

EXCAVATIONS ALONG THE HARDWICK TO MARSH GIBBON PIPELINE: AN IRON AGE TO ROMAN LANDSCAPE

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Between 2005 and 2009, archaeological work was conducted by Oxford Archaeology East and Network Archaeology Ltd along the route of a new gas pipeline between Hardwick (Buckinghamshire) and Marsh Gibbon (Oxfordshire).

A Bronze Age presence was revealed, but it was in the Iron Age that activity began in earnest. Small farmsteads lay scattered across the landscape, with a subsistence economy typical of the period. Of particular interest is the evidence for ironworking, which was to continue into the Roman period. After the Roman conquest, the earlier dispersed settlements were gradually replaced by larger, more nucleated centres, meaning that many lesser sites fell from use. At one notable site, however, a Late Iron Age farmstead developed throughout the Roman period to become an apparently significant local centre. Two stone-footed buildings were preserved in situ and are likely to have been ancillary buildings, perhaps used for metalworking associated with a minor villa. The site was apparently abandoned in the late 4th century.

INTRODUCTION

Archaeological evaluation, excavation and watching briefs were commissioned by Scotia Gas Networks in advance of the construction of a new pipeline between Hardwick, north of Aylesbury, Buckinghamshire and Marsh Gibbon north-east of Bicester, Oxfordshire – a total length of 20.1km (Fig. 1; NGR 479812 219531 to 462516 223863).

Seven areas were excavated, each being assigned a plot number in a sequence running from east to west. Results from the four most productive sites (Plots 0.01, 0.10, 4.02 and 5.03-05) form the main content of this report. The remaining areas (Plots 0.02, 0.03, 7.01) produced more limited evidence and are noted below in summary form, as are the results from other observations. The evidence spans three main periods: Bronze Age, Iron Age and Romano-British (Periods 1-3). Post-Roman

remains (Period 4) consisted of limited evidence for medieval and post-medieval field systems and furrows in Plots 0.02, 0.10 (Area A) and 5.03-05: these are detailed in the project archive. The latter will be deposited with the Buckinghamshire County Museum, Aylesbury, under accession code AYBCM:2007.44.

ARCHAEOLOGICAL BACKGROUND

Very little evidence for Bronze Age or earlier activity had previously been found in the study area, which lies in the southern part of the Vale of Aylesbury. The wider landscape may have been extensively cleared of woodland as early as the later Bronze Age, with activity focusing broadly along the river valleys. The occasional Neolithic and Bronze Age pits found at sites near Aylesbury such as Coldharbour Farm, (Parkhouse & Bonner

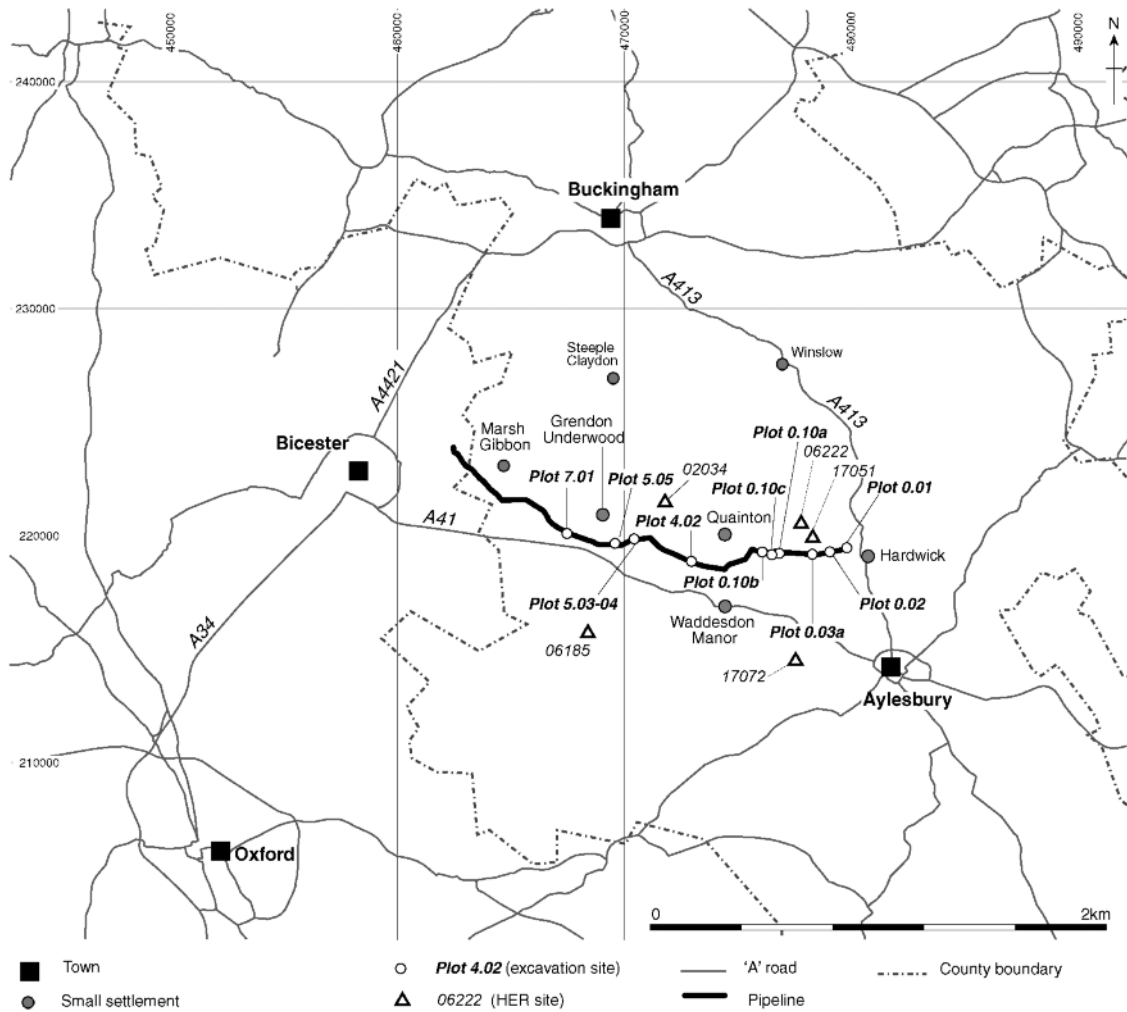


FIGURE 1 Location of the Hardwick to Marsh Gibbon Pipeline

1997, 121–1), Walton Lodge Lane (Bonner 1994, 4; Carstairs & Lawson 1992, 17) and St John's Hospital, Stone (Carstairs & Lawson 1992, 15–17), suggest that the local population was relatively small and seasonally mobile.

Early and Middle Iron Age pottery had previously been found on either side of the pipeline route (HER EBC17051; HER EBC17072; Buckinghamshire County Council Record ID 06222), while pollen evidence suggested that the surrounding claylands were farmed extensively at this time. Various ditches and enclosures of possible late prehistoric date were identified by

geophysical survey to the south-east of Grendon Underwood (Cotswold Archaeology 2006).

During the Late Iron Age, the subject area lay in a frontier zone between various tribes, within the territory of the Catuvellauni (Fig. 2). The river Cherwell (west of Bicester) and the Aves Ditch formed significant boundary features: the Dobunni lay to the west of the river, the Catuvellauni to the east and the Atrebates to the south.

The pipeline ran close to Akeman Street, an important route which connected the mid 1st-century fort at Alchester, to the west, with *Verulamium* (St Albans) to the east (Fig. 2). This major

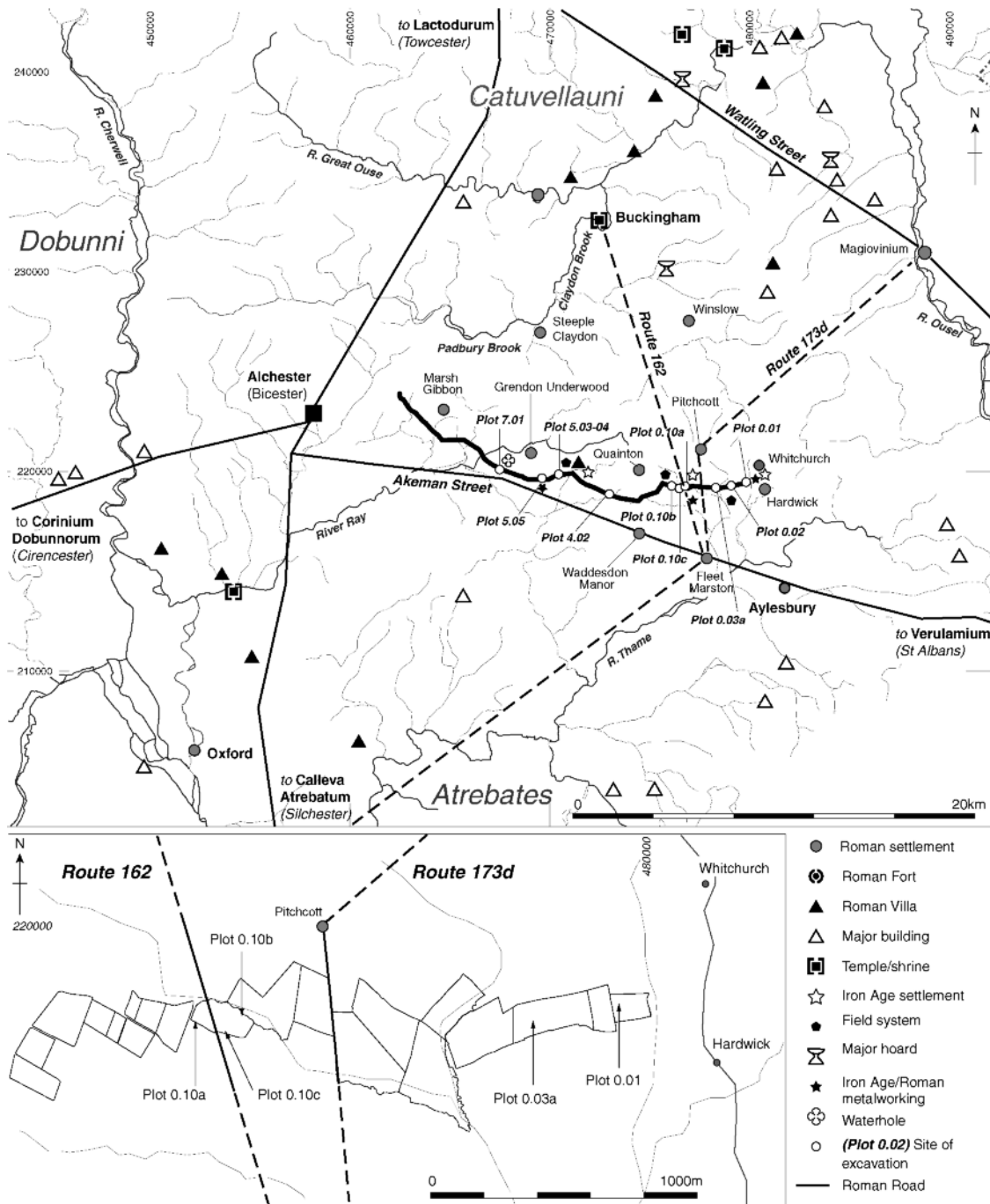


FIGURE 2 The Roman landscape, showing the local road network

Roman road (now the A41) lies less than a kilometre to the south of the pipeline. Two further Roman roads passed through the pipeline corridor. The easternmost of these (Viatores Route 173d), ran north from Dorchester-on-Thames and crossed Akeman Street at Fleet Marston, continuing on a slightly different alignment to Pitchcott, before turning north-eastwards towards Watling Street. Its projected course was followed by two field boundaries within the pipeline route. The second road ran close to Route 173b for the southern part of its course, near its junction with Akeman Street, and was recorded during the pipeline excavations (Fig. 1; HER 02034, Viatores Route 162; Margary 1955). This route evidently linked the small Roman town at Fleet Marston to Buckingham and beyond.

Construction of this road network during the 1st and 2nd centuries appears to have prompted increasing local activity: roadside settlements at Fleet Marston and Berryfields, Aylesbury to the east and Alchester (at Bicester), to the west, bear testament to this. Prior to this project, the intervening hinterland in which the pipeline lies had not been intensively studied. Evidence from the surrounding area accords with a broader regional pattern of dispersed agrarian farmsteads and villas, examples of which include Wymbush (Mynard 1987), Wavendon Gate (Williams *et al* 1996) and Bancroft (Williams & Zeepvat 1994), all lying 15km to the north.

Within the pipeline corridor, areas close to the Roman roads produced numerous Roman finds (mainly pottery) and possible settlement sites were identified (Figs 1 & 2). Some 500m south of the pipeline route, the discovery of large quantities of ceramic building material may indicate the site of a Roman villa (HER 06185). A potential roadside settlement was identified at Pitchcott, 90m north of the pipeline route (BCC ID 06222). Roman finds were also recovered from two ditches 70m south of the proposed route, while further ditches and enclosures identified in the vicinity by the geophysical survey may also date to this period (Cotswold Archaeology 2006).

GEOLOGY AND TOPOGRAPHY

The geology of the region through which the pipeline runs is dominated by mudstone of the Ampthill Clay, West Walton and Oxford Clay forma-

tions, interspersed with narrow areas of clay alluvium (British Geological Survey 2005). The height of the pipeline route varies, being *c.*99m OD at the Hardwick end and reducing to *c.*65m OD at the Marsh Gibbon end, crossing small tributaries of the river Thame, the flat fields of the Aylesbury region and the flood plains of the river Ray (Figs 1 & 2).

Of the NAL sites under consideration, Plot 0.01 was located 0.8km north-west of Hardwick, at the far eastern end of the pipeline, at a height of *c.*96m OD. This site was positioned on gravel, rather than clay, drift geology. Plot 0.10 was located 2.3km south-east of Quainton at a typical height of *c.*87m OD. Four areas (A-D) were excavated here and further features were identified during the watching brief. Area A consisted of two subsidiary areas (Ai and Aii). The excavation area within Plot 4.02 was 2.1km south-west of Quainton and lay at *c.*84.50m OD.

The excavations by OA East which spanned Plots 5.03-05 (collectively known as the Grendon Underwood sites) overlay mudstone, interspersed with areas of clay alluvium that in turn overlay gravels. This area was located in a rolling landscape, with Plots 5.03 and 5.04 forming a single excavation lying at the crest of low hill sloping away towards the west. Here, Plot 5.05 lay at the base of the hill, rising to the west on a gentle incline. Crucially, this part of the pipeline lay close to Akeman Street (Fig. 2).

THE ARCHAEOLOGICAL SEQUENCE

Period 1: Bronze Age (2000–700 BC)

Plot 0.01 (NAL; Fig. 3)

In the easternmost plot lay a heavily disturbed and isolated grave (1626) containing the partial remains of a young adult (sk. 1625), laid on its right side in a crouched position and facing south. It produced radiocarbon results of cal BC 1210–1200/cal BC 1190–1140/cal BC 1130–1000 (95% probability; Beta-313511; 2900±30 BP), suggesting a Late Bronze Age date.

Plot 0.03a (NAL; Fig. 4)

Some 62 fragments of fired clay or poorly fired pottery were recovered from a pit (305) of possible early prehistoric date in Plot 0.03a.

