles, fired clay, sand	
5002	5104	stones	12		
5002	5104	tap slag	66		
5002	5104	undiagnostic	16		
5002	5106	iron-rich undiagnostic	75		
5002	5106	run slag	53		
5002	5106	sample residue	295	tiny amount broken hammerscale flake & spheres, tiny undiagnostic slag, charcoal flecks	
5002	5106	stone	12		
5002	5108	hammerscale	6	occ. very broken flake, rare tiny spheres	
5002	5108	sample residue	234	tiny undiagnostic, (?intrusive) *?prunus* seeds, sand	
5002	5108	stones	6		
5002	5108	tap slag	68	very broken	lots
5002	5108	undiagnostic	7		
5002	5110	hammerscale	3	some broken flake, spheres	
5002	5110	iron-rich undiagnostic	34		1
5002	5110	sample residue	314	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5110	stones	34		
5002	5110	undiagnostic	35		
5002	5131	hammerscale	3	very occ. broken flake, very rarely occ. tiny spheres	
5002	5131	sample residue	383	charcoal flecks, tiny undiagnostic, fired clay, sand	
5002	5131	undiagnostic	129	tiny pieces	lots
5002	5133	hammerscale	0	virtually none	
5002	5133	sample residue	472	flecks burnt charcoal, cinder, tiny tap slag & undiagnostic frags., sand	
5002	5135	magnetic residue	5	some tiny flake, occ. spheres	
5002	5135	sample residue	339	charcoal flecks, tiny undiagnostic, dribbles, fired clay, sand	
5002	5135	tap slag	40		
5002	5135	undiagnostic	112		
5002	5137	hammerscale	5	very broken flake, tiny spheres	
5002	5137	sample residue	323	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5137	sandstone	9		
5002	5137	undiagnostic	39		
5002	5139	hammerscale	2	very broken flake, tiny spheres	
5002	5139	sample residue	347	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5139	sandstone	43	slagged and vitrified	
5002	5139	stone	39		
5002	5139	tap slag	62		
5002	5139	undiagnostic	42		
5002	5161	hammerscale	0	hardly any	

Context	Sample	Identification	weight	comment	pcs
5002	5161	sample residue	358	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5161	sandstone	168		
5002	5161	tap slag	160		
5002	5163	hammerscale	4	very occ. spheres and specks broken flake	
5002	5163	sample residue	427	all tiny: broken tap slag, undiagnostic, sand	
5002	5163	tap slag	57		
5002	5165	hammerscale	3	very broken flake, spheres	
5002	5165	run slag	5		
5002	5165	sample residue	212	**very tiny flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5165	sandstone	17		
5002	5167	gravel & stone	37		
5002	5167	hammerscale	1	very tiny amount broken flake, several spheres	
5002	5167	sample residue	241	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5167	tap slag	118		
5002	5190	hammerscale	4	very occ. broken flake & tiny spheres	
5002	5190	sample residue	315		
5002	5190	undiagnostic	78		
5002	5192	hammerscale	4	occ. flake, very few spheres	
5002	5192	sample residue	350	flecks burnt charcoal, cinder, fired clay, tiny undiagnostic, sand	
5002	5192	sandstone	35		
5002	5192	tap slag	154		
5002	5192	undiagnostic	8		2
5002	5194	hammerscale	0	very little flake, a few spheres	
5002	5194	sample residue	402	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5194	sandstone	39		
5002	5194	tap slag	57		
5002	5194	undiagnostic	5		
5002	5196	fired clay	45		4
5002	5196	hammerscale	2	tiny amount flake, some tiny spheres	
5002	5196	sample residue	359	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5196	stone	11		
5002	5196	undiagnostic	17		
5002	5198	hammerscale	0	very little of either flake or spheres	
5002	5198	quartz & sandstone	2	small fragments	
5002	5198	sample residue	280	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5198	sandstone	128		
5002	5198	undiagnostic	39		
5002	5219	iron-rich undiagnostic	46		

Context	Sample	Identification	weight	comment	pcs
5002	5219	sample residue	347	tiny quantities broken hammerscale flake & tiny spheres; tiny frags tap slag, slag dribbles, charcoal flecks, fired clay, sand	
5002	5221	sample residue	316	tiny amount broken hammerscale flake & spheres, tiny undiagnostic slag, charcoal flecks	
5002	5221	stone	11		
5002	5221	tap slag	56		
5002	5223	hammerscale	3	broken flake, some spheres	
5002	5223	sample residue	308	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5223	stones	16		
5002	5223	undiagnostic	18		
5002	5225	charcoal	1		
5002	5225	hammerscale	2	flake & spheres	
5002	5225	sample residue	321	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5225	stone	11		
5002	5225	undiagnostic	66		
5002	5246	run slag	25		
5002	5246	sample residue	330	tiny amount broken hammerscale flake & spheres, tiny undiagnostic slag, charcoal flecks, sand	
5002	5246	stone	8		
5002	5248	sample residue	349	tiny amount broken hammerscale flake & spheres, tiny undiagnostic slag, charcoal flecks	
5002	5248	sandstone	10		
5002	5248	tap slag	9		
5002	5248	undiagnostic	15		
5002	5248	undiagnostic	3		
5002	5250	hammerscale	1	some very broken flake, tiny spheres	
5002	5250	sample residue	347	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5250	stone	12		
5002	5250	tap slag	43		
5002	5252	hammerscale	2	very broken flake, tiny spheres	
5002	5252	sample residue	359	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5252	sandstone	39		
5002	5252	undiagnostic	21		
5002	5254	burnt stone	29		
5002	5254	hammerscale	1	only a tiny amount of spheres & very broken flake	
5002	5254	sample residue	238	flecks burnt charcoal, cinder, tiny undiagnostic, sand	
5002	5254	sandstone	101		1
5002	5254	sandstone	16		
5002	5254	undiagnostic	45		
5022		undiagnostic	2	non-magnetic residue	
5025	5264	fired clay	6		

Context	Sample	Identification	weight	comment	pcs
5025	5264	hammerscale	9	broken flake & very tiny spheres	
5025	5264	sample residue	0	gravel only	
5025	5264	sample residue	6	some flake hammerscale, very occasional spheres	
5025	5264	sample residue	220	gravel & tiny charcoal flecks	
5025	5264	sample residue	516	sand with occ. charcoal flecks	
5025	5264	undiagnostic	75		4
5025	5264	undiagnostic	5	tiny pieces	
5029		iron-rich undiagnostic	22	possible fines & charcoal lump	
5029		run slag	51		
5029		tap slag	115		
5029		undiagnostic	89		1
5033		iron-rich undiagnostic	422	one large, one small	2
5033		tap slag	301		
5035		fines & tiny charcoal flecks	14		
5035		iron-rich undiagnostic	368		
5035		tap slag	1189		lots
5035		vitrified hearth lining	263		
5037		fired clay	8		
5044		smithing hearth bottom	291	incomplete length 160, breadth 120, depth 30	
5044		stone	26		
5044		tap slag	38		
5044		undiagnostic	134	& small stone	1
5044		undiagnostic	393	possibly smithing hearth bottom fragment length 115, breadth 70+, depth 40	
5046		dense slag	3		
5046		undiagnostic	13		
5047		tap slag	3287	large: photographed as one piece	1
5048		tap slag	483		
5048		undiagnostic	47		
5052		tap slag	153		
5052		undiagnostic	375	probably smelting	1
5056		tap slag	21		
5068		run slag	489		1
5072		run slag	82		1
5072		undiagnostic	137		2
5072		undiagnostic	248	possible part of smithing hearth bottom length 70+, breadth 50	
5073	5262	hammerscale	30	lots of broken flake hammerscale and spheres	
5073	5262	sample residue	25	lots broken hammerscale flake & tiny spheres, tiny undiagnostic, some fired clay	
5073	5262	sample residue	690	fine gravel, sand, tiny charcoal flecks	
5073	5262	sample residue	17	runs, one large hammerscale sphere	
5073	5262	sample residue	305	medium gravel, tiny charcoal flecks, iron rich undiagnostic (approx. 0.25 of sample)	
5073	5262	slag run	6		
5073	5262	stone	6		

Context	Sample	Identification	weight	comment	pcs
5073	5262	tap slag	129		
5073	5262	undiagnostic	3		
5079		tap slag	325		
5084	5265	hammerscale	7	flakes & spheres	
5084	5265	microslags	12	flake, spheres, tiny undiagnostic	
5084	5265	sample residue	442	charcoal flecks, sand etc.	
5084	5265	sample residue	208	small amount tiny undiagnostic, gravel, fired clay	
5084	5265	tap slag	43		
5084	5265	tap slag	41		
5084	5265	undiagnostic	62		
5085	5261	microslags	1	very broken flake & tiny undiagnostic	
5085	5261	sample residue	63	some broken hammerscale flake, lots of sand	
5085	5261	sample residue	100	mostly gravel, tiny amount of undiagnostic	
5085	5261	sample residue	23	gravel & charcoal flecks	
5085	5261	tap slag	63		
5086	5263	gravel	276		
5086	5263	hammerscale	10	hammerscale flake & spheres	
5086	5263	iron-rich undiagnostic	26		
5086	5263	microslags	2	including some hammerscale flake	
5086	5263	sample residue	462	charcoal flecks, sand etc.	
5086	5263	sample residue	192	gravel & tiny burnt charcoal flecks	
5086	5263	stone	12		
5086	5263	tap slag	19		
5086	5263	vitrified hearth lining	3		

Explanation of terms and iron slag types

Activities involving iron can take two forms:
1) *Smelting* is the manufacture of iron from ore and fuel in a smelting furnace. The slag produced takes various forms depending on the technology used: furnace slags, run slag, tap slag, dense slag or blast furnace slag. The Cinderford assemblage contained large quantities of smelting slag, mainly in the form of tap slag.

Tap slag (of which 9062g were in large enough pieces to be separated as a type) is a dense, low porosity, fayalitic (iron silicate) slag with a ropey flowed structure. It is formed as the liquid slag is allowed to flow out continuously or intermittently through a hole in the side of the furnace into a hollow in the ground. An excellent example from Cinderford is the large piece from fill 5047 of ditch 5012. This tapping of the slag facilitated retrieval of the bloom after the smelting operation.

2a) *Primary smithing*: hot working (by a smith using a hammer) of the iron lump on a stringhearth (usually near the smelting furnace) to remove excess slag. The slags from this process include smithing hearth bottoms and micro-slags, in particular tiny smithing spheres.

2b) S*econdary smithing:* hot working, using a hammer, of one or more pieces of iron to create or repair an object. As well as bulk slags, including the smithing hearth bottom, this generates micro-slags: hammerscale flakes from ordinary hot working of a piece of iron

(making or repairing an object) or tiny spheres from high temperature welding to join or fuse two pieces of iron.

There was only one complete smithing hearth bottom. This was re-deposited in drainage ditch 5040. Two incomplete examples were found in the same drainage ditch and in metalworking dump 5072.

The hammerscale flake and spheres would indicate both primary and secondary smithing. The following is a table of the contexts where quantities of hammerscale which could be separately quantified.

Table 2: Hammerscale

cxt	sam	feature	description	wt (g)	condition of flake
5073	5262	5073	clay floor	30	lots of broken flake & spheres
5002	5048	5002	dump	14	
5002	5028	5002	dump	11	
5002	5088	5002	dump	11	
5086	5263	5086	associated with 5087 structure	10	flake relatively unbroken
5002	5066	5002	dump	10	
5025	5264	5025	clay floor	9	flake very broken

A significant quantity (3071 g) of the slag was undiagnostic, i.e. could not be assigned to either smelting or smithing either because of its morphology or because it had been broken up during deposition, re-deposition or excavation. A further quantity (1070g) of undiagnostic slag was iron rich (very magnetic).

Key Groups

The significant groups for the iron slag assemblage were as follows:

5073. A layer (clay floor) with the largest amount of hammerscale (30g) of any of the occupation deposits. This is probably an area where smithing took place. The tiny pieces of iron-rich undiagnostic slag from this layer form a significant proportion of the samples taken (at least 25%).

5086. A layer associated with structure 5087. This too contained relatively unbroken flake hammerscale (10g) and was probably another area where smithing took place.

5002. A large dump at the top of the metallurgical layer. Some samples within this were of particular interest in the ways they varied from the rest, which contained significant quantities of non-metallurgical material such as sand, pieces of sandstone and pea grit.

- Sample 5028. In this sample the charcoal fragments were larger than in most other samples.
- Sample 5011 contained a great deal of very broken-up charcoal, rather than the flecks that most others contained.
- Sample 5086 the hammerscale in this sample consisted mainly of larger pieces of flake and occasional quite large non-magnetic spheres.
- Sample 5088. In this sample there were larger pieces of charcoal and the usual charcoal flecks were larger.

- Sample 5165. In this sample the charcoal flecks were extremely tiny when compared with the majority of the samples from the context.

5025. A clay floor with charcoal. There was a moderate quantity (9g) of hammerscale on this floor although the flake was broken through trampling or re-deposition. The quantity of slag other than hammerscale was negligible.

5084. A layer which formed a surface within a possible structure (group 5137).
The hammerscale (7g) gives some indication that the layer may be related to secondary smithing activity.

Discussion of the assemblage

The bulk of the slag assemblage represents re-deposited material from smelting but no focus for this can be postulated. Fired clay was very scarce in the assemblage and was found as tiny pieces in the large layer [5002] and in even tinier fragments and amounts in other layers.

The foci of smithing activity have been suggested in Key Groups (above). Only 266g of vitrified hearth lining were present in the assemblage, 263g of this from the ditch or terrace draining [5033]. This small amount almost certainly indicates the smiths were using one or more raised firebeds and worked standing up (like the forges and in the manner we are familiar with in modern times). Once the raised firebed was demolished – as it might be if it were made of stone blocks or reusable material – there would be no trace of the activity apart from hammerscale and charcoal staining or flecks.

APPENDIX 6 ANIMAL BONE

By Lena Strid (OA)

The faunal remains derive from two contexts, 5004 and 5030. Context 5004 was a modern fill of the hollow-way (5007) and contained 38 bone fragments of butchery waste mixed with 20th century glass and pottery. The species present among the animal bones were cattle, sheep/goat and pig. Context 5030, dated to the 12th-14th century, contained one burnt bone fragment of an unidentified mammal (weight: 3g).

APPENDIX 7 ENVIRONMENTAL REMAINS

By Wendy Smith (OA)

The archaeological excavation revealed a number of burnt layers associated with 12-13th century metalworking, which were specifically sampled for the recovery of charcoal. Five bulk soil samples were collected. One sample (sample 5261, context 5085) was from pit 5075 and all remaining samples were from floor layers. Analysis of charcoal was carried out in order to establish the range of wood fuels in use and whether there was evidence for woodland management.

Methodology

Sample volumes were relatively small, ranging from 2L – 20L, in order to ensure uncontaminated samples of discrete ash lenses. Samples were processed using a modified Siraf flotation machine at Oxford Archaeology. The flot (the material which floats) was collected in a 0.25mm mesh and the heavy residue (the material which does not float) was retained in a 0.5mm nylon mesh. Both the flot and heavy residue were air-dried in a heated drying room at 30°C. The heavy residues were sorted by environmental assistants at OA. In general only very small quantities of charcoal were recovered in the heavy residues. The flots were rapidly scanned under low-power magnification to establish the range of wood taxa present. The assessment results are presented in Table 1.

Oak (*Quercus* spp.) charcoal was clearly strongly dominant in all of the samples and in four cases (samples 5262–5265) the charcoal was highly fragmented (generally <2mm, usually 1 growth ring or less available in transverse section). As a result only one sample (sample 5261, which only produced >2mm in the flot) is fully analysed here (e.g. 100 fragments >2mm) and the results of analysis are presented in Table 2. Although only one of the samples is fully analysed here, it is likely that the other samples were similarly dominated by oak wood fuel/ charcoal fuel.

All identifications were made using low-power microscopy and utilising existing or fresh breaks on the transverse section. Although this method is adequate for the identification of oak charcoal, identification of other taxa is less secure, since it normally requires high-power magnification and examination of cell patterns from all three planes (transverse, tangential and radial) of a charcoal fragment (e.g. Gale and Cutler 2000: 4–15; Hather 2000: 13–14). As a result, identifications other than oak (*Quercus* sp.) presented here should be treated as provisional.