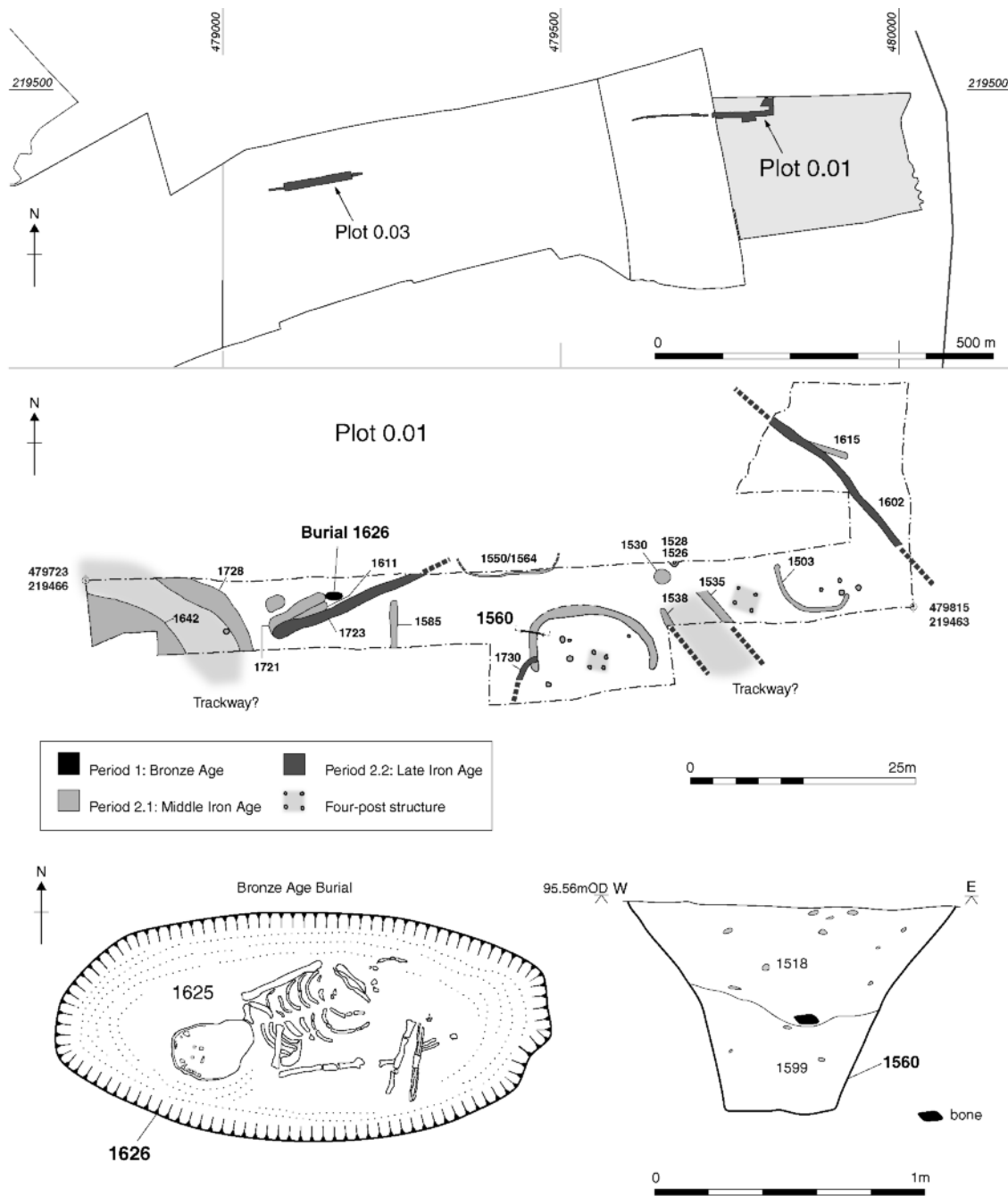


FIGURE 3 Site plan of Plot 0.01, showing section across ditch 1560

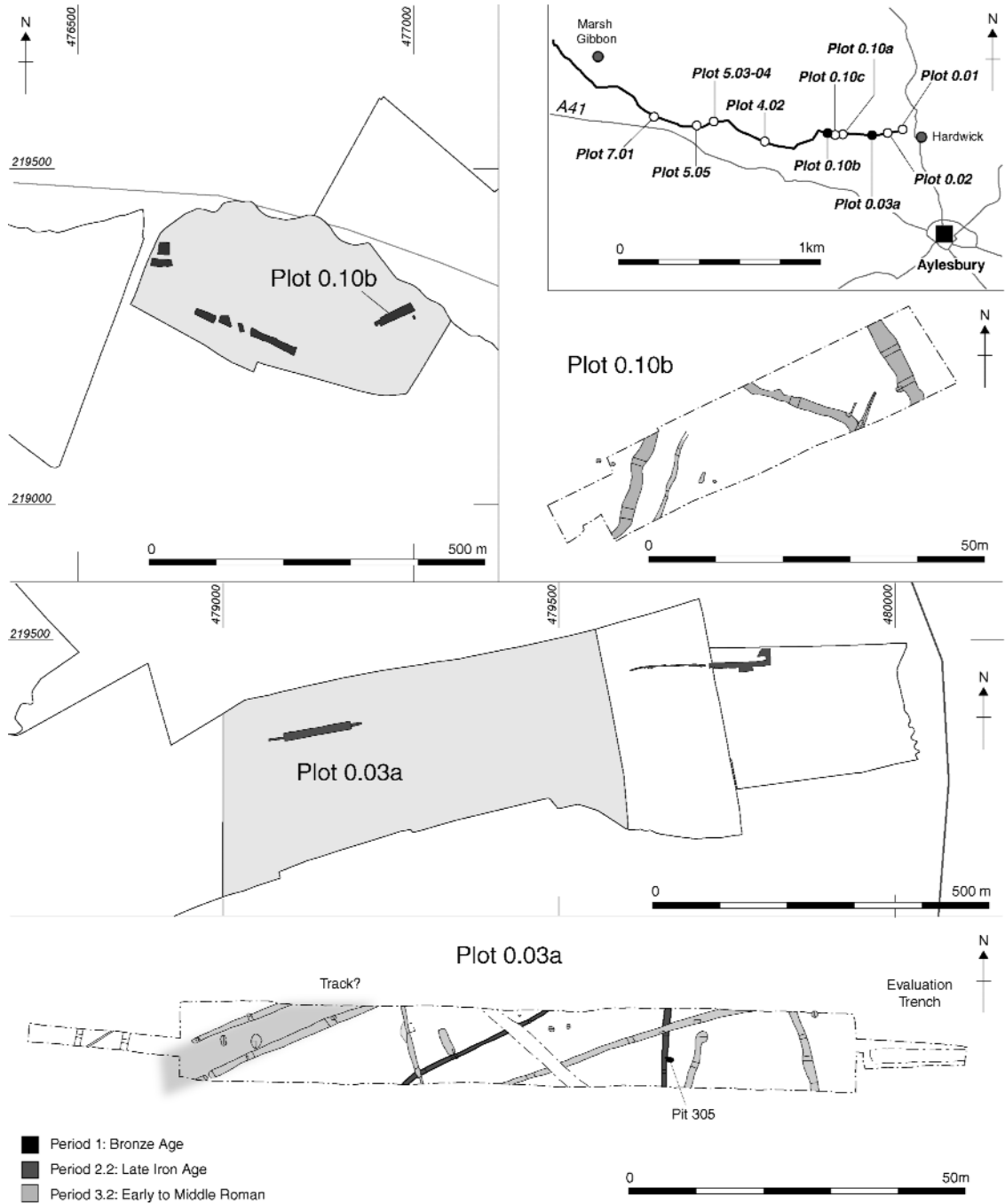


FIGURE 4 Plots 0.03 and 0.10b, showing the Iron Age and Roman field systems

Plot 10c (NAL; Fig. 1)

Further west along the pipeline route, a cremation burial (9702, not illustrated) had been placed in a small shallow pit with a large quantity of charcoal, probably from a wood-fuelled pyre. The meagre quantity of human bone recovered (50-100 fragments) limited the information that could be obtained. Radiocarbon dating of two bone samples produced results of cal BC 1410–1260/cal BC 1230–1220 (95% probability; Beta-313512; 3050±30 BP) and cal BC 1370–1360/cal BC 1310–1130 (95% probability; Beta-313513; 2990±30 BP), indicating a Late Bronze Age date.

Plots 5.03-05 (OAE; Fig. 1)

Two copper alloy artefacts of probable Middle Bronze Age date were recovered from Plots 5.03-05 during machine stripping. One is a dirk (Fig. 13, SF 116), a short-bladed knife, the other a large ring (Fig. 13, SF 176). No archaeological features of the period were found *in situ*.

Period 2.1: Middle Iron Age (300–100 BC)*Plot 0.01 (NAL; Fig. 3)*

Excavation at this plot revealed traces of a possible Middle Iron Age farmstead and related field systems. The main focus of activity was a roughly C-shaped ditch (1560), open on its south side, which contained animal bone, residual worked flint, fired clay and Middle Iron Age pottery. It enclosed an area c.12m in diameter and encircled numerous small pits and post holes, including a four-post structure. Just to the north lay a narrow ditch/gully (1550/1564) which may have defined the southern edge of another enclosure, the remainder of which lay outside the excavated area.

On the eastern side of the C-shaped enclosure two parallel, linear ditches (1535 and 1538) spaced c.3m apart perhaps formed the northern end of a track/droeway leading to the minor agricultural enclosures. Further north was a cluster of pits (1530, 1526 and 1528) which contained no finds. Another four-post structure was positioned on the eastern side of the possible track.

A further curving ditch (1503) to the east may have formed another minor C-shaped enclosure, with its open side to the north or east. It contained worked flint, animal bone, Middle Iron Age pottery and an iron nail. This ditch was associated with various postholes which may have related to an

entrance or other structure. One posthole contained a little Middle Iron Age pottery. A single isolated ditch (1615) lay further east.

The few plant macrofossils found in samples from ditches 1503 and 1535 include indeterminate cereal grains that probably derived from accidentally incorporated waste.

Various other ditches in the western part of the site ran on differing alignments. These contained naturally derived fills that yielded very few finds, primarily small fragments of Middle Iron Age pottery and animal bone. Closest to the C-shaped enclosures one ditch ran north to south (1587). Near the Bronze Age burial lay two ditch segments (1721 and 1611) aligned south-west to north-east, just to the north of which was an undated pit (1725). At the western end of the trench, two curvilinear ditches (1642 and 1728), the former being very wide, ran parallel to each other on a roughly north-west to south-east alignment, with a gap of c.3m between them. They may represent the remains of a larger enclosure system or perhaps defined a track/droeway. Ditch 1728 contained a flat-topped rim, perhaps from a lugged vessel (Fig. 17, No. 3).

Period 2.2: Late Iron Age (100 BC – AD 43)*Plot 0.01 (NAL; Fig. 3)*

Two field boundary or drainage ditches of possible Late Iron Age date that cut across earlier features were recorded in this plot, indicating that the focus of settlement had moved or reduced in size. In addition, a smaller curving ditch (1730) post-dated the south-western terminus of one of the earlier C-shaped enclosures and may have formed part of another minor enclosure. Further west, a more substantial ditch (1723) ran for 17m in a south-westerly direction before ending in a rounded terminus. At approximate right angles to it was another ditch (1602) in the north-eastern part of the site. Pottery recovered from it included an open Middle Iron Age vessel, possibly a bowl, with a fingertip impressed flat-topped rim (Fig. 17, No. 2). Two samples from fills of the ditch yielded charcoal and sparse plant remains, including indeterminate cereal grains.

Plot 0.03a (NAL; Fig. 4)

By the Late Iron Age a minor field boundary system represented by two ditches had developed

in this area. One ditch was aligned north-east to south-west and the other north to south. Neither contained finds, but they were both cut across by Roman ditches.

Plot 0.10a (NAL; Fig. 5)

More substantial evidence for Late Iron Age activity was found in Area Ai at this plot. Here, a ditch (9147) with a rounded terminus at its northern end contained daub, coal, iron slag and Late Iron Age pottery. A second ditch (9184) at the northern end of the trench was aligned broadly east to west. Its basal fill contained charcoal, animal bone, daub, slag and Late Iron Age pottery. The upper fill was naturally derived.

Set between the two larger ditches was a group of smaller features that may have been gullies or beamslots, their regular profiles suggesting that the latter interpretation is more likely. If so, a building associated with metalworking appears probable. Three parallel gullies/slots (9170, 9168 and 9133) were aligned east to west. The features were typically 1.50m long, 0.35m wide and 0.15m deep with single naturally derived fills, containing small quantities of animal bone, daub and Late Iron Age pottery. Two further gullies/slots (9166 and 9153) mirrored the course of ditch 9184 and may have related to it.

An irregular shallow feature (9183) lay just to the east of the parallel gullies/slots. It perhaps formed an eroded area that became infilled with occupation debris, its regular north and east sides perhaps suggesting that it formed part of the same structure as the gullies. Its fill consisted of solid, dark greyish brown silty clay, containing a little animal bone. A similar deposit lay just to the east (9110) in another shallow hollow: it contained burnt animal bone and Late Iron Age pottery as well as an iron collar fragment, and iron smelting waste (including slag).

Numerous small to moderately sized pits and/or postholes, as well another minor gully, were concentrated in the vicinity of the putative building. They generally contained animal bone, daub, Late Iron Age pottery and iron slag.

Plots 5.03 & 5.04 (OAE; Fig. 6)

The earliest settlement on this part of the pipeline appeared to date to the Late Iron Age, although a small quantity of Middle Iron Age pottery was found residually. The remnants of two possible

roundhouses (gullies 6622/6658 and 6319) took the form of surviving sections of possible ring ditch, with internal diameters of approximately 10m. The position of only one roundhouse entrance (gully 6319) could be ascertained and lay to the north-west. The upper fills of both gullies contained Roman pottery, which could either have been intrusive or could indicate continuation in use after the conquest. An iron split-spike loop was also recovered.

To the north-east of the roundhouses, the remnants of three shallow penannular gullies (6397, 6379 and 6372) perhaps formed minor structures such as haystacks or animal pens, c.8m in diameter. Gully 6397 contained an intrusive L-shaped iron pintle (Fig. 14, SF 118).

A curvilinear ditch (6596) lay towards the western limit of the excavation trench, containing a small quantity of Late Iron Age pottery. The alignment of this ditch noticeably varied from those of the boundary and enclosure systems attributed to the later phases, which may suggest a shift in land use or land division after the conquest.

Plot 5.05 (OAE; Fig. 6)

Several curvilinear ditches and numerous pits were concentrated in the centre of this plot, each containing Late Iron Age pottery. A total of 32.72kg of slag was recovered from the evaluation and excavations in this area and much of this material was diagnostic of iron smelting, either in the form of tap slag or as large furnace bottoms. Much of it was recovered from the upper fills of relevant features, perhaps suggesting later use of this area as a dump for metalworking waste.

The earlier of two minor enclosures (6556) formed an irregular U-shape. Cutting across the initial enclosure was a hook-shaped enclosure (6508) whose open end faced north-east. Metalworking debris recovered from it was sampled for metallurgical analysis (Samples A and B, see MacKenzie below). A third enclosure-type ditch (6536) lay further south and was sub-circular in plan.

Set within the north-western part of enclosure 6508 was a steep-sided pit (6507) with relatively sterile fills. It contained 54 sherds from a single grog-tempered Late Iron Age vessel (totalling 0.47kg) and a tanged knife blade fragment. Various other pits were clustered within and around the enclosures, one of which (6528) contained signifi-