Results

As Table 1 demonstrates, all of the samples contained abundant quantities of oak, with the highly characteristic 'flame pattern' or 'dendritic organisation of cells' (e.g. Hather 2000: 49

and see Figure 1). Samples 5262–5265 contained highly fragmented oak (*Quercus* sp.) charcoal, which was too comminuted for analysis (e.g. <2mm in one or more dimension and <2 growth rings visible in transverse section).

The analysis results for 100 >2mm fragments from pit sample 5261, context 5085 are presented in Table 2. Oak charcoal accounts for 91% of all charcoal identifications made. Approximately 7% of the charcoal fragments were too highly vitrified to be identifiable and, in two cases were from a knot (where branches join) where the cell pattern can be highly warped from the expected 'normal' structure. Seven fragments of oak were clearly from roundwood and in all cases could be aged to 7 years growth. This was a small sample, however, so it is possible that the roundwood recovered is only from two or three branches, coming in with larger heartwood/ cordwood oak wood fuel or, indeed, oak charcoal. In addition to oak, one fragment was tentatively identified to beech (cf. *Fagus sylvatica* L.) and another fragment was tentatively identified to hazel/ willow type (cf. *Corylus avellana* L./ cf. *Salix* spp.).

Discussion

The preference for oak wood fuel and/or charcoal fuel is well known archaeologically, especially in association with iron working (e.g. Gale 2003, 32 and 42-44). Ironworking requires temperatures between 1100°C – 1150°C, which can only be achieved through the use of charcoal (if not using an enclosed kiln or furnace) (Gale 2003, 32). Oak is a denser wood which is capable of producing long lasting heat (Gale 2003, 36) and thus, ideally suited to metalworking.

The recovery of 7-year old oak roundwood provides limited evidence for coppicing. There is a long-established system of harvesting oak coppice on a 7-year cycle (e.g. Gale 1991, 233). However, the roundwood fragments are only a small proportion of the oak charcoal fragments recovered in sample 5261 and may simply be remnants of branch wood which was not fully removed from cord wood.

Conclusion

Deposits associated with metalworking sampled at St. White's Farm, Cinderford have produced abundant oak (*Quercus* sp.) charcoal. Oak is frequently the preferred wood fuel from metalworking sites (e.g. Gale 2003). Most of the samples produced highly fragmented charcoal, which is likely to be primarily oak, but were technically too small (<2mm and less than 2 years growth rings available on the transverse section) for analysis. However, one sample (pit sample 5261) produced larger fragments of charcoal. The majority of charcoal identified was oak heartwood, but some roundwood (branch/ stem) fragments were also recovered. These may simply represent fragments of branches/ stems which were not fully removed from cord wood; however, they may also be indicative of coppicing. Notably, all of the roundwood fragments were 7 years in age; which is a well-established coppicing pattern for oak stem-wood (cf. Gale 1991, 233). Only a few fragments of roundwood were recovered from this relatively small sample, so it is possible that these are from as few as 2 or 3 branches/ stems. Two tentative identifications of possible beech (cf. *Fagus sylvatica* L.) and possible hazel/ willow (cf. *Corylus avellana* L./ *Salix* spp.) charcoal were made from pit sample 5261 as well.

APPENDIX 8 BIBLIOGRAPHY

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APPENDIX 9 SUMMARY OF SITE DETAILS

Site name: St. White's Farm, Cinderford, Gloucestershire

Site code: SOYDH 2007.46

Grid reference: SO 365833 213096

Type of project: Excavation

Date and duration of project: 3rd December 2007 - 25th January 2008

Area of site: 1180 sq. m

Summary of results:

In December 2007 and January 2008, Oxford Archaeology (OA) undertook an excavation at St. White's Farm, Cinderford, Gloucestershire (NGR SO 6583 1310) commissioned by Waterman on behalf of the client, Bloor Homes (Western). This preceded the development of new housing and an access road. The excavation was focussed upon part of the access road to the west of St. White's Farm and followed a field evaluation within the whole development boundary by OA in June 2007.

St. White's Farm is believed to be on the site of a medieval chapel and hermitage, once part of the Flaxley Abbey Estate. A Charter of 1158 makes mention of a *"grangia"* at Wastadene and an iron forge *(unam forgiam ferrariam)* at Edlond. Wastadene was thought by some antiquarians to be the Flaxley Grange property belonging to the Abbey located south of the village of Little Dean, and the farm on the hill west and above it was "Edlond" (now St. White's Farm), where the iron forge was located. More recent research has suggested that the medieval Grange might actually have been located at St. White's Farm itself.

The excavation was concentrated on a 12th-13th-century ironworking area partly that was encountered in evaluation Trench 5. The site included stone walls of probable buildings, a possible oven lined with stone, a further possible hearth associated with clay floors, drainage ditches and refuse pits. All of these were directly associated with substantial deposits of ironworking debris. This comprised smelting slag waste and both primary and secondary smithying waste in the form of hammerscale and slag spheres. The artefact assemblages were dominated by pottery of 12th-13th-century suggesting a rather short period of activity. The small quantities of 16th-century material encountered suggests that some later activity did take place at the site although archaeological evidence of this was limited to the few sherds of pottery of this date.

To the north-east of St. White's is a disused hollow-way that may have originally led to this small settlement and latterly to the farm itself, before it was infilled in the 20th century when a new access road was made to the farm off the B4226. This feature was partly excavated in the course of the work, revealing cartwheel ruts in the trackway stone surface.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with Dean Heritage Museum Trust under the accession number: SOYDH: 2007.46.

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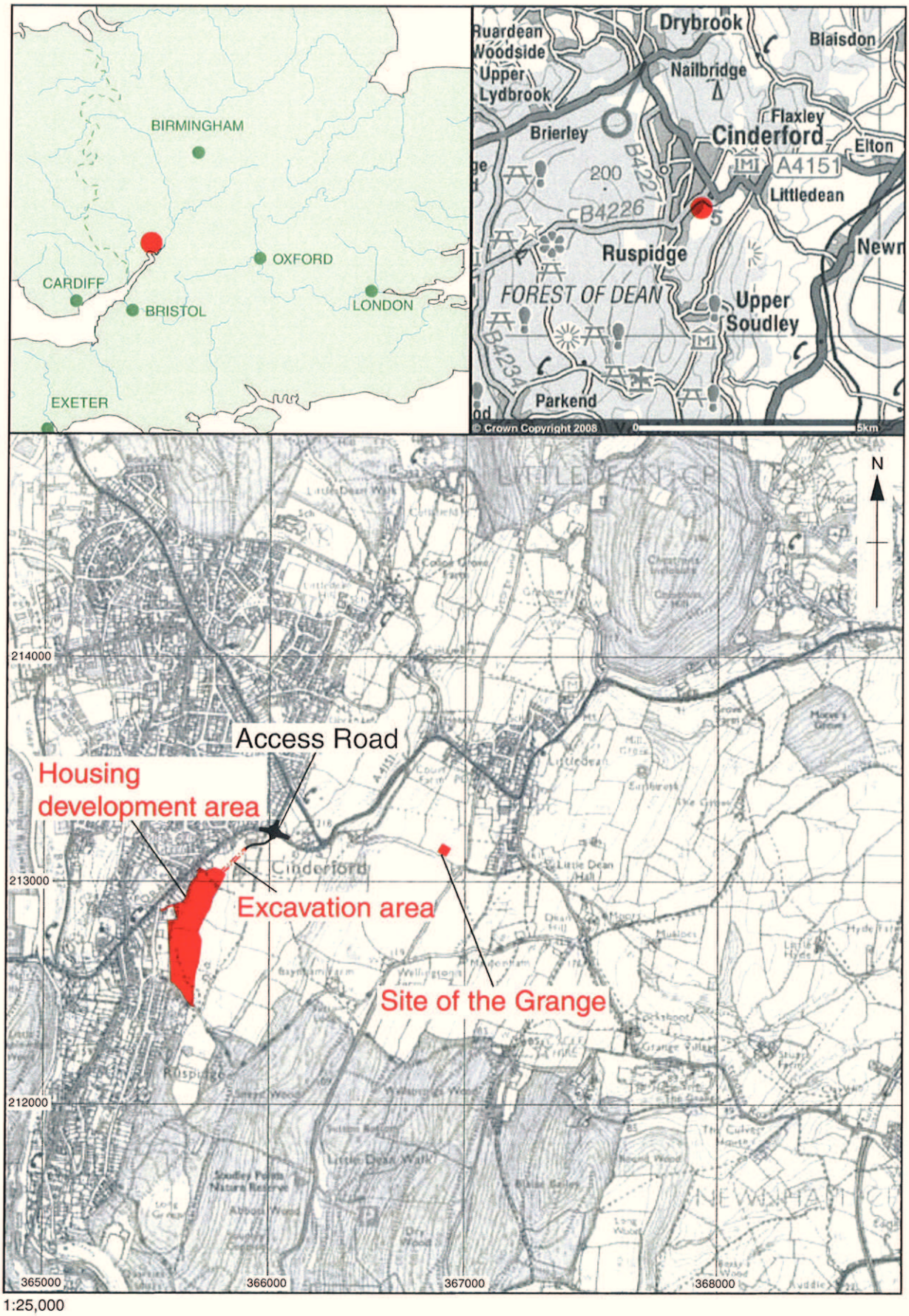