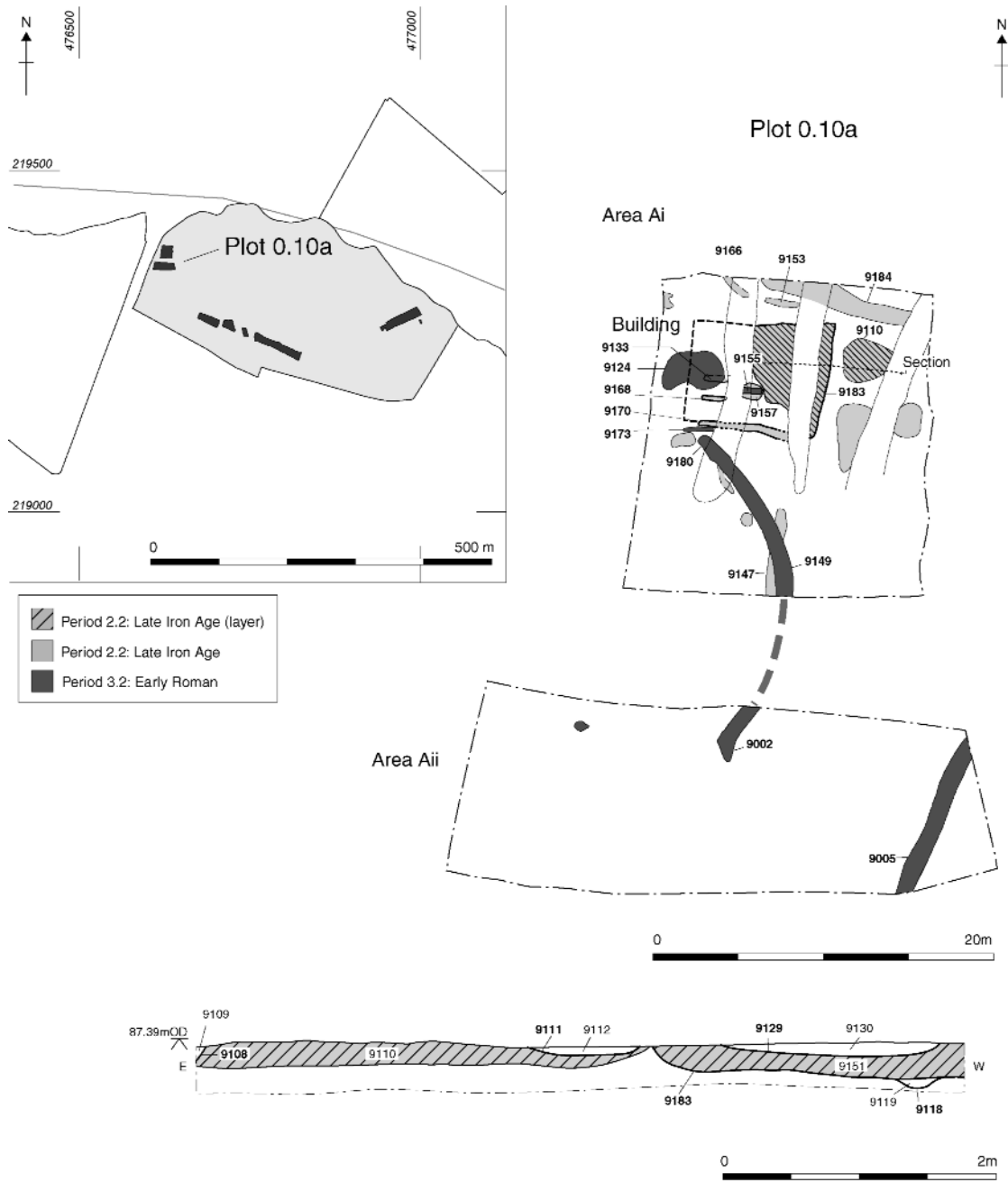


FIGURE 5 Site plan of Plot 0.10a, showing section across the possible building

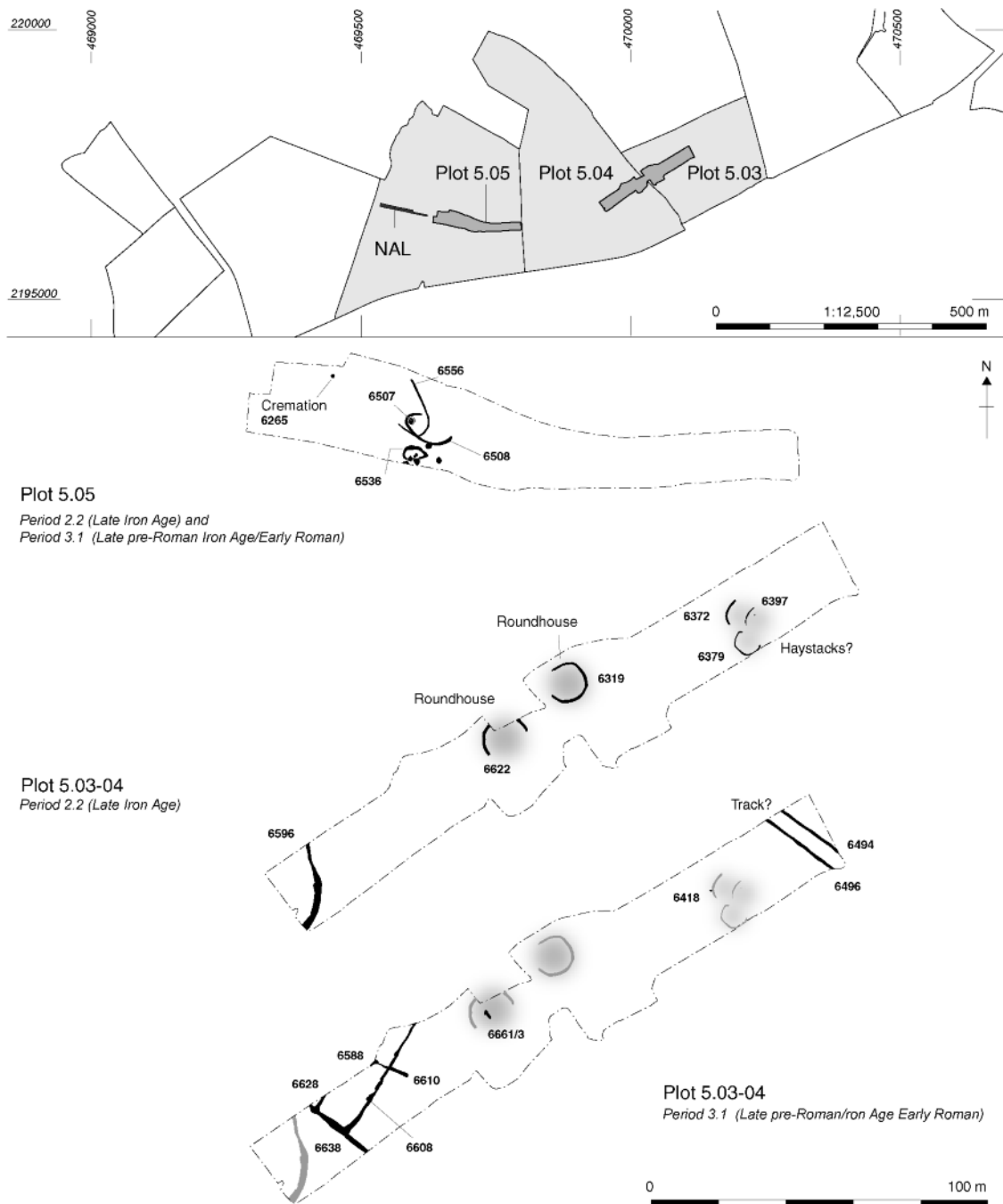


FIGURE 6 Site plan of Plots 5.03-05, showing the Late Iron Age to Late pre-Roman Iron Age/Early Roman phases (Periods 2.2-3.1)

cant quantities of slag (4.91kg), along with evidence of burning in its reddened clay fills. An environmental sample taken from another pit yielded spheroidal hammerslag.

Plot 5.05 (NAL)

An additional excavation area to the west of the OAE works was investigated by NAL, revealing various discrete and generally undated features. These included ditches on varying alignments which may have been remnants of field boundaries. Of the two pits found, one contained charcoal, animal bone, burnt flint, fired clay, iron working slag and Late Iron Age pottery.

Plot 7.01 (NAL; Fig. 7)

Further west, Plot 7.01 contained a substantial watering hole (70103) measuring 8.10m long, 5.6m wide and 1.2m deep. Its six fills were generally naturally derived and included a lense of peaty material. Running out from the northern edge of the pit was a gully with a possible entrance gap, which may have been associated with livestock control. Small quantities of Iron Age pottery came from the features. Adjacent to the waterhole was an alluvial deposit (70120) that may have been natural, or the result of animal trampling.

Period 3.1: Late pre-Roman Iron Age to Early Roman (1st century AD)

Plot 4.02 (NAL; Fig. 8)

Activity appears to have commenced at this site in the Late pre-Roman Iron Age to Early Roman period and was characterised by boundary features and pits, although the presence of Middle Iron Age pottery suggests earlier activity in the vicinity. The principal ditch (42068) ran across the western part of the site in a north-easterly direction before ending in a rounded terminus. It contained a little animal bone. Probably continuing the boundary to the north-east was a discontinuous ditch or hedge line (42035/42118/42121) on a slightly different alignment, the gap between it and ditch 42068 perhaps forming an entrance.

Two fairly large sub-oval pits lay to the east (42100 and 42097). Both yielded Late Iron Age to Early Roman pottery (including a late 1st-century sherd of south Gaulish samian form 18 from pit 42097), as well as animal bone and ceramic building material suggesting the disposal of

domestic waste from a nearby settlement. Pit 42100 contained 20 sherds from a Gallo-Belgic whiteware beaker with horizontal grooved and vertical combed decoration (Fig. 17, No. 9) and further sherds came from the fills of a nearby Roman ditch (42123), suggesting the use of material from a similar source. The presence of this 1st-century import is notable. The type is commonly used as grave goods in cremation burials in south-east and central England, although it also occurs in other contexts, both military and native (Fitzpatrick & Timby 2002, 167).

Plots 5.03 & 5.04 (OAE; Fig. 6)

The earliest phase of Roman activity at this site was relatively sparse in comparison with the later phases. The surviving features of this date appeared to respect those of the Iron Age, particularly the two putative roundhouses, raising the possibility that these structures remained extant into the Roman period and suggesting a gradual shift to a more Romanised lifestyle.

Part of a rectilinear ladder-type enclosure lay in the western part of this area, and endured in varying form throughout the Roman occupation of the site. The initial phase comprised at least three ditches that contained Early Roman pottery. The main element of the system (ditch 6638) was aligned north-west to south-east: it intersected with two ditches placed at right angles to it (6628 and 6608) to form internal sub-divisions within the enclosure.

A third possible subdivision consisted of two elements (6588 and 6610) aligned parallel with and 20m to the east of ditch 6638. Ditch 6610 contained a grog-tempered jar (Fig. 17, No. 6) and a Hod Hill brooch (Fig. 13, SF 137), of a type normally associated with the Roman army and dating to *c.*AD 43–60/5. Pottery from the second feature (6588) included a micaceous greyware bowl (Fig. 18, No. 18).

Two shallow intercutting pits containing Early Roman pottery (6661 and 6663) lay within the area formerly (or perhaps still) encompassed by roundhouse 6622. Similar pottery came from another pit (6418) in the eastern part of the site.

Further east lay two north-west to south-east aligned ditches (6496 and 6494), attributed to this phase on the basis of their alignments. These may have formed a track, perhaps leading towards Akeman Street.

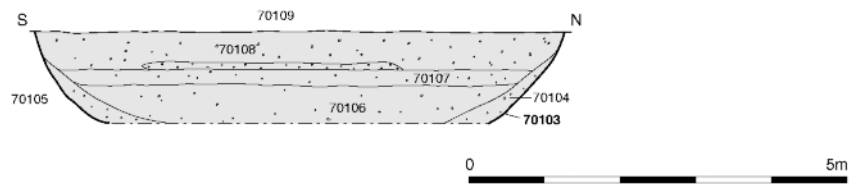
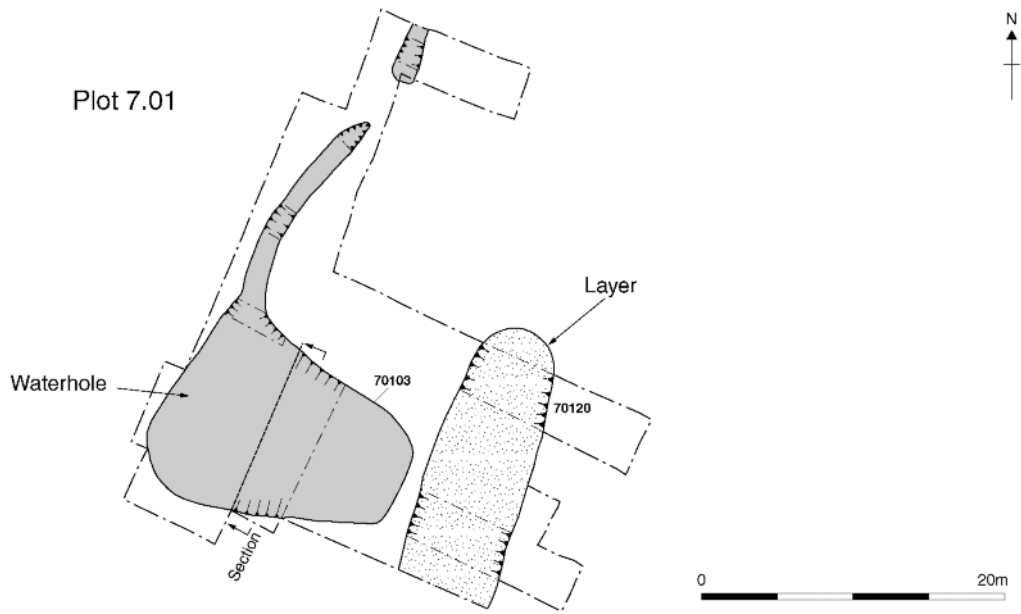
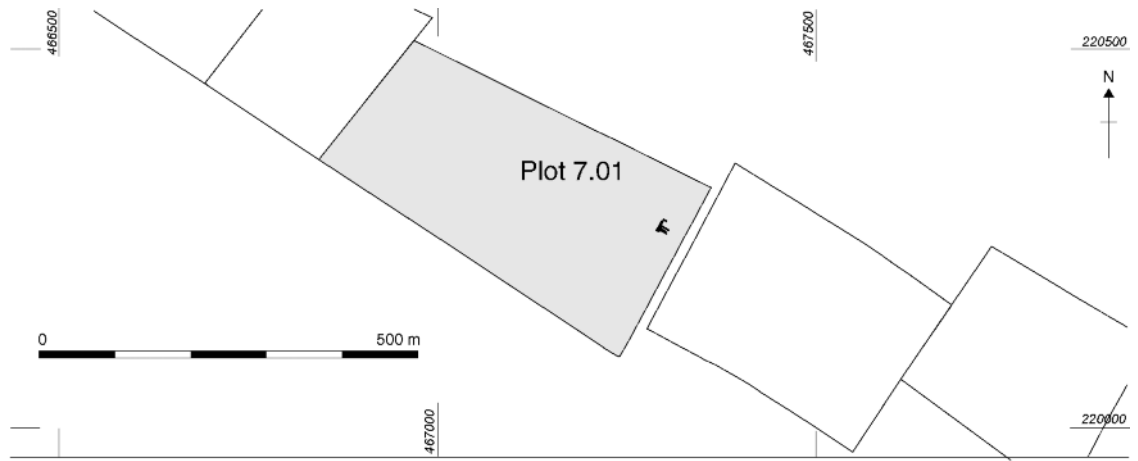


FIGURE 7 Plot 7.01: Waterhole 70103

Plot 5.05 (OAE; Fig. 6)

Very limited evidence for 1st- to 2nd-century activity in this area came in the form of a single truncated cremation (6265) which lay to the west of the Iron Age features. It contained a single sherd of pottery. Samples yielded 95g of cremated human bone along with numerous hobnails (1 complete, 11 incomplete, 6 nail heads and 19 shank fragments), suggesting that the individual was clothed when cremated. The presence of a cremation in this part of the site may suggest that the limit of any contemporary settlement lay further to the east, since human burial is unlikely to have occurred within its bounds.

Period 3.2: Early to Middle Roman (1st to 2nd century AD)*Plot 0.03a (NAL; Fig. 4)*

The earlier field system, which originated in the Late Iron Age (Period 2.2) was extended and developed, with two parallel ditches spaced c.5m apart (perhaps demarcating a track/droeway) at the western end of the trench and an adjacent series of field or enclosure boundaries, most of which ran on similar alignments, suggesting a ladder-type system. The pottery indicates that this part of the site began to fall out of use by the end of the 2nd century. As in the earlier phase, the general lack of finds implies that this area was not located close to a settlement, although a few scattered pits were present.

Plot 0.10a (NAL; Fig. 5)

The dominant Early Roman feature at this site was a curving ditch, which was recorded to the south in Area Aii (9002) and to the north in Area Ai (9149), where it terminated just to the south of the putative building, cutting across earlier ditches and therefore interpreted as of Early Roman date. It contained charcoal, animal bone, daub, iron furnace slag and Late Iron Age pottery. The latter included a grog-tempered base sherd with two post-firing holes (Fig. 17, No. 8). A second ditch (9005) in Plot Aii ran from south-west to north-east and contained a little Romano-British pottery.

Cutting across the former 'building' in Area Ai was a substantial pit (9124). Its basal fill of orangey brown silty clay was overlain by dark greyish black silty clay. Both of these deposits contained significant quantities of finds, including

charcoal, animal bone, burnt/heat-cracked stone, ceramic building material, fired clay, slag and Late Iron Age to Early Roman pottery. Other finds include tap slag and furnace slag (Samples C1 and C2, see Mackenzie below) and reduced ore. The Iron Age pottery included a grog-tempered wide-mouthed jar (Fig. 17, No. 4), as well as two grog-tempered vessels with post-firing holes drilled through the neck and base. This feature was probably a midden or rubbish dump, which included waste from iron smelting.

Adjacent to it to the south were two gullies/slots (9155 and 9173), cutting across earlier features. Their presence perhaps suggesting a second phase of the putative building. Both features contained charcoal, animal bone and Late Iron Age pottery.

Plot 0.10b (NAL; Fig. 4)

Three phases of field boundary ditches of 1st- to 2nd-century date were present at this site. The initial phase consisted of two irregular ditches that may have formed a field or other enclosure (aligned south-west to north-east and north-west to south-east). This alignment was reflected by two smaller ditches which may have been slightly later, followed by a more substantial ditch. Five pits scattered across the site contained moderate quantities of animal bone, ceramic building material, Romano-British pottery, iron nails, charcoal and iron working slag, attesting to nearby settlement.

Plot 4.02 (Figs 8 and 9)

During this phase the Late Iron Age to Early Roman boundary ditch (42121) was at least partially re-cut (42023). This recut contained two fills, yielding animal bone, coal and Early Roman pottery.

A second ditch in the eastern part of the site (42123) ran from north-east to south-west. Its upper fill contained animal bone, Romano-British pottery (3.3kg) and two fragmentary iron nails. The pottery included 38 residual sherds from a Middle Iron Age round-shouldered jar (Fig. 17, No. 1). This feature was probably a boundary or enclosure ditch, albeit on a different alignment than the ditch to the west.

Scattered across the site but largely confined between ditches 42023 and 42123 were numerous small to moderately sized, sub-circular to elongated oval pits and postholes, one of which (42048/42037) blocked or reduced the width of the

entrance gap between ditches 42068 and 42121. Some features had traces of silting/weathering at the base. The backfills typically contained animal bone and pottery of Late Iron Age to Early Roman date, with a few containing slag. Pit 42082 also yielded an iron nail and an awl or punch (Fig. 12, SF 42516); pit 42012 contained another nail, while pits 42044, 42064 and 42079 contained metal working waste, including coal, iron slag and fuel ash slag.

At the southern edge of the site was a more substantial circular rubbish pit (42127). Its seven fills (Fig. 8) were variations of sandy clays, representing a mixture of silting, slumping and deliberate backfills. These contained relatively substantial quantities of finds including animal bone, ceramic building material, daub, slag, the ribbed handle of a glass bottle (of 1st- to 2nd-century date) and Iron Age to Early Roman pottery (3.5kg). Samples produced low levels of plant macrofossils, including a single grain of germinated wheat: wheat, as well as barley, was commonly malted prior to brewing during this period although germination could also have occurred as a result of inadequate storage conditions.