Figure 1: Site location

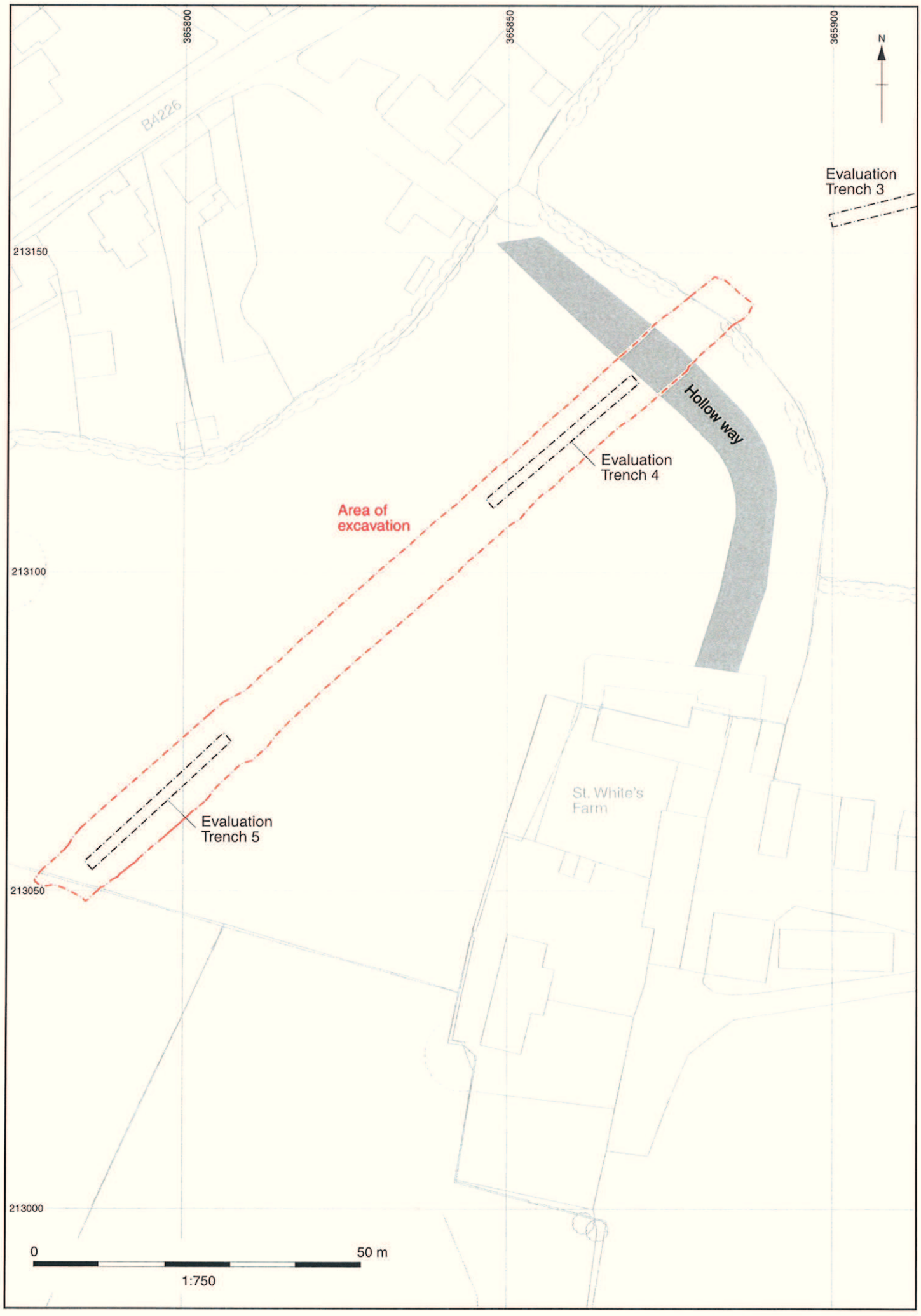

Figure 2: Plan of access road corridor adjacent to St. White's Farm

Figure 3: Site plan (west): Interventions through layer 5002

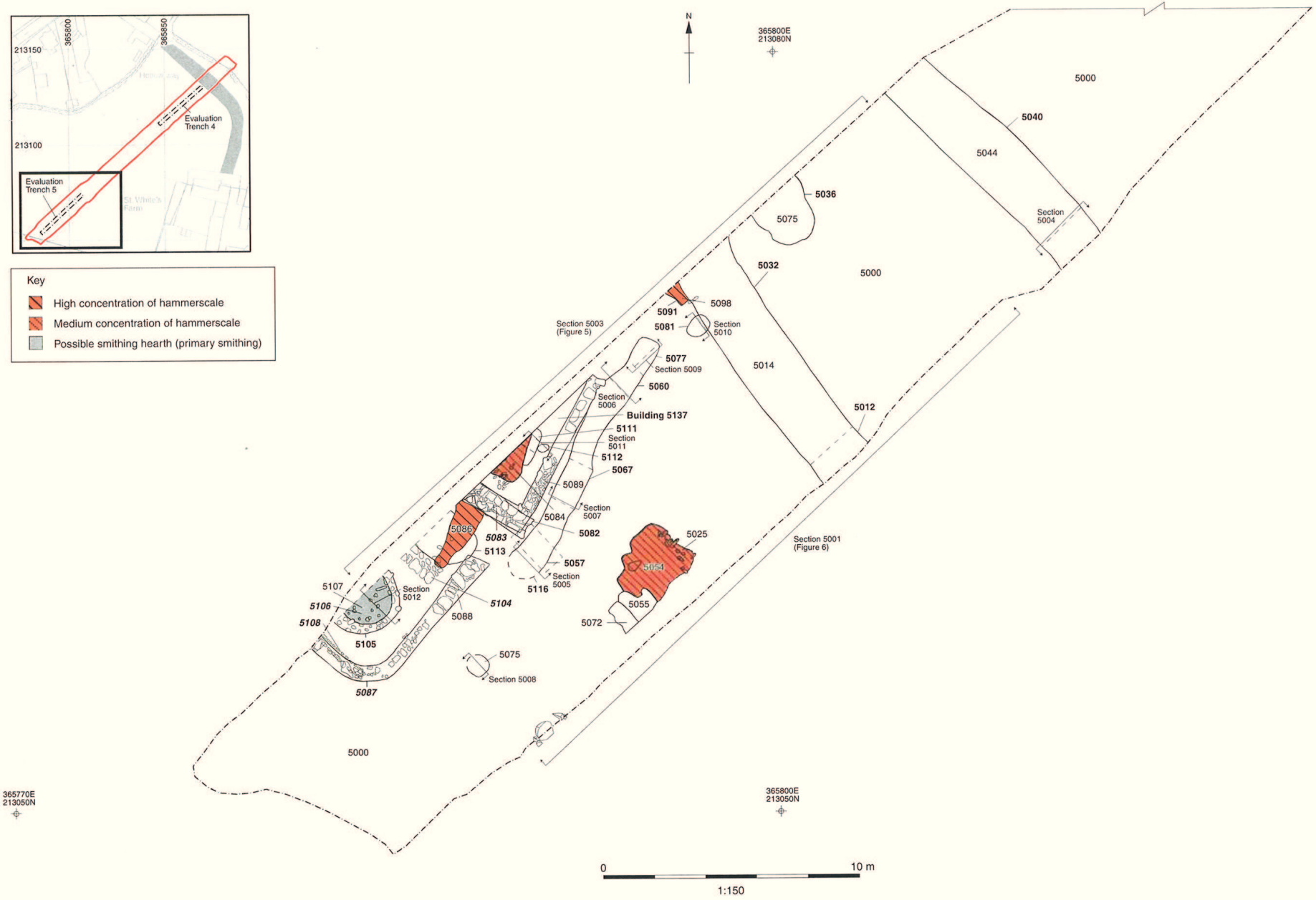

Figure 4: Site plan (west): west end of road corridor, excavated features and section locations

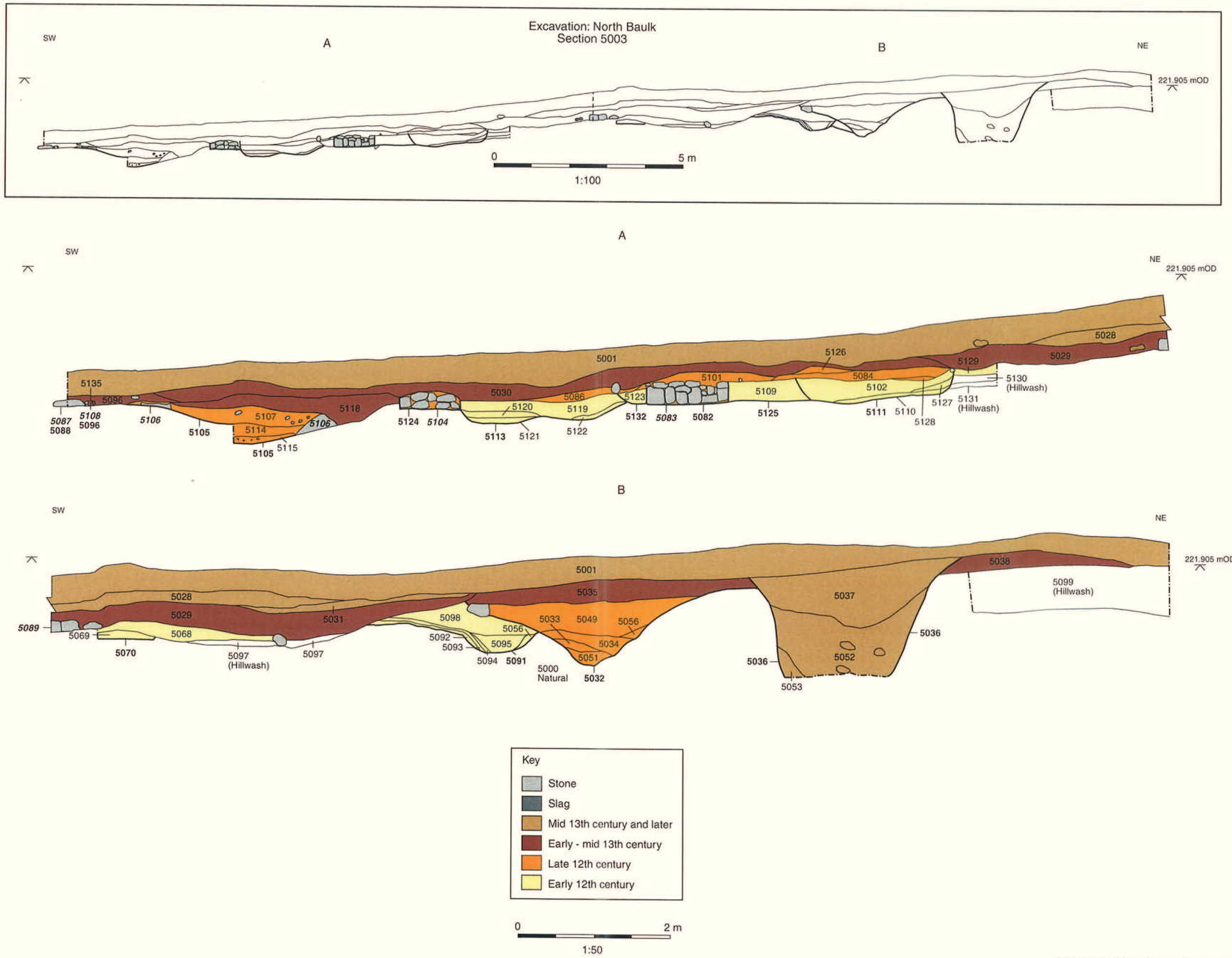

Figure 5: Trench sections west end of site

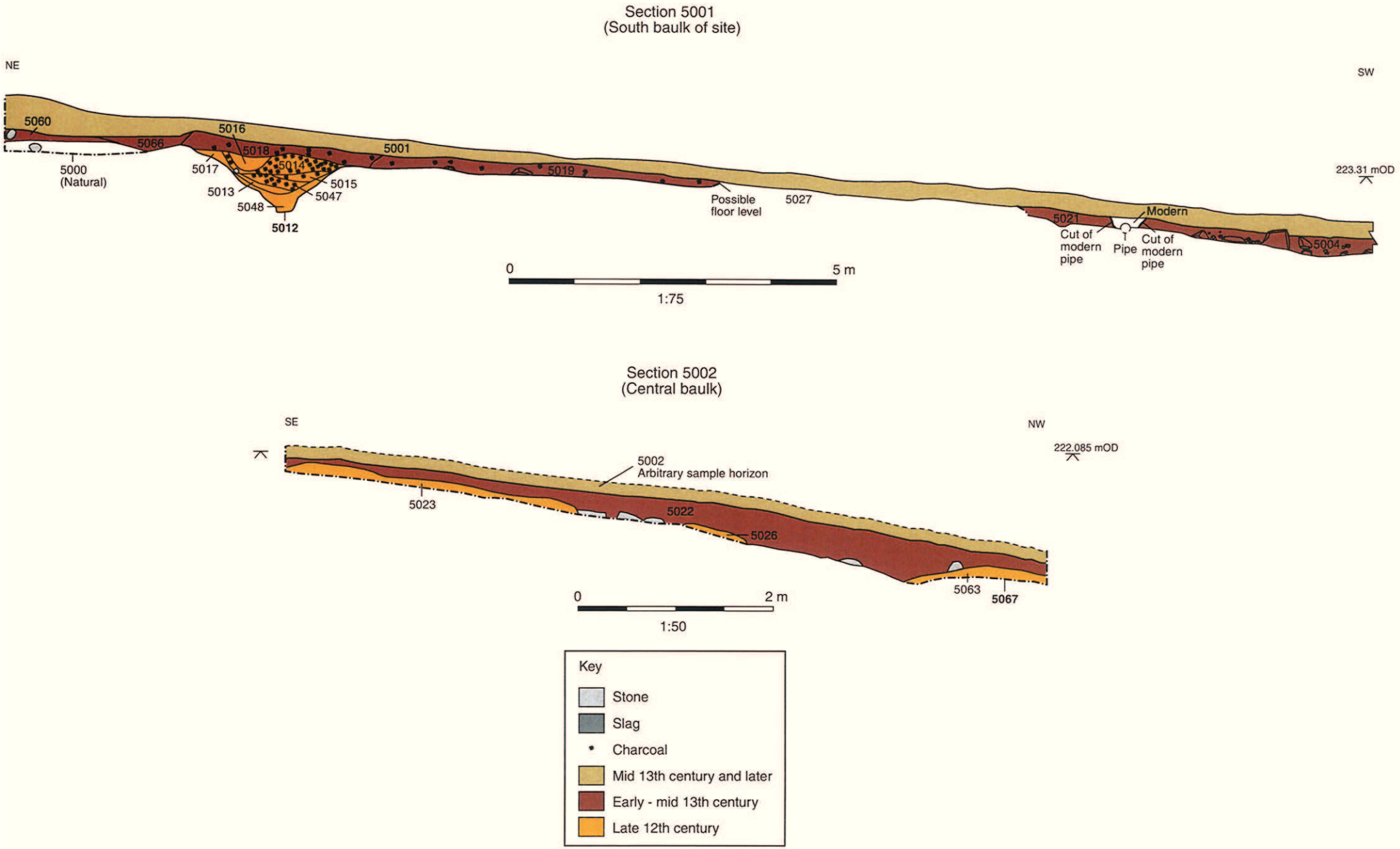

Figure 6: Trench sections west end of site

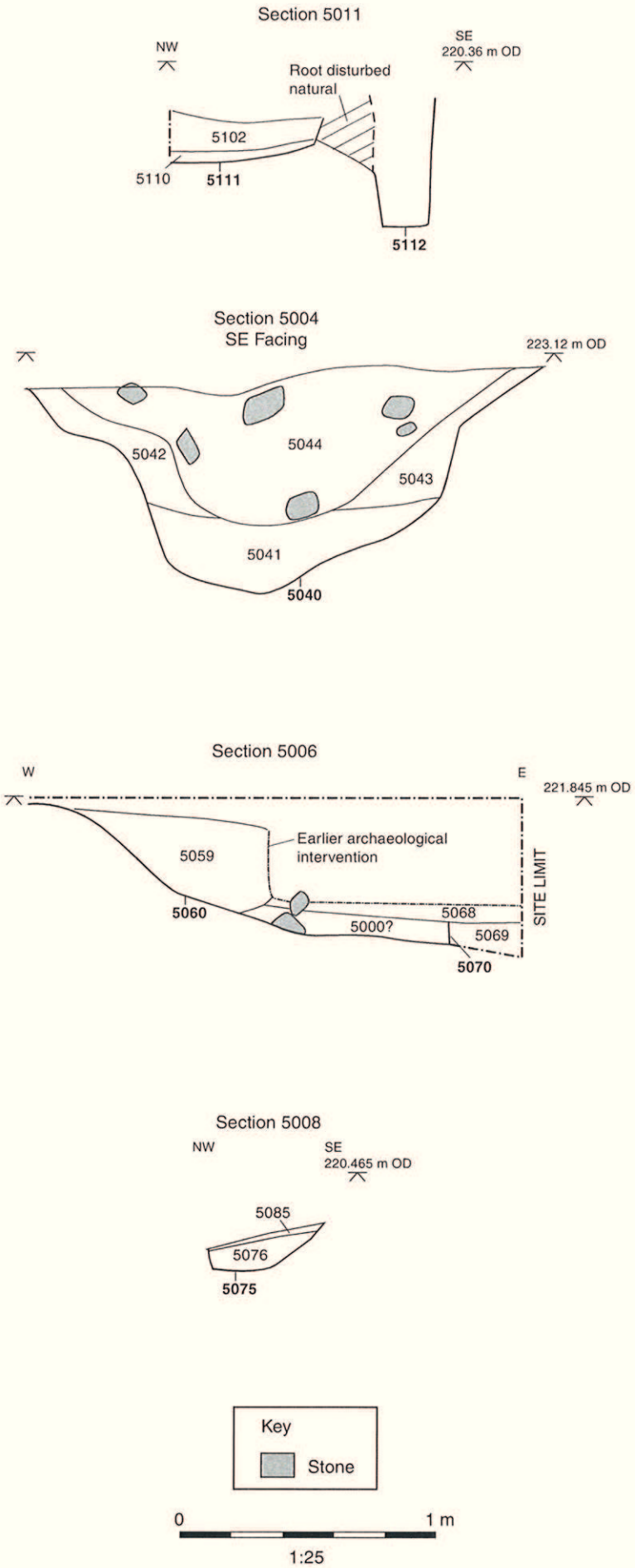