Lying to the north of the ditched boundary (42068=42023) was a timber-lined well (42014 (Fig. 9), the fills of which contained 2.5kg of Late Iron Age and Early Roman pottery (183 sherds). Its form suggests a domestic, rather than agricultural, function indicating that settlement lay nearby. The construction cut was sub-circular in plan, measuring 3.30m wide and 2.90m long, and was 2.90m deep with steep, straight, near vertical sides and a narrow flat base. Its basal fill (42139) consisted of sticky/plastic dark greyish blue clay that appeared to be alluvially derived: it also had a high organic content. Placed into the centre of the well above this deposit and 0.65m above the bottom of the pit was a structure (42140) made from oak timbers which consisted of three elements. The first was a supporting structure or 'cradle', comprising four timbers forming a rectangle, which were set into a step within the pit. This created the foundation for a square timber frame, measuring 0.80m wide and long, which consisted of 30 straight timbers and was preserved to a height of eight courses (0.86m tall). Thus, the structure survived to roughly half way up the pit, a total height of 1.50m. At some time during its life this timber framework had

collapsed on its western side and had been shored up with six supporting timbers. Once complete, the entire timber structure (which would have originally existed to ground level) was lined with a thin layer of clean clay serving as damp proofing. When the lining was in place, the c.1.10m wide gap between the construction cut and the outer face of the wooden frame was backfilled with soft, mottled orange, greyish blue silty clay (42126). This deposit contained moderate quantities of animal bone and Romano-British pottery, as well as a copper alloy point of uncertain function (Fig. 12, SF 42513) and a pierced iron weight (Fig. 12, SF 42512).

Once the well had fallen from use, the shaft was largely allowed to silt up naturally. The initial fill above the base of the timber frame (42145) was very similar to the basal fill (42139), although a little darker and less organic. It was followed by a similar silty fill (42144). Its uppermost fill of soft, yellow grey, clay (42143, not illustrated) contained a little animal bone and Late Iron Age to Early Roman pottery. Samples taken from various fills contained plant remains, providing data on the local habitat (Fryer, below).

Surrounding the well was a 0.40m thick layer of trampled material, which probably accumulated during its construction and use. This material (not illustrated) covered an area of roughly 7.20m x 6.50m, and contained a little Late Iron Age pottery. Cutting into the top of the well was a later pit or waterhole (42135, Fig. 9), which may simply have been the result of slumping into the underlying feature. It contained a fragmentary iron chain (Fig. 12, SF 42518), which perhaps related to the use of the well, and a Roman grog- and sand-tempered jar with a post-firing hole in the neck (Fig. 18, No. 11).

Lying just to the south of the well, a heavily truncated grave (42114, Fig. 8) contained the remains of an adult (sk. 42112), laid out extended and supine, with its head to the north. The bones were extremely degraded and fragmented, with less than 25% of the individual remaining. The lower fill of the grave (42113) yielded a bone clasp knife handle of 2nd- to 3rd-century (or later) date, possibly incised with a Chi-Rho or other symbol (Fig. 15, SF 42506): if the former suggestion is correct, a 4th-century date would be indicated for the burial (see Faine, below). Also associated with the burial were 89 sherds from two Roman coarse-

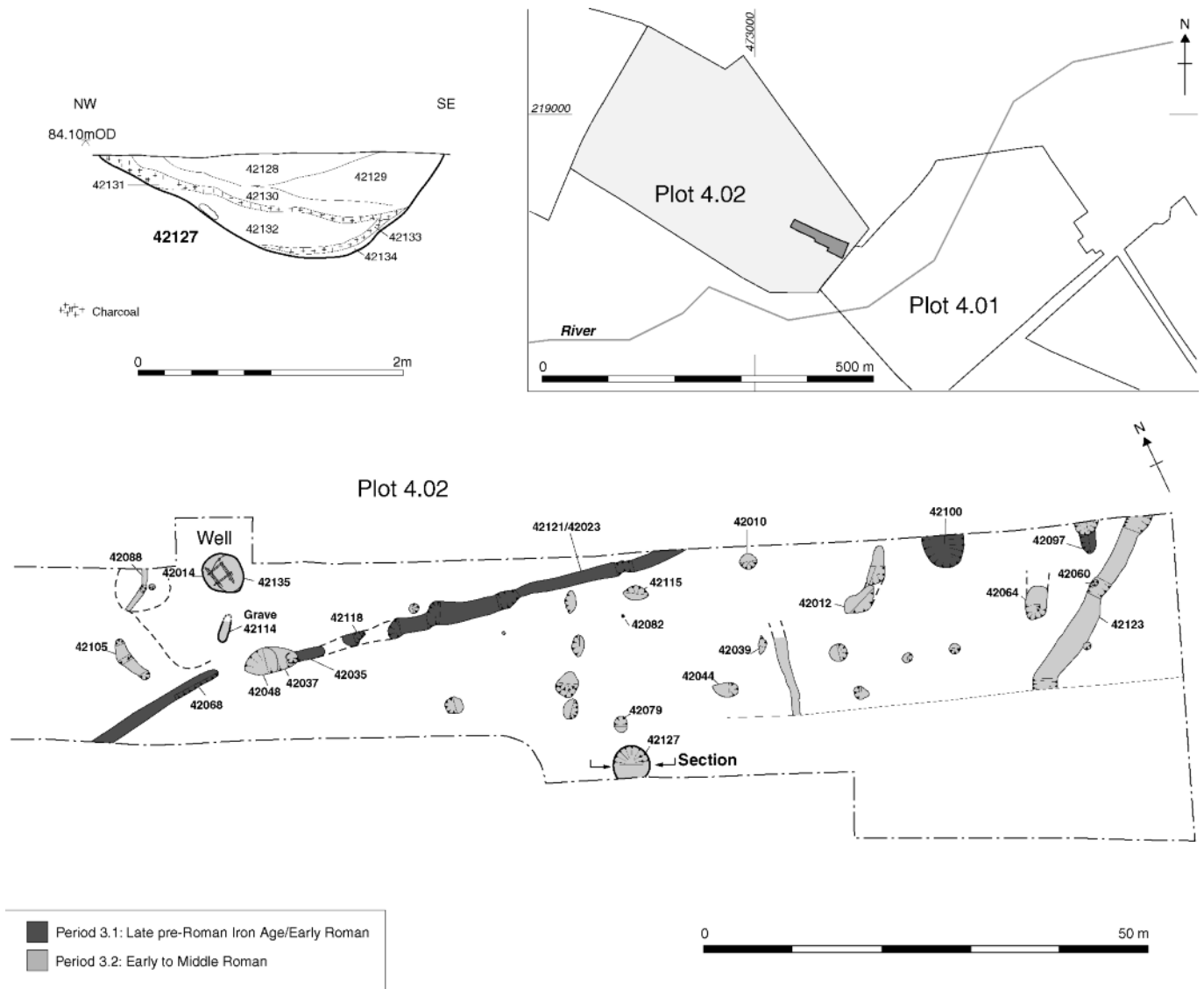
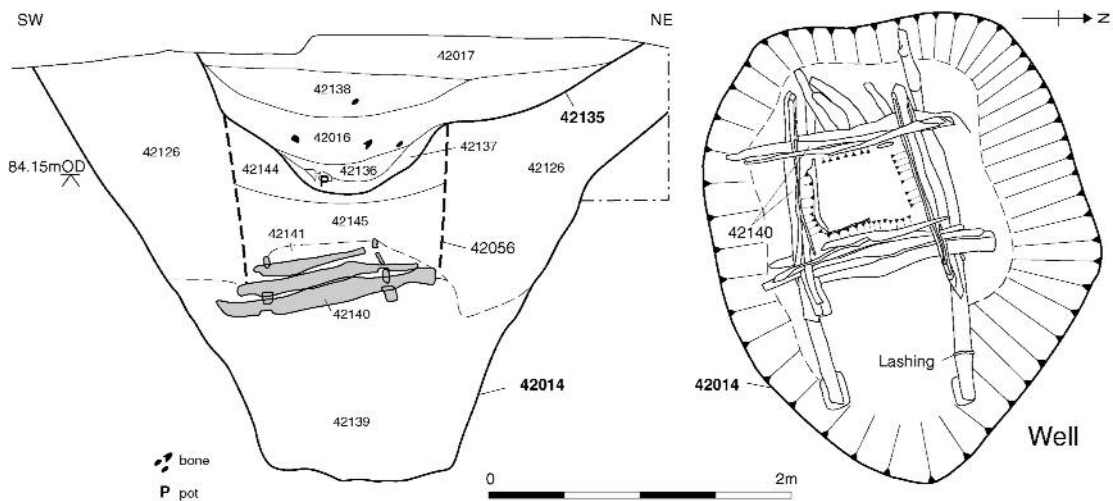
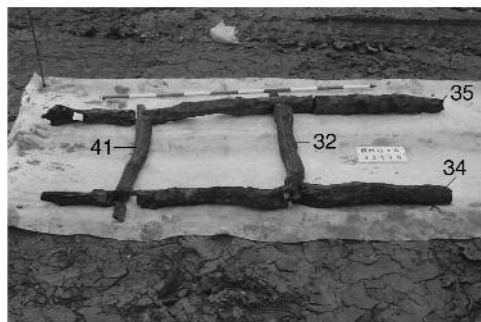


FIGURE 8 Site plan of Plot 4.02, showing section across pit 42127



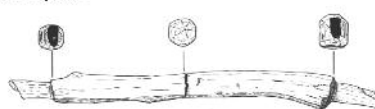
Well lining, looking north



Well base plate



Timber 41



Timber 32



Timber 35



Timber 34



FIGURE 9 Plot 4.02: constructional detail of well 42014

ware vessels (44g): the low sherd weight and poor condition may suggest accidental incorporation into the grave fill, rather than disturbed grave goods.

A small, curvilinear ditch lay in the western part of the site (42088), perhaps indicating the presence of a minor enclosure. Another small ditch or elongated oval pit lay just to the south (42105) and contained a few small fragments of Early Roman pottery.

Plots 5.03, 5.04 & 5.05 (Fig. 10)

No evidence of Middle to Late Roman activity was found in Plot 5.05. In contrast, settlement appears to have remained constant within Plot 5.03-04, with the reworking of previously established boundaries. On the basis of the pottery recovered from its fills, ditch 6638 remained in use during the 2nd century. The ditches lying immediately to the east, within the boundary, were altered. A new ditch (6655) reflected earlier alignments, but unlike its predecessor, terminated after approximately 12m. In conjunction with ditch 6580, which was aligned parallel with ditch 6638, these features formed a small enclosure, whose south-east facing entrance was formed by the termini of the two internal ditches.

In the central part of the site was a slightly curving and steep-sided gully (6344) lying in relative isolation, which may have formed part of a fence line or pen for animal husbandry.

Towards the eastern limit of the excavation lay two possible boundary ditches (6422 and 6339), mirroring the alignment of the settlement's western boundary and perhaps suggesting that the former track may have remained in use and been widened at this date. The larger of the two (6422) yielded Roman pottery. It also contained a Roman tumbler-lock lift-key (Fig. 14, SF130). These finds suggest the presence of a nearby building.

Period 3.3: Late Roman (AD 200–410)

Plot 4.02 (NAL)

A single sub-circular Late Roman pit (42003) lay 3m to the north-west of the main excavation area. Its basal fill produced a little Late Romano-British pottery, while its upper fill contained a few sherds of intrusive Saxo-Norman pottery (10th-11th century). The general lack of Late Roman features in the vicinity suggests that settlement had shifted or declined by this period.

Plots 5.03, 5.04 & 5.05 (OAE, Figs 10 and 11)

In contrast, activity at Plots 5.03-04 began to increase during the 3rd century, peaking in the 4th century, before the site was eventually abandoned. The Late Roman period is discussed below in relation to these three phases of activity.

Phase 1: Occupation and Use (Figs 10 and 11)

a) Enclosures and Related Features

As in the preceding periods the western limit of the settlement appeared to be demarcated by ditch 6638; a fragment of an armlet dating to the 4th- (to early 5th-) century (Fig. 13, SF 166) recovered from its upper fills attests to the fact that it remained open during this time. A single posthole (6600) lay immediately to the west of the ditch 6638. There was some evidence for post packing at its base, which contained Late Roman Oxford and grey wares and residual fragments from a Late Iron Age, grog-tempered jar with horizontal tooling (Fig. 17, No. 5). To the east of ditch 6638 was a small gully (6631) running perpendicular to the western boundary, before turning southwards for a further 8m.

On the inner (eastern) side of boundary ditch 6638 was an area of extensive pitting. This comprised a series of intercutting pits (6665, *etc*): although slightly irregular in plan, a single tertiary fill (6668) spanning the entire sequence suggests that the excavation of this feature represented a single event, possibly for clay extraction. A total of 1.92kg of brick and tile was recovered, together with an assemblage of Late Roman pottery totalling 2.35kg. This included a near-complete Oxford white ware bowl (SF143, Fig. 18, No. 21), a sherd of stamped Samian (Fig. 19, No. 6), a sherd of a Black Burnished ware jar (Fig. 18, No. 10) and 7 sherds of a grey ware bowl with horizontal burnishing. Of note amongst the other pottery were sherds of a grey ware bowl (Fig. 18, No. 19), an Oxford white mortarium (Fig. 18, No. 23) and a very coarse shelly ware jar.

A similar pit sequence (6641) lay 15m to the east, inside the minor enclosure. The ceramic assemblage was also of Late Roman date (2.43kg). A Hertfordshire Puddingstone quern was also found and is likely to date to the 1st century AD. A *nummus* of Constantine I from the upper fill (6639, SF 138) dates to AD 310–13.

Two other pits lay to the north of the buildings

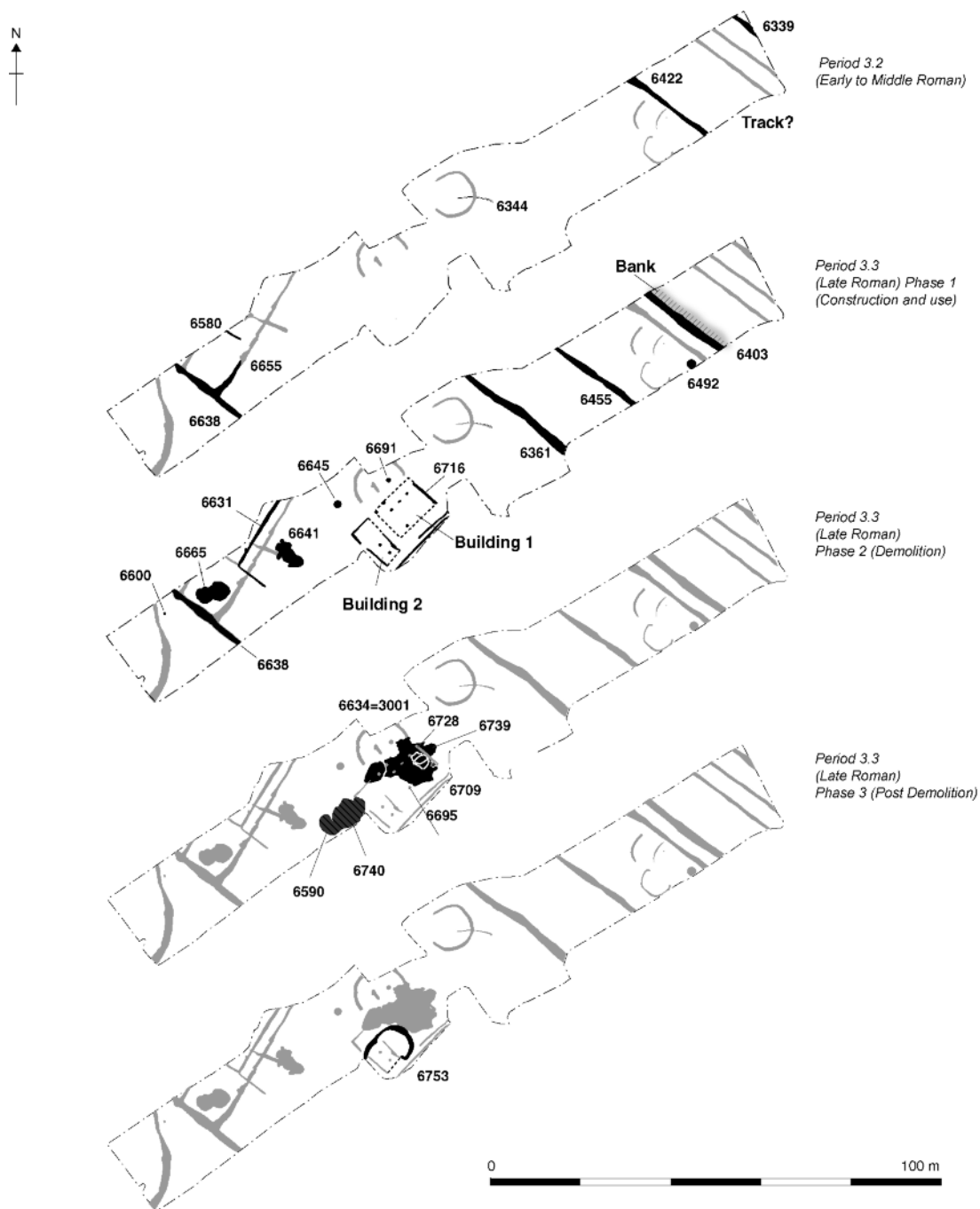


FIGURE 10 Site plan of Plot 5.03-04, showing the Early to Middle Roman and Late Roman phases (Periods 3.2-3.3)

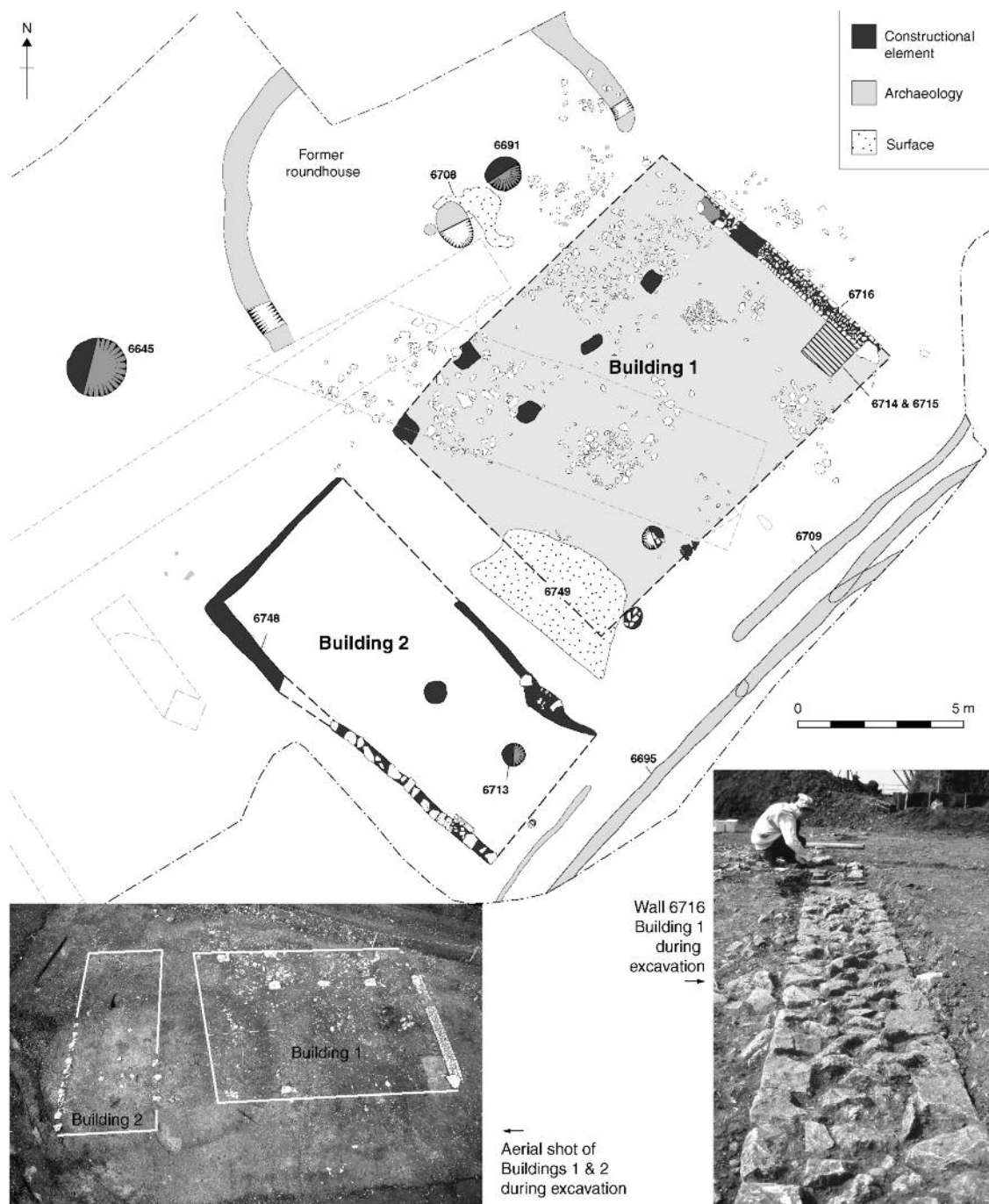


FIGURE 11 Plot 5.03-04, showing constructional details of Late Roman Buildings 1 and 2

detailed below. Pit 6645 contained a relatively substantial quantity (2.4kg) of Late Roman pottery. An illegible 4th-century coin (SF 139), an iron fitting and 1.30kg of animal bone were also recovered from its single homogeneous fill. Pit 6691 had a banded fill sequence, the uppermost of which was charcoal rich. Finds comprised Late Roman pottery, box flue tile, *imbrices* and *tegulae*.

b) Buildings and Related Features

Close to the centre of the site were the remains of a fairly substantial building (Building 1, Figs 10 & 11). These were masked by a significant layer of collapsed material including Roman roof tiles and brick (layer 6634, see Phase 2 below). The most substantial surviving part of the building was its eastern wall (6716), which was aligned north-west to south-east and was 7.5m long by 0.6m wide. It consisted of faced blocks with a limestone rubble core, set within a foundation cut (6718) which, although not fully excavated, was at least 0.30m deep.

Abutting the southernmost corner of the surviving wall were two heavy clay packing/levelling layers (6714 and 6715) that probably formed the base for a floor. A hinge and a strap terminal were recovered from layer 6714. A near-complete small black burnished ware bowl (Fig. 18, No. 22), dating to the early 3rd century was recovered from layer 6715: the vessel was broken and several fragments were coated in a carbonised residue. Chaff, cereal grains and charred peas found within the pot may have been burnt after they had been placed in the vessel (Fosberry, below).

Lying to the south-west of wall 6716 were six post pads. These were not excavated but were capped by single flat-faced pieces of stone on average 0.70m by 0.70m across. Three of the post pads extended in a line at right angles to the northernmost corner of wall 6716, with two more lying parallel, to the north-west: these appeared to mark the north-western side of the building's footprint. These structural elements were spaced on average 2m apart. The remaining post pad lay to the south, demarcating the south-western corner of the structure and suggesting building dimensions of 7.50m by between 9.60m and 12.80m.

The subsequent extent of destruction deposits (Fig. 10, Phase 2) may also be an indicator of the overall size of the building, suggesting that its footprint did not extend much further than the post

pads. Several stone roof tiles were recovered from the destruction deposits: such tiles became more common from the mid 2nd century AD onwards, suggesting a Middle to Late Roman date for the building's construction. In addition, a large number of box flue tiles, bricks and other ceramic building material came from the subsequent destruction layers (6634 and 6709, see Phase 2), indicating the nearby presence of a hypocaust (see Shaffrey, below).

To the south-west of Building 1, lay several sections of another wall (6748; Building 2) on the same alignment as Building 1 but set a right angles to it. In plan the walls encompassed an area of approximately 6.20m by 11.00m. Wall 6748 was of inferior construction: the building stone was of irregular size, unfaced and in places the wall was a single course thick. Lying along the centre line of the building's long axis were two circular post pits, spaced 2m apart. One remained unexcavated, the second (6713), was 0.67m wide with two homogeneous, sterile fills.

Immediately to the north of Building 1 was the remnant of a metalled surface (6708), consisting of small, smooth worn cobbles. Further evidence for possible external floor surfaces was recorded between Buildings 1 and 2 where a layer of coarse gravel (6749) overlay the natural deposits. This extended into the footprint of Building 1, suggesting a possible entrance or that this part of the building was open ended.

c) Boundary Wall?

Two parallel linear features were recorded to the south of the buildings. The northernmost terminated close to the south-west corner of Building 1, less than 2m to the south, while the second feature continued beyond the limit of the excavation to the east and west. Neither was excavated but they were similar in width to the foundation cut of wall 6748 and may represent the basal elements of foundation trenches, perhaps for a boundary wall enclosing the buildings.

d) A Field System?

The eastern side of the settlement now housed three parallel ditches (6361, 6455 and 6403, Fig. 10): these presumably formed elements of a field system that extended beyond the limit of the excavation, but which evidently lay within the settlement enclosure, perhaps with a track still running

to its west. The new ditches were all considerably larger than their predecessors. Later fills of ditch 6455 contained Late Roman pottery, including a roller stamped/decorated jar in soft pink grog ware. Several nails and a bar fragment in dense iron, perhaps an offcut from a smith's blank (Fig. 14, SF 218) were also recovered. The primary fill of ditch 6403 comprised redeposited natural material slumped along the eastern side of the profile that may indicate the presence of a bank on its eastern side. Its fills yielded a coin of Constantinopolis dating to AD 330–335 (SF 120) and an illegible issue of AD 364–378 (SF 119). Other finds included Late Roman pottery and a relatively large assemblage (1.51kg) of animal bone, mainly cattle.

Within the putative fields was a large pit (6492), which produced Late Roman pottery (1.37kg), along with several pieces of building stone, possibly associated with Building 1. The pottery included several notable vessels, including a tiny jar or beaker in orange oxidised ware, a necked jar (Fig. 18, No. 13), and a narrow-necked pink fine ware flagon (Fig. 18, No. 15), a coarse grey ware bowl (Fig. 18, No. 17) and a Nene valley greyware bowl (Fig. 18, No. 20).

Phase 2: Destruction and Disuse (Fig. 10)

Lying above the remnants of Building 1 were *in-situ* destruction deposits, sealing the footprint of the building where they had fallen. In addition, there was evidence for post-depositional dispersal of material, probably by ploughing, over a wide area. Layer 6709 lay over the eastern part of the structural remains and had a noticeably high concentration of roofing stone (Shaffrey, below). Large quantities of ceramic building materials were also recorded in this layer, of which 8.94kg were sampled (Wells & Slowikowski, below).

As described above, the subsequent destruction layer (6634, recorded as 3001 during the evaluation) encompassed the entire area of Building 1. Large quantities of pottery (7.96kg), ceramic building materials (31.23kg), metalwork and stone were found in this layer, which was between 0.10m and 0.20m thick. This deposit represented a conglomeration of topsoil and material derived from the building that had been mixed by later activities. The pottery includes a fine grey ware vessel sherd reshaped to form a disk, a soft pink grog ware storage jar with a very large roll rim

(Fig. 18, No. 14) and from 3001, a sherd of stamped Oxford colour coat (Fig. 18, No. 24). Five coins were recovered from the deposit. Those from layer 6634 comprise a residual *as* of Vespasian (SF 146), a coin of Valens dating to AD 367–375 (SF 179) and an illegible issue dating to 364–378 (SF 165). The two coins from layer 3001 are also of Late Roman date: issues of Valentinian I (AD 367–375, SF 7) and the House of Valentinian (AD 364–378, SF 8).

The animal bone assemblage from layers 6634/3001 (>2.5kg) consists largely of adult cattle lower limb bones with half of them showing evidence of butchery. A smaller number of butchered horse, pig and sheep/goat remains were also recovered.

The large assemblage of ironwork (totalling 164 items from contexts 6634/3001 alone) includes many nails and nail shanks of varying form, including examples with anchor-shaped and square heads and other items in sufficient quantities to suggest that this may have been debris from a smith's workshop (Crummy, below). This may be corroborated by the presence of a possible smith's blank from ditch 6455. Amongst the non-nail items was a swivel loop (Fig. 14, SF 160), two rings (*e.g.* Fig. 14, SF 204) and a strap fragment.

Two pieces of worked stone were recovered from destruction layer 3001 (=6634), comprising a small piece of deliberately squared sandstone which may have served as a counter and a large chunk of shelly limestone, possibly used as a weight.

Close to the north-eastern wall of the building (6716) was a layer (6695) distinguished by a larger concentration of tile. This was overlain by a patch of burnt material (6728), comprising burnt clay, fire-cracked stone and ceramic building material. It is possible that this indicates the position of a hearth/fireplace within Building 1.

There was far less destruction material in evidence around Building 2, which may suggest that it was of less substantial form. Two hollows (6590 and 6740) to the west of the building contained mixed brown black silt clay. These deposits yielded an assemblage of Roman brick and tile, pottery and animal bone weighing in excess of 2kg; of note were several pieces of metalwork including a punch with a burred head (Fig. 14, SF 199a). Two coins were found: one is of Valens (SF 134) and dates to AD 375–378 and the other is illegible, dating to AD 364–378 (SF 135).

Phase 3: Post-Destruction (Fig. 10)

After the demise of the buildings it appears that the site was largely abandoned. The only evidence for later activity was a sub-circular enclosure (6753) with a south-facing entrance: this structure truncated both Building 2 and one of the postpads associated with Building 1. A few sherds of Late Roman pottery were recovered from the ditch, but may have been residual.

THE FINDS

Worked Flint by Hugo Lamdin-Wymark

A small group of 34 residual worked flints and six burnt flints was recovered from the pipeline sites. A few items from Plots 0.01, 0.10 and 4.02 are the product of a blade-orientated industry of Mesolithic date, but the majority of the debitage derives from a Neolithic or Bronze Age flake-based industry. A single retouched artefact of this date was recovered: an end and side scraper from Plot 2.05.

Roman Coins by Adrian Popescu

The 16 Roman coins retrieved from Plots 5.03-5.04 commence in the reign of Vespasian and end in the second half of the 4th century: the majority belong to the 4th century (13 coins) with a clear concentration (50% of the site total) in the period AD 364-78. This confirms other evidence that the main occupation of this site falls in the Late Roman period. The earliest coin is a worn *as* of Vespasian (SF 146) and is residual, having been recovered from a context (6634) relating to the destruction of Late Roman Building 1. The other Early Roman coin (SF 180) is unstratified and very worn, its condition suggesting a possible loss date in the middle 3rd century. Four further coins relating to the destruction of Building 1 (context 6634/3001; SF 7, 8, 165 and 179) were produced between AD 364-78, providing a useful *terminus post quem* for this event. Since the majority of the coins from this part of the investigation are from this period, an increased level of coin loss is suggested at this time, reflecting higher availability of low face value coins on the site. The increased incidence of coin loss in the period AD 364-378 suggests a potential change in the way this area of the site was

used, illustrating intense activity towards the end of the 4th century.

Two further coins came from the same unstratified context (42001) in Plot 4.02. These are an irregular *as* of Caligula struck in the name of Agrippa some time after AD 37 and a copy of a mid 4th-century coin. The unworn condition of the earlier coin may indicate activity of the mid 1st century in the vicinity.

CATALOGUE OF COINS
(in chronological order)*Plot 5.03-04*

- SF 146** Vespasian. *As*, 69-79, illegible type. Plot 5.03-04. 6634, destruction of Building 1, Period 3.3, Phase 2
- SF 180** Illegible emperor. *As*, 1st or 2nd century. Plot 5.03-04. Unstratified
- SF 181** Tetricus I. Radiate, Irregular mint, 271-274, as Cunetio 3015. Plot 5.03-04. Unstratified
- SF 138** Constantine I, *Nummus*, Trier, *officina* P, 310-313, RIC VI, p. 227, no 870. Plot 5.03-04. 6639, fill of pit 6641, Period 3.3, Phase 1
- SF 120** Constantinopolis, *Nummus*, Illegible mint, Victory on prow, 330-335. Plot 5.03-04. 6401, fill of ditch 6403, Period 3.3, Phase 1
- SF 175** Constantius II, AE2, Trier, *officina* P, 348-350, RIC VIII, p. 153, no 220. Plot 5.03-04. 6739, destruction of Building 1, Period 3.3, Phase 2
- SF 174** Constantius II, AE2, Trier, *officina* P, 353-354, RIC VIII, p. 167, no 350. Plot 5.03-04. Unstratified
- SF 139** Illegible emperor, Irregular AE 3, after 353/4, FEL TEMP REPARATIO (FH 3), 12mm. Plot 5.03-04. 6644, fill of pit 6645, Period 3.3
- SF 7** Valentinian I, AE 3, Arelate, Illegible *officina*, 367-375, RIC IX, p. 66, no 17a.XIVa or b. Plot 5.03-04. 3001, destruction of Building 1, Period 3.3, Phase 2
- SF 134** Valens, AE 3, Arelate, *officina* P, 375-378, RIC IX, p. 66, no 18a.XVa. Plot 5.03-04. 6589, fill of hollow 6590, Period 3.3
- SF 179** Valens, AE 3, Rome, *officina* PRIMA, 367-375, RIC IX, p. 121, no 24b.IXa. Plot 5.03-04. 6634, destruction of Building 1, Period 3.3, Phase 2
- SF 101** Illegible emperor, AE 3, Illegible mint, 364-378, GLORIA ROMANORVM. Plot 5.03-04. 6311, fill of pit 6312, unphased
- SF 119** Illegible emperor, AE 3, Illegible mint, 364-378, GLORIA ROMANORVM. Plot 5.03-04. 6401, fill of ditch 6403, Period 3.3, Phase 1
- SF 165** Illegible emperor, AE 3, Illegible mint, 364-378, GLORIA ROMANORVM. Plot 5.03-04. 6634, destruction of Building 1, Period 3.3, Phase 2

- SF 8** Illegible emperor, AE 3, Illegible mint, 364–378, SECVRITAS REIPVBLICAE. Plot 5.03-04. 3001, destruction of Building 1, Period 3.3, Phase 2
- SF 135** Illegible emperor, AE 3, Illegible mint, 364–378, SECVRITAS REIPVBLICAE. Plot 5.03-04. 6589, fill of hollow 6590, Period 3.3

Plot 4.02

- SF 42503** Gaius in the name of Agrippa. Irregular *as*, struck after 37, as RIC I², p.112, no 58. Plot 4.02. 42001, unstratified
- SF 42504** Illegible emperor, Irregular AE 3, after 353/4, FEL TEMP REPARATIO (FH 3 or 4), 12mm. Plot 4.02. 42001, unstratified

Metalwork from Plot 4.02 by Nina Crummy

The only metalwork of note from the NAL excavations came from Plot 4.02, most of it deriving from Early Roman deposits assigned to Period 3.2. None of the objects can be closely dated, although a small lead weight from the upper backfill of well 42014 is Roman (SF 42152). From the same fill came a copper-alloy point with cross-head tip (SF 42513). No parallel for this object has been found, but its association with domestic refuse suggests a household origin. Iron-impregnated clay from the lower backfill of the well (defined as a void left by a decayed iron spike and a short length of wood from the same area) may be part of the same object. A shattered chain (SF 42518) with open figure-of-eight-shaped links came from pit 42135, above the well (42014). Although few links are complete, some fragments are joined by more than two others, suggesting that the chain formed part of a complex suspension mechanism of some kind, perhaps even part of the lifting gear of the well.