Figure 7: Individual feature sections

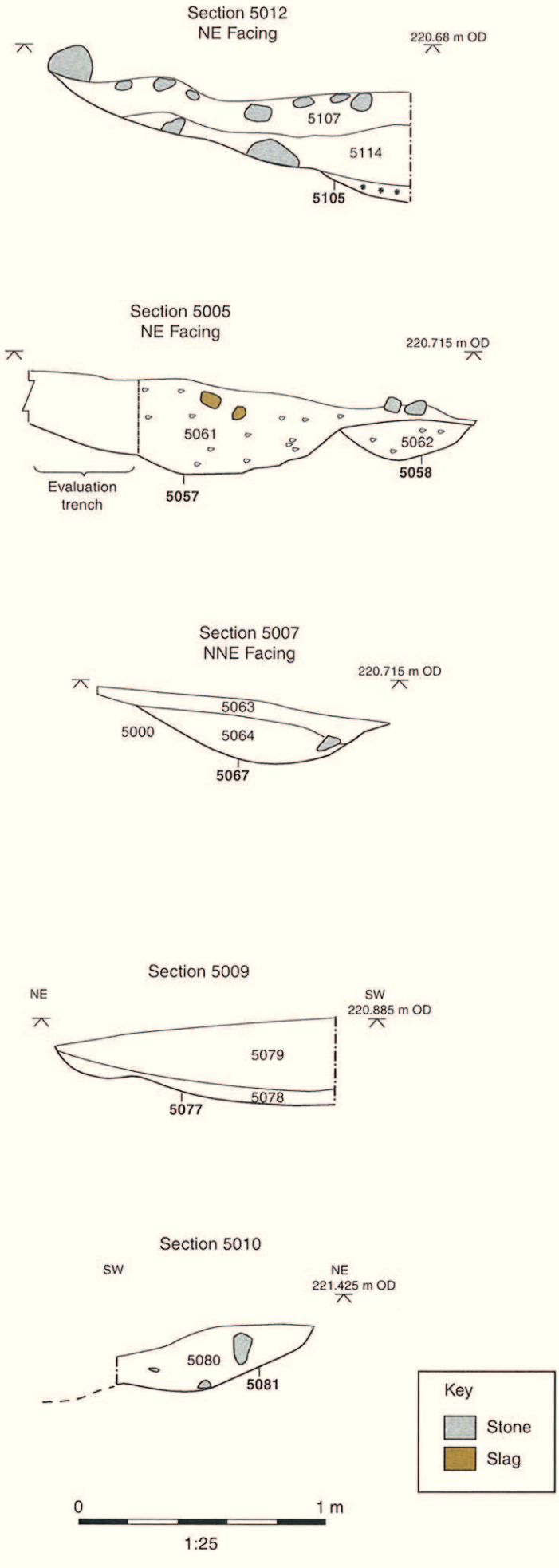

Figure 8: Individual feature sections

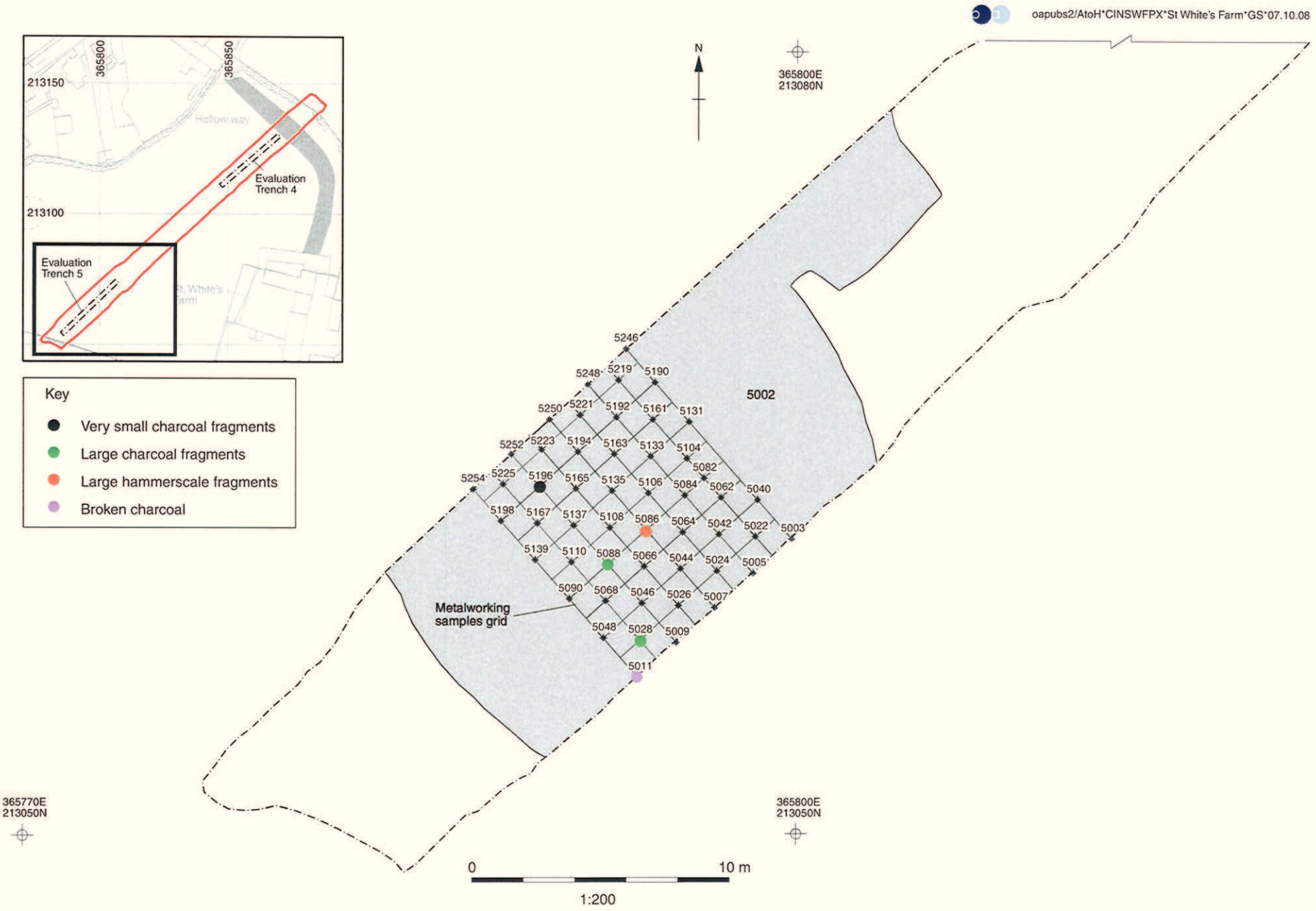

Figure 9: Site plan (west): Extent of iron