The other objects are a small iron awl from pit 42082 (SF 42516), a few nails from various features and some scrap ironwork from ditch 42062. The awl provides evidence for leather-working nearby.

CATALOGUE OF ILLUSTRATED ITEMS (FIG. 12)

- SF 42512.** Pierced plano-convex lead **weight**. Diameter 14mm, height 8mm; weight 9.85g. Plot 4.02. Context 42126, fill of well 42014. Period 3.2
- SF 42513.** Copper-alloy **point fragment** with cross-head tip. Length 51mm. Plot 4.02 Context 42126, fill of well 42014. Period 3.2
- SF 42518** One hundred and twenty-three fragments from an iron **chain** with open figure-of-eight-shaped links

62mm long and 24mm wide. The majority of pieces are small fragments, and the original number of links present cannot be estimated. Plot 4.02. Context 42017, upper fill of pit 42135. Period 3.2

- SF 42516** Small iron **awl** with thin tang and rectangular-section shank tapering to a blunted point. Length 49 mm. Plot 4.02. Context 42083, fill of pit 42082. Period 3.2

Metalwork from Plot 5.03-5.04 by Nina Crummy

Bronze Age

An unstratified blade fragment is almost certainly of Middle Bronze Age date (SF 116). Too little remains for it to be identified as coming from either a dirk (<300mm long) or a rapier (>300mm long), or for it to be closely dated (Burgess & Gerloff 1981, 4–5, pl. 134). The conventional division of Middle Bronze Age blades into dirks or rapiers implies that they were used as weapons, but they may instead have been ceremonial items that expressed the status of an individual or group (*ibid.*, 5; Needham 1990, 248–9). The surface condition of a large copper-alloy ring (SF 176) found nearby is very similar to that of the blade fragment, suggesting that this too is a Middle Bronze Age piece.

CATALOGUE OF ILLUSTRATED ITEMS (FIG. 13)

- SF 116** The tip of a copper-alloy **blade** with worn midrib. Length 90mm, maximum width 36mm. Both sides are damaged along their length, with little if any of the original edges remaining. The semicircular notch on one side is a fracture, not part of a rivet hole. Plot 5.03-04. Unstratified
- SF 176** Large copper-alloy **ring** of slightly flattened circular section. Diameter 47mm, section 4 by 5mm. Plot 5.03-04. Unstratified

Late Iron Age and Roman

Cremation 6525

The only items from this burial, found in Plot 5.05, are a small stud, at least 71 iron hobnails, over 20 iron nails and many nail shank fragments representing further examples. The group is typical of 1st- or 2nd-century AD cremations. The nails and stud may have derived from wooden pyre goods, such as chests of other small pieces of furniture, or from timber used to construct the pyre. The high

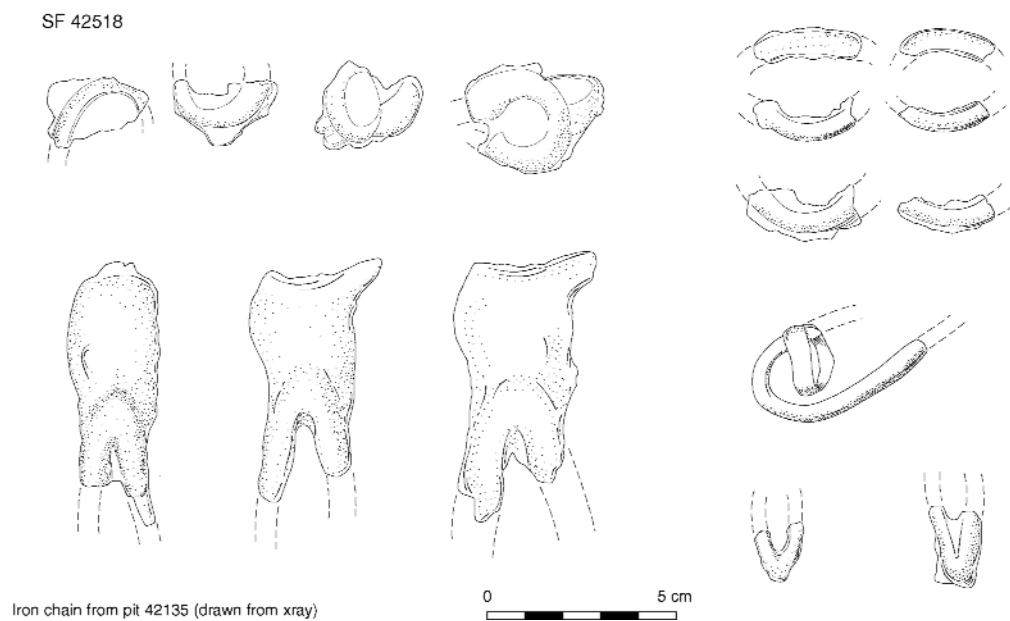
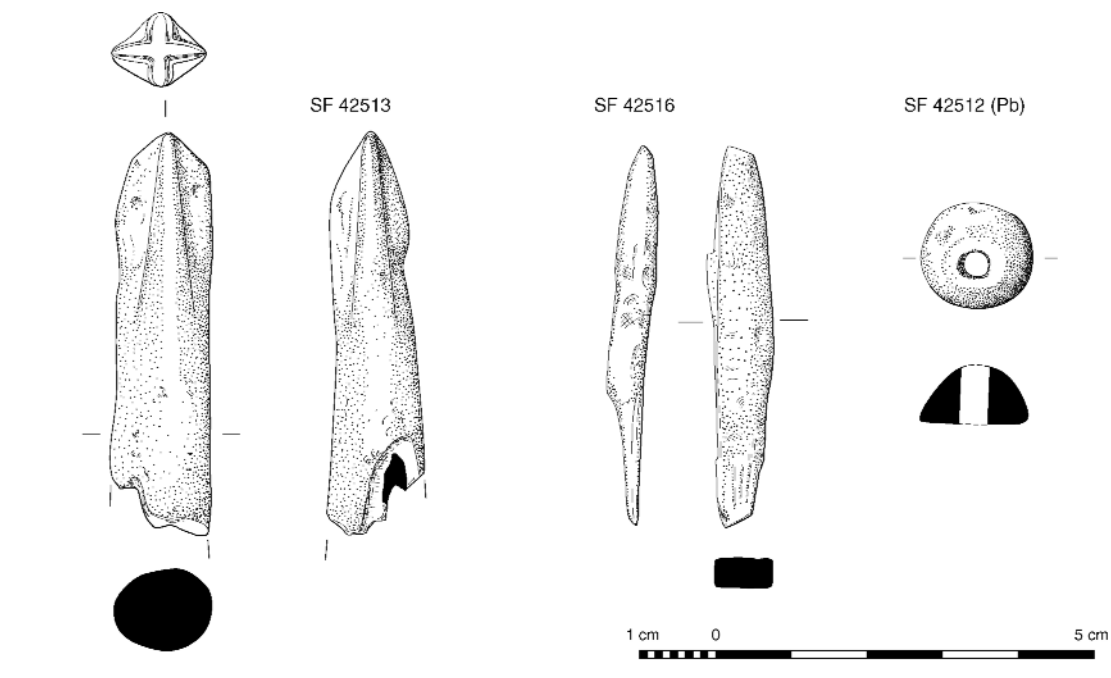
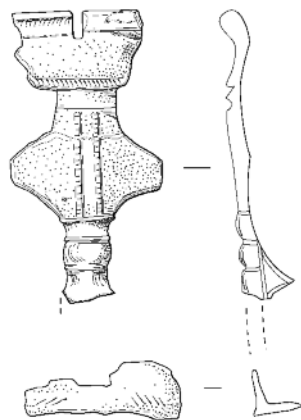
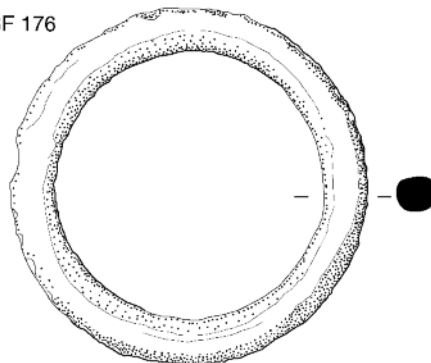


FIGURE 12 Metalwork from Plot 4.02. Scale 1:1 and 1:2

SF 137

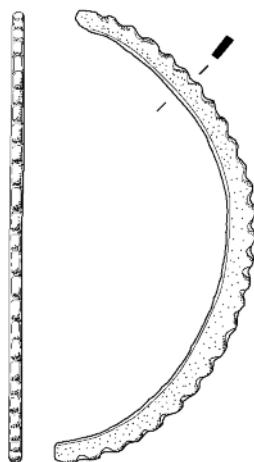


SF 176



Stippling indicates patina still visible

SF 166



SF 116

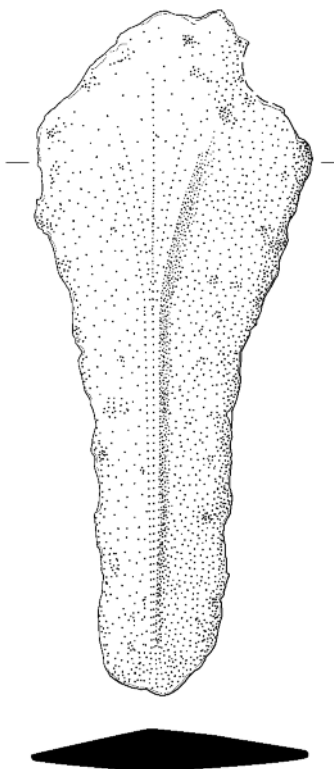


FIGURE 13 Copper alloy objects from Plot 5.03-04. Scale 1:1

number of hobnails points to the deceased being burnt wearing shoes or boots with the soles either nailed in a complex decorative fashion or completely covered with hobnails (Rhodes 1980, 105, fig. 59). It has often been suggested that nailed footwear in a burial was symbolic of the journey to the afterlife (e.g. Henig 1984, 199; Philpott 1991, 73), largely based on what appeared to be the comparative rarity of hobnails in burials giving them disproportionate emphasis and ignoring the contemporary evidence that the dead were fully dressed when burnt (Toynbee 1971, 44–50). More recently, an increased use of sieving cremation fills and X-raying ironwork has shown that hobnails are much more common than previously believed and that, where none were found, either the deceased wore stitched or thonged footwear instead of nailed, or that no hobnails were picked out from the cooled ashes to be placed in the burial pit (Mould 2004, 392; Crummy 2011, 4).

Dress Accessories

The dress accessories from Plots 5.03-04 range in date from the mid 1st to 4th century. The earliest item is a Hod Hill brooch dated to c. AD 43–60/5 (SF 137) that was found in the fill of a Late pre-Roman Iron Age ditch. Hod Hills were first introduced to Britain at the conquest and often have strong military associations, but they also occur on civilian sites such as *Verulamium* and Baldock (Waugh & Goodburn 1972, 116, nos 14-16; Stead & Rigby 1986, 120, nos 112–20). The latest piece is a fragment of a 4th-century crenellated (cogwheel) bracelet (SF 166), again from a ditch. The fragment belongs to the plain form of this bracelet type and dates to the mid and later 4th century as it lacks the teeth between the crenellations that characterise the form that continued in use well into the 5th century (Bayley & Butcher 2006, 128).

The remainder of the dress accessories are all iron hobnails. There are 17 in total, which represents a very small number compared to the minimum of 71 found in cremation 6525 (see above) and compared to the footfall across the site over several hundred years. They were scattered across the site and the various phases or occupation, but with a small concentration in the upper fill of one of the roundhouse gullies (6322).

CATALOGUE OF ILLUSTRATED ITEMS (FIG. 13)

- SF 137** Two non-fitting fragments from a copper-alloy Hod Hill **brooch** with most of the white-metal plating surviving. The hinged pin is missing. The bow is lozenge-shaped, with a pair of very narrow ridged mouldings running down the centre; both side angles were probably knobbed or pointed but are now broken. Cross-mouldings separate the bow from the foot, which is now separated and damaged. Length 36 mm; foot fragment 19mm. A smaller brooch from Stone has a similar bow with pointed sides (Cotton & Richardson 1941, 141, fig. 5, 2). Plot 5.03-04. 6609, fill of ditch 6610. Period 3.1
- SF 166** Fragment of a copper-alloy **bracelet** with notched edge. Diameter 59mm, section 3 by 1.5mm. Plot 5.03-04. 6636, fill of ditch 6638. Period 3.1

Textile

A copper-alloy shaft fragment from a Period 3.3 pit (6477; SF 128, not illustrated) may be from a needle.

Literacy

Part of an iron stylus came from Period 2.2 layer 6323, which overlay a roundhouse gully (6322; SF 102, not illustrated). This object is of Early Roman or later date, and is a comparatively unusual find from a rural site. The fragment has a narrow eraser, the section changing to round at the break.

The number of styli found on rural sites is not high, although a survey by Hanson and Connolly found many other individual examples on farmsteads and small settlements across southern Britain (2002, 156, table 1). This scant evidence for both literacy and numeracy on Plot 5.03-04 may relate to stock control or accounting by merchants or administrators, rather than for more domestic purposes such as household accounts or the education of the young. It can be contrasted with 30 styli found in the small town of Heybridge in Essex, and with the large number from the baths and *macellum* at Wroxeter, most of were probably associated with commercial transactions (Major 2002; Mould 2000, 115–16, 137–40).

Tools

While various crafts would have formed a major part of the activities of the settlement throughout its life, there are no agricultural tools and only a single smith's punch (see below). The general tools consist

of three knife fragments, one from a Period 2.2 pit and two from Period 3.3 contexts, none of which can be associated with any specific craft activity.

Fittings

A variety of iron fittings and a considerable number of nails form the bulk of the metalwork assemblage. The fittings include a pintle from the fill of a possible haystack gully (6397) in Period 2.2, used to hang a gate or shutter (Fig. 14, SF 118), and two joiner's dogs from other timber structures of some kind, one from Period 3.2 and one from Period 3.3 (SFs 187 and 178). A tumbler-lock lift-key (Fig. 14, SF 130) points to the need to protect property and personal possessions, an indication of at least some degree of economic wealth and status that is not otherwise evident in the assemblage. A damaged bar fragment may be the shank of a second key (SF 123). An iron swivel ring (SF 160) was also found.

The nails are mainly of the most common form found in the Roman period, with a round and slightly convex head and below 150mm in length (Manning 1985, 134, Type 1b). A few different forms are also present: two with a triangular head not wider than the shank, five with a T-shaped head no wider than the shank (*ibid.*, Types 2 and 3), one with a large convex head and one with an anchor-shaped head. Two of the Type 3 nails are complete and, at 121 and 119 mm, were probably part of a single batch made for a specific purpose while the nail with the anchor-shaped head is, at 66mm, a shorter version the large T-clamps with anchor-shaped heads that were used to secure poles or other curved pieces of timber (*ibid.*, 132).

Nails were found scattered across the site and in most periods, but the majority (over 200 nails and many shank fragments), come from the Period 3.3, Phase 2 destruction layer, along with a range of other fittings and miscellaneous ironwork. While this concentration of objects may all derive from the fabric of Building 1, a punch from the same layer (see below) suggests that at least some may be debris from a smithy. This possibility is supported by 84 complete nails from the destruction layer, an unusually high proportion, and the presence within it of both Type 2 nails, three of the Type 3 nails, the convex-headed nail and that with the anchor-shaped head. These complete nails may therefore represent a smithy's unused stock, while the clenched and fragmentary pieces may either have been used in Building 1 or may be scrap

collected for recycling. The few iron tools noted above may also be evidence for recycling.

CATALOGUE OF ILLUSTRATED ITEMS (FIG. 14)

SF 118 Iron **pintle** (hinge pivot) with square-section spike and round-section pivot. Length of both spike and pivot 60mm. Plot 5.03-04. 6396, fill of ring gully 6395 (= 6397). Period 2.2

SF 130 Iron L-shaped **tumbler-lock lift-key**, with two teeth and suspension loop at the top of the shank. Length 140mm. Plot 5.03-04. 6497, fill of ditch 6498 (= 6422). Period 3.2

SF 160 Iron **swivel ring**, with the terminal of the ring wrapped around the shank. Length 85mm, diameter of ring 35mm. Plot 5.03-04. 6634, destruction layer. Period 3.3, Phase 2

Metalworking

Three objects from Late Roman contexts point to ironworking on the site: a punch from the dispersed destruction material 6740 (SF 199a), a probable smith's blank offcut from the upper fill of ditch 6455 (SF 218), and what may be a blank for a knife from the upper fill of ring gully 6319 (SF 121, not illustrated).

CATALOGUE OF ILLUSTRATED ITEMS (FIG. 14)

SF 199a Iron **punch** with slightly burred head and slightly blunted tip. Length 116mm. (6740), layer of dispersed destruction material. Plot 5.03-04. Period 3.3, Phase 2

SF 218 Iron **bar fragment**, probably an offcut from a smith's blank. Length 53mm, width 26mm, 8mm thick. Plot 5.03-04. 6458, upper fill of ditch 6455. Period 3.3, Phase 2

Miscellaneous

Most of the miscellaneous pieces are of iron and many come from the destruction layer. As with the nails and other fittings noted above, they may either have been part of the fabric of Building 1 or dumped material from a smithy.

CATALOGUE OF ILLUSTRATED ITEM (FIG. 14)

SF 204 Iron **ring** of flattened round section. Diameter 28mm. Plot 5.03-04. 6634, destruction layer. Period 3.3, Phase 2

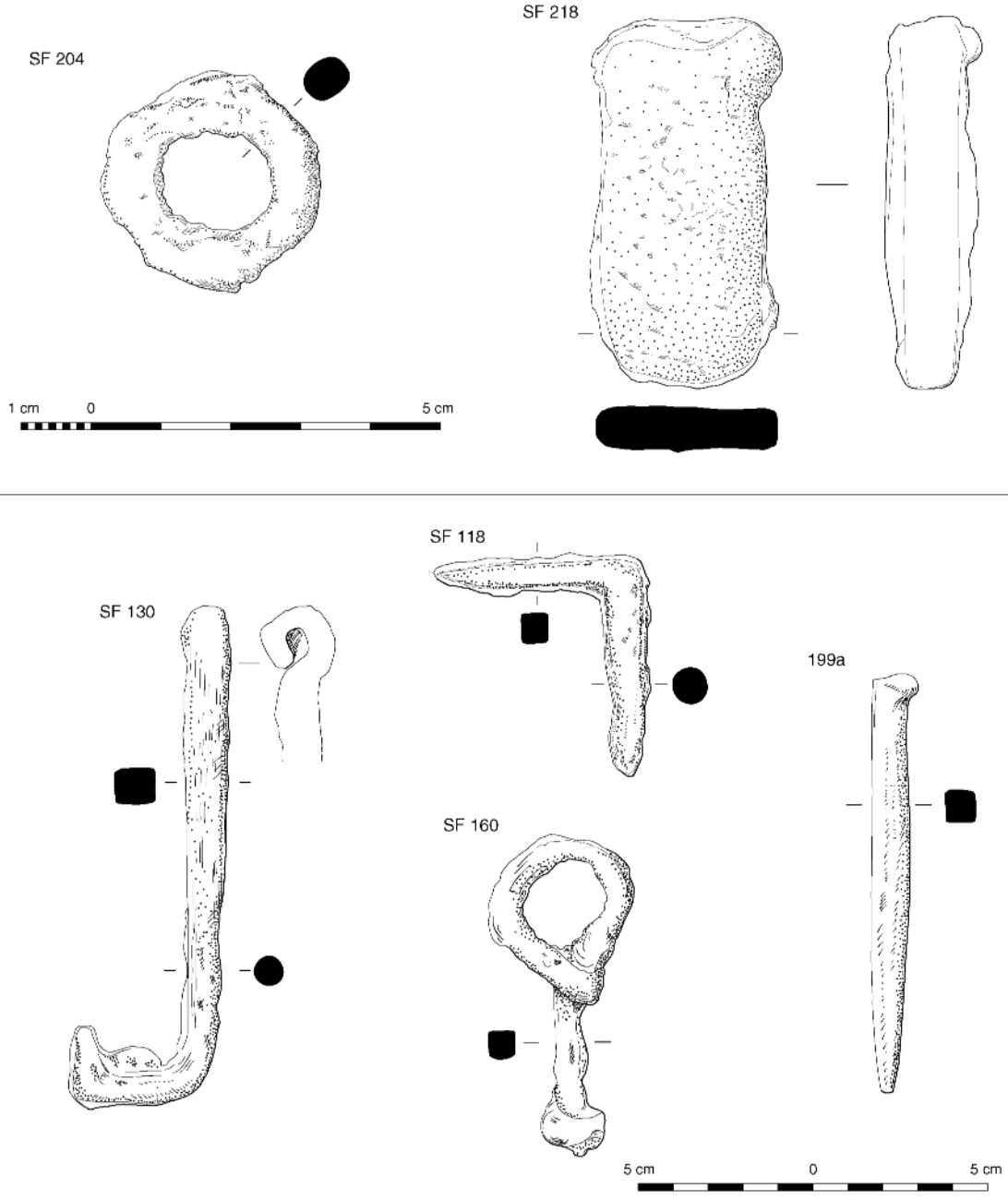


FIGURE 14 Ironwork from Plot 5.03-04. Scale 1:1 and 1:2

Bone Knife Handle by *Chris Faine*

Recovered from the lower fill of grave 42114 in Plot 4.02 were fragments of a bone clasp knife handle (SF 42506 & 42508). Numerous examples of clasp knives displaying varying degrees of ornateness have been recovered from Cologne, with examples similar to that from the pipeline being described as representing stylised military scabbards (von Mercklin 1940, nos 7-8). In Britain, similar examples were recovered from Alchester (Lloyd-Morgan 2001, no 7) and Fishbourne (Cunliffe 1971, no 14). Both of these examples dated from the early 2nd to mid 3rd centuries, but similar items from elsewhere have been dated as late as AD 300–370.

The pipeline handle appears to be decorated with a small symbol (*c.*6mm high), although other marks/scratches are present and its identification is highly tentative: its small size may argue against such in interpretation. The ‘symbol’ is superficially similar to a Chi-Rho (one of the earliest forms of Christogram), although if so it should not show a horizontal line on the left hand side, and the top right hand diagonal is missing, meaning

that identification of the mark remains uncertain. Examples of coins bearing the Chi-Rho symbol have been found in Late Roman graves elsewhere, including examples at Poundbury (Farwell and Molleson 1993), Colchester, Butt Road and Lankhills (Crummy 2010, 65). As well as being used on official coinage and objects associated with the Christian religion, the symbol was also used throughout daily life, being scratched onto items such as vessels, perhaps as a protective symbol or as a mark of ownership (Crummy 2010, 65). The identification of the pipeline item remains equivocal.

CATALOGUE OF ILLUSTRATED ITEM
(FIG. 15)

SF 42506 Five fragments of a bone **knife handle**. L: 392mm. Made from part of a large mammal tibia shaft or possibly scapula (although perhaps a little too thick to be the latter). Fragments of both sides are present along a section of blade 20.3mm in length. The lower part of the handle is missing, while the upper sections of the two main fragments show two carved collars above which a metal collar would have retained the blade. The handle shows traces of an incised design, which has tentatively been identified as a possible Chi-Rho or other symbol. Plot 4.02. 42113, lower fill of grave 42114. Period 3.2

SF 42506

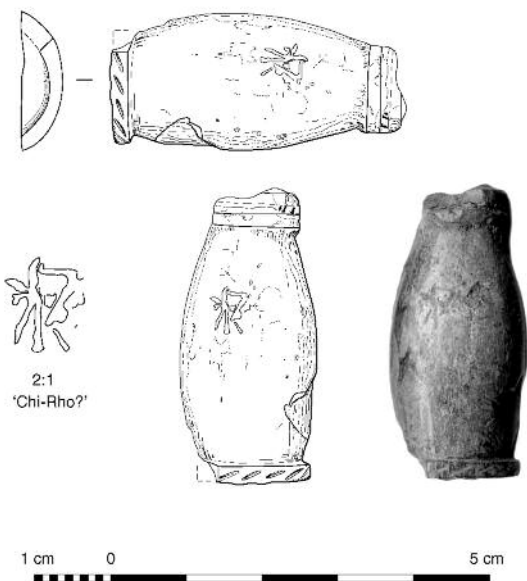


FIGURE 15 Bone knife handle from Plot 4.02. Scale 1:1

METALWORKING DEBRIS

by *Roderick Mackenzie*

Introduction

An assemblage of 44.766kg of iron smelting slag was recovered from the site during the main excavation with a further 18.919kg coming from the evaluation, making a total site assemblage of almost 64kg. Of this, 32.72kg (51%) came from Plot 5.05 and 12.04kg (19%) from Plots 5.03-04. No structural remains of furnaces were found, although the amount and type of slag recovered strongly suggests that smelting was carried out in the immediate vicinity. The recovery of much of the material from a cluster of Late Iron Age pits in Plot 5.05, associated with minor enclosures, may suggest a focus of ironworking here. Plot 0.10a provided possible evidence for a structure associated with Late Iron Age metalworking, while the Late Roman buildings found in Plot 5.03-04

included metal items that may indicate the presence of a smithy (see Crummy, above).

Previous research into the regional variation of pre-industrial smelting slags, and apparent lack of data for slag from the Buckinghamshire area, highlighted the research potential of the smelting slag from the subject sites (Paynter 2006).

Background: Pre-Industrial Ironmaking

During the Iron Age to Romano-British period in Britain, iron was produced using either relatively simple bowl-type furnaces, or shaft-type furnaces known as bloomery furnaces. It is currently thought that bowl-type furnaces were superseded by the more productive bloomery furnaces around the Middle to Late Iron Age period (c.400 BC–AD 50); this technological change is reflected in the archaeological record as, in contrast to bowl-type furnaces, bloomery furnaces typically produced high volumes of tap-slag. The bloomery furnace itself consisted of a vertical clay shaft, estimated to have been around 1 to 1.5m in height. The walls of the shaft were normally over 0.2m thick and the internal diameters of the shafts at their bases appear to have ranged from 0.3m to over 1m (Bayley *et al* 2001, 10).

The physical chemistry of iron smelting in bloomery furnaces is described in detail by Tylecote (1986, 128–131). Temperatures reached inside bloomery furnaces were normally not sufficiently high to produce a fully liquid iron, although there do appear to be occasional exceptions (McDonnell, pers. comm.). During smelting, the iron from the ore would coalesce into a semi-molten rough blob of iron, known as a ‘bloom’. When it was removed from the furnace, the bloom would contain a high volume of entrapped slag and required forging to consolidate the iron into a solid bar or billet of metal. At forging temperatures, the entrapped slag would be in a molten or semi-molten state, and would be squeezed out of the iron. The repeated cycles of forging involved in the manufacture a finished object would typically improve the quality of the iron by reducing the volume of slag present in it; however, although forging could substantially reduce the volume of slag in the iron, small amounts would remain entrapped within the microstructure of the finished object.

By comparing the slag inclusions in finished iron objects against a database of smelting slags

from different regions, it may therefore be possible to provenance iron objects (Paynter 2006; Blake-lock *et al* 2009). At the time of writing, data on the composition of Iron Age to Romano-British smelting slag varies depending on geographic area, and there are substantial gaps where more data is required to make provenancing feasible. A few archaeological sites in Buckinghamshire dating to the same period as the subject site provide evidence of iron-making: Newsetts Wood (HER 012310000), Mantle’s Green Meadow (McDonnell 1992; HER 0029204000), Soulbury (HER 0955600000); Grendon Underwood (HER 0954700001); Taplow (HER 0455100000) and Cholesbury Camp Hillfort (HER 0001603000). Most of these sites produced small quantities of production waste, little of which has apparently been analysed or published.

No roasted ore was recovered from the excavations along the pipeline. Iron ore is found locally within the Whitchurch sand formation dating to the early Cretaceous geological period and outcrops on hills between Aylesbury and Oxford. As the iron ore deposits are comparatively minor, they do not appear to have been exploited in modern times: this may explain the lack of published analyses of the precise source of local iron ores.

Results

The slag assemblage recovered from the excavations consists of approximately 22kg of non-tapped furnace slags and approximately 24kg of tap slag; of this total, just over 26.2kg came from contexts dating to the Late Iron Age (from Plot 5.05), with just over 7.2kg coming from features of the Late Roman period (from Plot 5.03-04). In addition 2.9kg of iron smelting tap slag was recovered from Plot 0.10a, dating to the Early to Middle Roman period. Six specimens of slag were analysed (Table 1) and the results are given in Table 2, which summarises the results of the analysis using a Scanning Electron Microscope with Energy Dispersive Spectrometer (SEM-EDS).

Interpretation and Discussion

The Tap Slag

The sample microstructures are quite typical of bloomery furnace tap slag (Fig. 16, Nos 1 and 2)

and, given their different dates, are remarkably similar. This suggests some continuity in furnace operating conditions. The chemical composition of samples from both Late Iron Age and Late Romano-British contexts are also very similar, and the amounts of certain ‘signature elements’ such as manganese, phosphorus and magnesium, suggest that the same ore source was probably being used throughout the various periods. The amount of iron oxide in the specimens is high, although within the range typically found within bloomery tap slag of this period (Paynter 2006). The low levels of calcium oxide (CaO) detected suggest that significant quantities of lime were not deliberately added to the furnace charge during smelting.

One of the more interesting aspects of this analysis regards the heterogeneity of one of the specimens. In his recent work, Dungworth (2007) suggests that the chemical homogeneity or heterogeneity of slag specimens may be a useful diagnostic indicator of the technological process used in their production; this could be useful where the archaeological context or morphology of the slag makes positive visual identification impossible.

The opportunity was taken to compare the results of the specimens analysed here to the ‘heterogeneity model’ suggested by Dungworth (2007, 3). Table 1 includes a column which gives a heterogeneity figure for each sample (calculated from the weighted sum of standard deviations for each element analysed). Dungworth’s research suggests that the heterogeneity of tap slags tends to be generally very low, *i.e.* $H = 2.1 \pm 0.5$, whereas non-tapping smelting slags tend to have higher values, typically in the 2 to 4 range; although no \pm figure is quoted for the latter range, the heterogeneity value of the non-tapping specimens analysed by Dungworth (*op. cit.*) was $H = 2.4 \pm 1.0$.

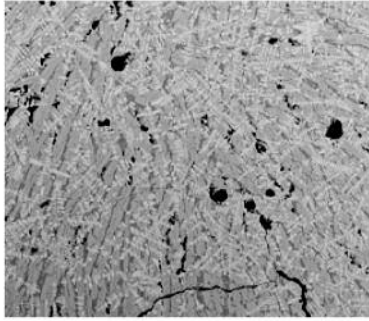
Table 2 shows that the heterogeneity figures for five of the six pipeline samples agree with those mentioned above. However, Specimen D (the only one examined from Plot 5.03-04), which has the classic morphology of a bloomery tap slag, has heterogeneity of 3.49. Given its morphology, it seems surprising that the heterogeneity value of this sample is well within the range expected for non-tapping furnace slags; however, the small number of specimens analysed means that it is

TABLE 1 Samples of metalworking waste

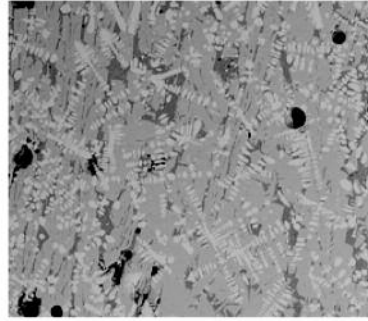
Sample	Context No.	Feature	Plot	Period	Type
A	6513	Enclosure 6508	5.05	2.2	Tap slag
B	6515	Enclosure 6508	5.05	2.2	Tap slag
C1	9125	Pit 9124	0.10a	3.2	Tap slag
C2	9125	Pit 9124	0.10a	3.2	Furnace slag
D	6412	Pit 6413	5.03-04	3.3	Tap slag
E	6573	Pit 6574	5.05	2.2	Furnace slag

TABLE 2 Average values of SEM-EDS area analyses of slag samples

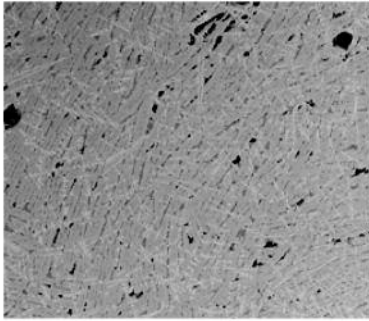
Sample	Type	Na ₂ O	MgO	Al ₂ O ₃	SiO ₂	P ₂ O ₅	K ₂ O	CaO	MnO	FeO	Heterogeneity
A	Tap	0.00	0.32	6.81	22.58	1.47	1.42	2.18	3.64	61.60	0.71
B	Tap	0.00	0.00	4.64	23.07	1.49	1.03	0.71	2.52	66.54	0.93
C1	Tap	0.00	0.00	4.80	23.55	1.66	1.13	0.65	1.46	66.77	0.35
C2	Furnace	0.00	0.00	4.18	16.24	1.47	0.47	1.40	0.00	76.25	3.00
D	Tap	0.00	0.00	7.08	28.51	1.40	1.11	0.26	3.07	58.56	3.49
E	Furnace	0.28	0.00	3.46	16.39	0.75	0.00	1.47	2.00	75.67	1.14



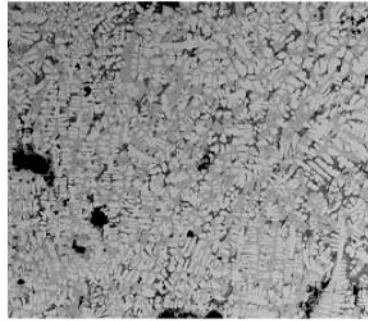
No. 1: Backscattered electron image of the microstructure of tap slag specimen A showing wustite dendrites (light grey), fayalite/silicate laths (mid grey) and glassy background matrix (dark grey); black areas are porosity or cracks within microstructure.