working layer 5002 and metalworking samples grid

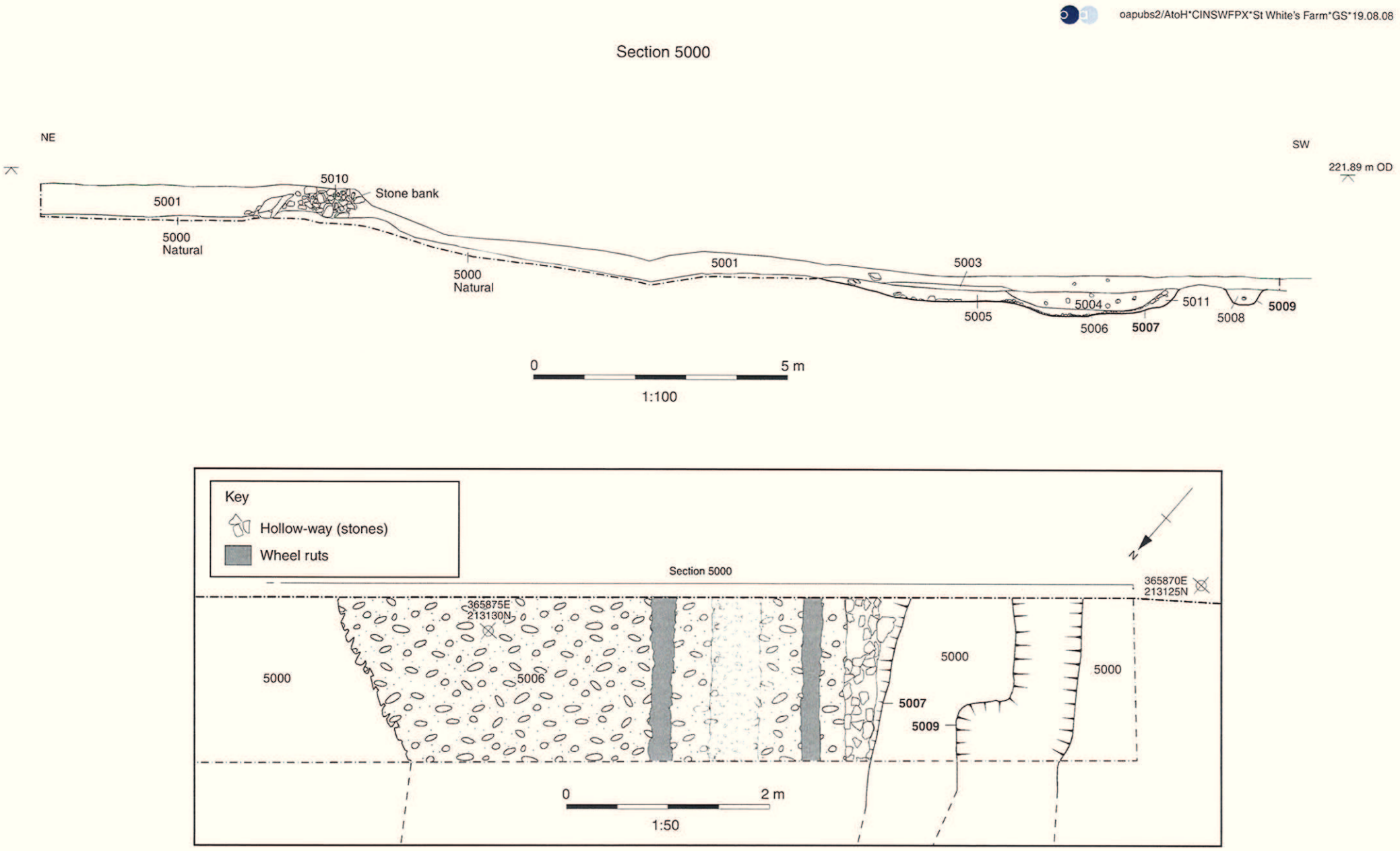

Figure 10: Site plan (east): Hollow-way plan of stonework and section across profile including stone bank and hedgerow

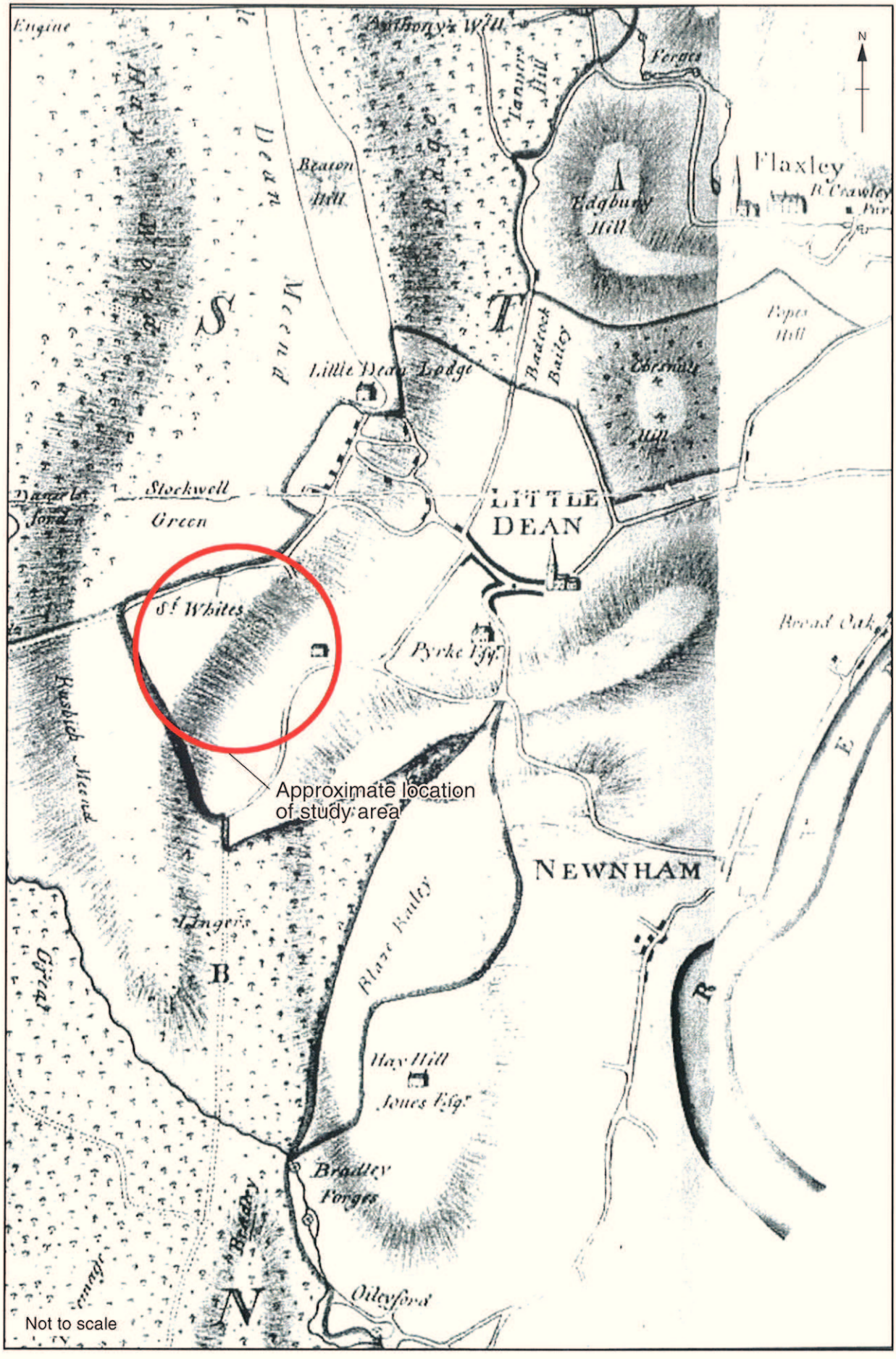

Figure 11: Historic map of Forest of Dean, 1782

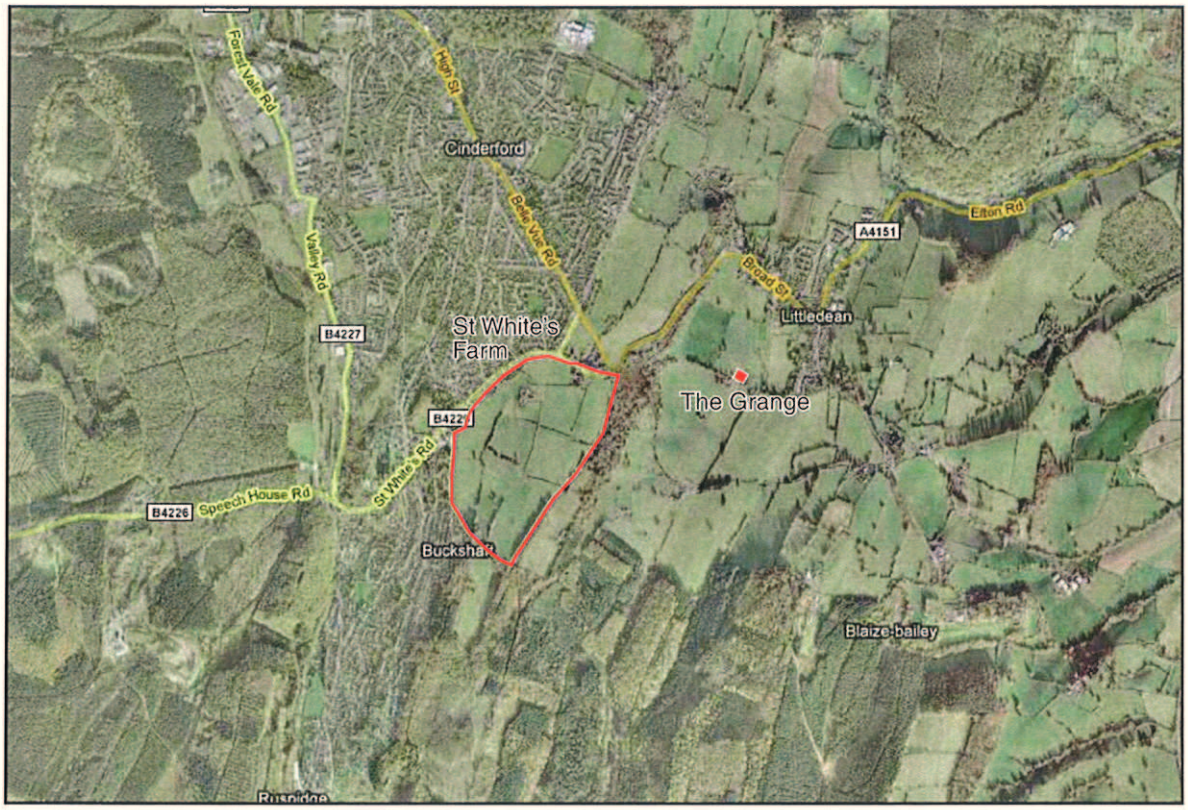

Plate 1: Aerial photograph showing environs of St White's Farm and site of the Grange

Plate 2: View of building 5137 (walls 5083 and 5089)

Plates 1 and 2

Plate 3: Drain 5108 and wall 5087

Plate 4: Oven 5105

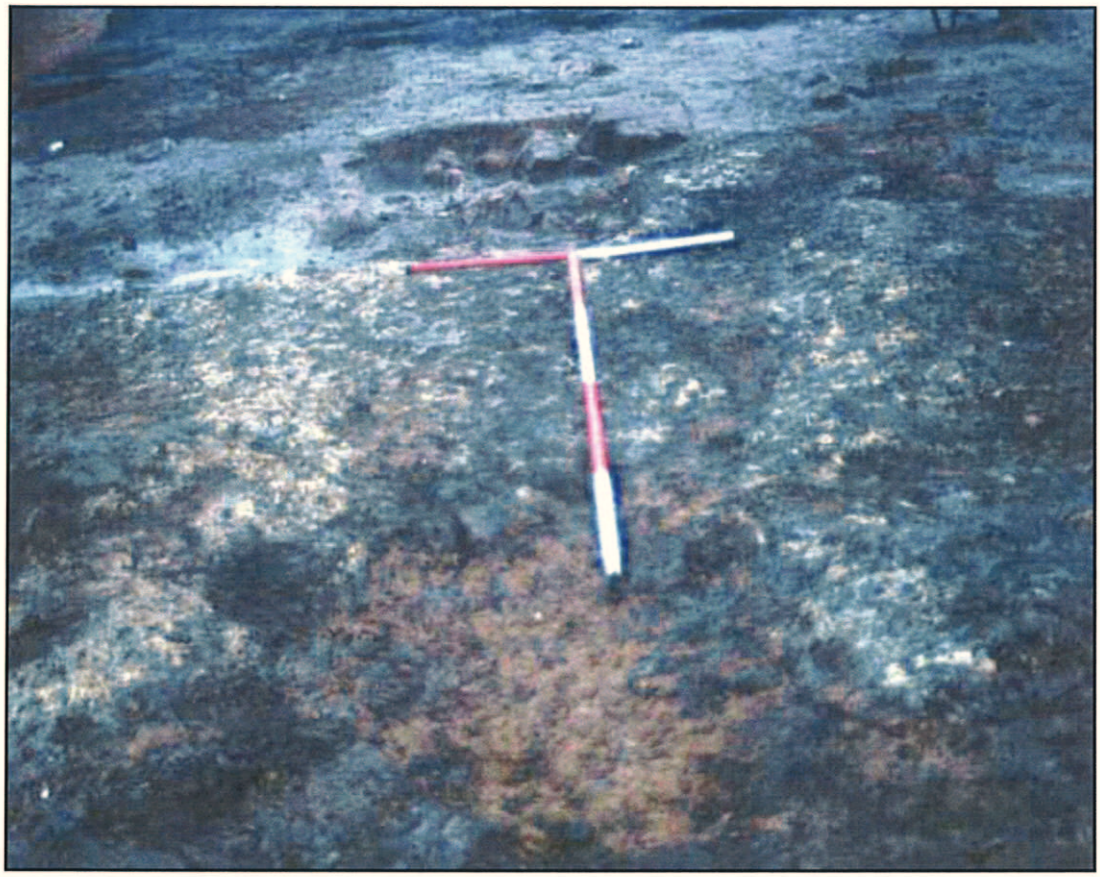

Plate 5: Clay floor 5025, looking north-east

Plate 6: The hollow-way, looking north-west

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