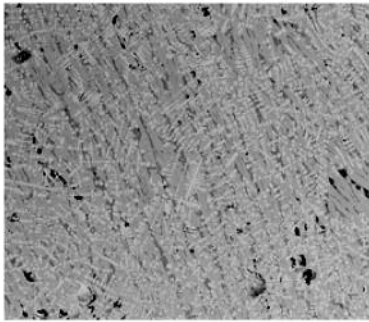
No. 2: Backscattered electron image of the microstructure of tap slag specimen B. The microstructure features the same phases as Specimen A above.



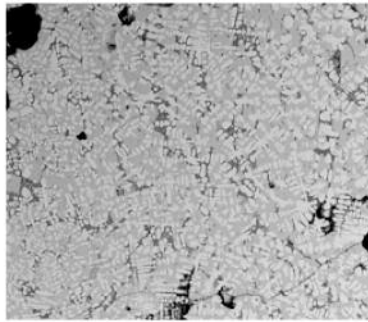
No. 3: Backscattered electron image of the microstructure of tap slag specimen C1. The comparatively fine microstructure is composed of the same phases as specimens A and B.



No. 4: Backscattered electron image of the microstructure of furnace slag specimen C2. The microstructure features the same mineral phases as the previous three specimens shown above, although the higher proportion of the iron oxide phase (wustite) is noticeable.



No. 5: Backscattered electron image of the microstructure of tap slag specimen D. The microstructure features the same phases as the other tap slag specimens (A, B & C) shown above.



No. 6: Backscattered electron image of the microstructure of furnace slag specimen E. The microstructure features the same phases as the other specimens shown above; the amount of the iron oxide phase (wustite) present is similar to the other furnace slag, specimen C2.

FIGURE 16 Metallurgical analysis of metalworking debris

impossible to establish whether Specimen D is an unusual one-off, or whether similar examples occurred elsewhere on the site.

The Furnace Slag

The microstructure and chemical composition of the two furnace slag specimens are generally very similar (Fig. 16, Nos 3 and 4). However, in contrast to all of the other specimens analysed, manganese was not detected in Specimen C2. This absence could be interpreted as an indicator of different ore source, although the amounts of phosphorus, alumina and lime in the specimen are all similar to other specimens analysed, which suggests a very similar ore source. It is possible that the Specimen C2 slag was produced using local ore that was taken from a different seam.

The elevated levels of manganese in the specimens is of particular interest, as the analysis of residues from the Mantles Green Meadow site (McDonnell 1992) showed that manganese bearing iron ore was being smelted there. The Mantles Green Meadow site is approximately 35km from the subject site.

The source of the ore used by the ironmakers at the subject site is not known, although deposits of ironstone are present in the Whitchurch area, which is within approximately 15km of the site. Given this relatively local availability, and that the ore type appears to have remained constant during the period from the Late Iron Age to the Late Romano-British, it seems reasonable to assume that local ore was being smelted. The iron ore found at Mantles Green Meadow was analysed, but its exact source remains unknown. The possibility that more than one source of ore was being smelted at the pipeline site is interesting, as two types of iron ore were also found at Mantles Green Meadow, one of which was linked with smelting activities there.

The bloomery method of iron production could consume around a 60:1 ratio of wood charcoal to ore (Morris 2009). Although the main source of ore may seem distant at around 15km away from the site, it would be easier to transport the ore, particularly if it was pre-roasted, to the furnace, rather than more friable charcoal. Another benefit of bringing in lighter pre-roasted ore is that it would have also lessened the demand on woodland in the area of the furnace.

As with the tap slag specimens, relatively low

levels of CaO were detected in the furnace slag samples, and the quantities of 'free' iron oxide detected are at the higher end of the range typically found in slag of this type; this, however, probably simply reflects the relatively low CaO content of the slag.

Conclusions

The quantity and types of slag found at the site leave little doubt that iron smelting was being carried out in the immediate vicinity of the excavated areas. Although furnace or smithing hearth structures were not found during the excavations, they may have been located just outside areas examined: the possible association of metalworking with particular buildings is noted above.

The bloomery process of iron smelting is, compared to later smelting methods, a particularly variable process, which can produce slag of varying microstructure and composition. One of the interesting revelations of this analysis is the similarity of the microstructure and composition of the slag from the Late Iron Age and Late Romano-British periods.

Since the slag recovered during the excavation may only be part of the total amount produced at the site, it is not possible to establish how frequently iron smelting was being carried out. However, the similarities found in the specimens analysed suggest that it was occurring sufficiently frequently for the production techniques to be retained and passed on, perhaps even through generations of the same family. The similarity in slag composition also suggests a continuity of ore source.

From a research perspective, the slag assemblage recovered from the site is interesting, as there appears to be only one other metallurgical analysis of ironmaking slag of comparable date from Buckinghamshire. The results are subtly different to those published by Paynter (2006) in her study of regional variations in slag composition. It is well known that iron artefacts produced by the bloomery process contain relatively high volumes of entrapped slag and the composition of this is often very similar to the bulk smelting slags that are found. Although the number of specimens analysed here is small and it has not been possible to investigate slag inclusions within metal artefacts produced at the site, the results suggest that there is enough difference in composition to permit the

possibility of identifying artefacts produced from local ore.

Iron Age and Romano-British Pottery (excluding samian) by Jackie Wells (analysis) and the late Anna Slowikowski (quantification)

Introduction

A pottery assemblage totalling 2,578 vessels, represented by 4,494 sherds and weighing 57.6kg was recovered from four plots along the route of the pipeline (Table 3).

The earliest pottery within this assemblage dates to the Early Iron Age, and the latest to the post-medieval period; accordingly, condition and preservation of the material is highly variable. Pottery datable to the Roman period dominates the assemblage, totalling 71% (by weight), followed by Late Iron Age material (24%) (Table 4). Overall, the poor condition of the assemblage is demonstrated by a low average sherd weight of 13g, and vessel to sherd ratio of 1:2. The generally fragmented nature of the pottery gives the general impression of

domestic rubbish which has been randomly deposited in features, or accumulated over time. There is no evidence for single episodes of concentrated deposition comprising largely unbroken vessels, although several near complete vessels were found.

As each plot represents a snapshot of the landscape, and is not truly representative of a 'site', the validity of synthetic analysis has its limitations. However, similarities between aspects of the assemblages recovered from the various plots allow a number of observations to be made. The analysis of the pottery by area is held in the project archive, as is the ceramic fabric type series, with an overview by period presented below.

Early and Middle Iron Age

Approximately 4% (by weight) of the total assemblage is of Early and Middle Iron Age origin, the majority dating to the Middle Iron Age (c.300–100 BC). Evidence for activity during this period was concentrated in Plot 0.01, located near Hardwick, at the eastern extent of the pipeline corridor. A

TABLE 3 Pottery quantification by excavation plot

<i>Site</i>	<i>Vess.</i>	<i>% Vess.</i>	<i>Sherd</i>	<i>% Sherd</i>	<i>Wt (g)</i>	<i>% Wt</i>
Plot 0.01	73	2.9	134	2.9	1043	1.8
Plot 0.10a	249	9.7	424	9.4	4037	7.0
Plot 0.10b	17	0.6	39	0.9	429	0.7
Plot 4.02	377	14.6	1262	28.1	14339	25.0
Plots 5.03-05 Area 1	1676	65.0	2335	52.0	35091	60.9
Plots 5.03-05 Area 2	186	7.2	300	6.7	2665	4.6
Total	2,578	100	4,494	100	57,604	100

TABLE 4 Pottery quantification by excavation plot (excluding indeterminate sherds)

<i>Site</i>	<i>Early to Mid Iron Age</i>		<i>Late Iron Age</i>		<i>Roman</i>		<i>Post-Roman</i>	
	<i>Sh</i>	<i>Wt (g)</i>	<i>Sh</i>	<i>Wt (g)</i>	<i>Sh</i>	<i>Wt (g)</i>	<i>Sh</i>	<i>Wt (g)</i>
Plot 0.01	115	964	13	60	6	19	–	–
Plot 0.10a	4	58	405	3928	12	33	3	18
Plot 0.10b	–	–	1	1	37	427	1	1
Plot 4.02	100	1536	587	7637	561	5142	3	15
Plots 5.03-04	(11)	(51)	87	999	2224	33696	1	15
Plots 5.05	(2)	(10)	148	1373	150	1282	–	–
Total	232	2,619	1,241	13,998	2,990	40,599	8	49

Bracketed figures show residual pottery

small quantity occurred as residual finds in later features within Plots 0.10A, 4.02 and 5.03-5.05. Iron Age pottery scatters have been identified in surveys around Aylesbury (Kidd 2007), where it has been observed that the material is generally poorly preserved, in comparison with more durable Roman pottery. Although deriving from buried deposits, rather than ploughsoil, the pipeline assemblage reflects this pattern, with pottery surviving in poor condition, and comprising abraded sherds with a low average weight (11g). There are no complete vessels, although a sizeable proportion of a round-shouldered jar occurred as a residual find in Plot 4.02 (Fig. 17, No. 1).

The seven fabrics identified were divided into four fabric groups, all hand-made. Ordered by prevalence, these are 'mixed' inclusions, sand, grog, and flint, the latter two occurring in negligible quantities. Mixed fabrics total over 76% of the assemblage; the homogeneity of this material suggests the use of a single primary source of raw material, likely to be fairly local to the site. The high proportion of mixed fabrics is in contrast to nearby investigations. Flint-gritted sherds dominated the Group I assemblage at Berton (Knight 1986, 18), while at sites along the Aston Clinton Bypass, quartz-rich fabrics were prevalent (Slowikowski 2008b, 225). This may, in part, reflect chronological disparity, but may also serve to emphasise the highly localised nature of pottery production during this period. Although scarce, vessel forms are characteristically Middle Iron Age – ovoid jars, an open vessel with a fingertip impressed flat-topped rim (Fig. 17, No. 2) and a flat-topped rim, the shape of which suggests it may derive from a lugged vessel (Fig. 17, No. 3). Forms and decorative elements accord well with the Middle Iron Age components of the Berton and Aston Clinton assemblages (respectively Knight 1986, 18; Slowikowski 2008b, 225).

Late Iron Age

Twenty-four percent of the total pottery assemblage is datable to the Late Iron Age (*c.*50 BC–AD 100). All plots yielded pottery of this period, with particular concentrations occurring in Plots 0.10a and 4.02, located in the eastern half of the pipeline corridor. Like the earlier Iron Age assemblage, the pottery generally survives in poor condition,

comprising abraded sherds with a low average sherd weight of 11g.

Pottery attributable to the Late Iron Age occurs in a fairly restricted range of grog-dominated fabric types. All are thought to be of local, but uncertain origin. Shelly pottery occurs in small quantities, and is likely to originate from further east and north, in Bedfordshire/Northamptonshire, where kilns are known to have been operating in the Conquest period (Slowikowski 2000, 73). There are no unusual or exotic forms to indicate significant status for the early settlement. The majority of Late Iron Age vessels are wheel-thrown; a proportion is hand-made with a wheel-finished shoulder and rim, and some are entirely hand-made. The latter mainly occur in the coarsest fabrics, and generally represent the largest vessels in the assemblage (storage jars and cooking pots). Diagnostic forms are in the 'Belgic' tradition, the appearance of which in the region is conventionally dated to the mid 1st century BC, although the adoption of the tradition may not have become immediately widespread.

Jars of varying size are dominant, and have everted (Fig. 17, Nos 5 & 6), bead or lid-seated rims. One grog-tempered wide-mouthed jar has horizontal combing on the shoulder and a roughened surface below (Fig. 17, No. 4), known to be a Hertfordshire style (Thompson 1982, 275, no.12). The roughened surface served a functional purpose in that it made the pot easier to hold. Cordoned jars, wide-mouthed bowls and large roll rim vessels, the latter probably used for storage, also occur. The limited range of jar and bowl forms, coupled with a paucity of specialised tablewares, such as cups, beakers and platters, may suggest the adoption of only a limited range of 'Belgic' vessel types by the local inhabitants (*cf.* Hill 2002, 157–58). Attempts at curation and repair or lid attachment occur on a number of vessels (Fig. 17, No. 7), reinforcing the picture of a low status, rural community. Vessels with holes in their bases clearly fulfilled a different function to those drilled in the necks (Fig. 17, Nos 8 & 9). Bases with post-firing holes are relatively common on late Iron Age and early Roman sites and several suggestions have been made as to their purpose, ranging from dairying to ritual (*cf.* Lyons 2008, 37). The limited range and variety of vessel forms accords well with pottery recovered from Aston Clinton Site B (Slowikowski 2008a,

94–100; 112–13), but is in contrast to the richer assemblage recovered at Berton, which contained a higher proportion of imported wares and native versions of these (Knight 1986, 21).

Romano-British

Pottery datable to the Romano-British period totals 71% of the pottery assemblage, and derived from all plots, with particular concentrations in Plots 4.02 and 5.03–5.04. Pottery from Plot 4.02 ranges in date from the late 1st to mid 3rd centuries. Material from Plot 5.03–04 spans the late 2nd to late 4th centuries and includes a greater variety of wares, perhaps reflecting its possible association with a minor villa. The Roman pottery is moderately abraded and survives in fair, although fragmented condition, evidenced by an average sherd weight of 15g. In general, the assemblages are fairly uniform; no significant differences in the proportions of the major fabric groups or vessel forms within the fills of the various feature types were observed. The material accords well in terms of vessel forms and fabric range, with that recovered from nearby contemporary sites (*cf.* Berton, Parminter 1986, 59–61; Aston Clinton Site B, Slowikowski 2008a, 100–106; Quarrendon, Wells 2009).

The assemblage comprises a range of 50 individual fabrics, the majority of which are unsourced, locally produced, utilitarian coarse wares. Throughout the Roman period, sandy grey wares were the most commonly utilized fabrics. These contain various inclusions, although are mostly defined by the size and amount of quartz. Numerous sources are likely for these wares during the Early Roman period, when small-scale localised manufacture would have been the main means of production (*cf.* Zeepvat & Radford 2009). There is, however, no evidence that any pottery was made within the study area.

Grog-tempered pottery, mainly in the form of basic utilitarian kitchen wares, supplements the reduced sandy wares. Pink-grogged ware is an important local type, with kilns excavated at Stowe Park, near the Alcester-Towcester Road (Henig & Booth 2000, 172; Zeepvat & Radford 2009), and is well attested from sites in the county (Marney 1989, 67). The type has been dated from the late 2nd century, although continued in use, possibly into the 5th century (Marney 1989, 55). An absence of sooting suggests that these vessels were used as

containers, rather than cooking pots. Hand-made vessels in a grogged fabric, similar to a coarse version of the ‘Belgic’ grog-tempered wares, also occur, mainly in Middle to Late Roman contexts. The same tradition of hand-made, grog-tempered wares is known elsewhere in the country, for example in the Kent area, where it is dated from the late 3rd century to the end of the Roman period (Tyers 1996, 191; Tomber & Dore 1998, 167). Patchy internal or external sooting and internal pitting suggest functions associated with cooking, unlike the pink-grogged vessels, which are used primarily for storage.

Shell-tempered coarse wares, from at least two sources, were also used as an alternative utilitarian coarse ware, especially during the later Roman period. The shell-tempered wares cannot all be assigned a specific source (Tomber & Dore 1998, 115), although they mostly contain fossilized shell, probably deriving from the Jurassic beds in the South Midlands. Such vessels were produced at the Harrold kilns in north Bedfordshire (Brown 1994), and some of the shelly wares are recognisable products of this industry.

The earliest vessels display both adherence to Iron Age traditions, and adoption of the styles of the encroaching Roman Empire. Early forms are largely varieties of jar: lid-seated, everted rimmed (Fig. 18, Nos 10 and 11), necked (Fig. 18, Nos 12 & 13) and storage (Fig. 18, No. 14). This falls within the established trend for rural sites, which show a consistently higher proportion of jars (generally 50% and above) than ‘urban’ sites, where dishes and bowls predominate (Timby 2009, 181). Other forms are rarer, and include flagons (Fig. 18, No. 15), beakers (Fig. 18, No. 16), bowls (Fig. 18, Nos 17–22) and dishes. This suggests an emphasis on function, in the form of kitchen wares, rather than display, in the form of table wares. The presence of Romanised pottery suggests that by the 2nd century, the occupants were aspiring to a Roman way of life. Mortaria (Fig. 18, No. 23), although relatively small in number, indicate the adoption of Roman cooking methods, while table wares and imported pottery indicate social and economic expansion. Significant amongst the pottery from the destruction layer (3001/6634) associated with Building 1 is an Oxfordshire colour-coated ware base sherd with a worn illiterate stamp (Fig. 18, No. 24; Young 1977, fig. 68, no. 27). Pierced vessels were again present

and occurred in coarse grey ware (x 1), late oxidised ware (x 1) and reduced sandy ware (x 1 lid).

During the Roman period, the study area was located in the vicinity of Akeman Street and other road routes. This would have exposed the inhabitants to a number of native potting traditions, and also facilitated access to a wide range of traded goods. It is interesting, however, that the ceramic assemblages mainly comprise a range of locally produced utilitarian coarse wares, with a lesser range of domestic fine wares and a small quantity of imported wares, predominantly samian (see Wild, below) and amphorae. This reflects the modest status of the rural settlements depositing this pottery. It may indicate that not enough surplus goods were produced to permit trade, or it might reflect a cultural preference, whereby the population did not require 'fancy' traded wares.

Fine wares were imported from the domestic regional centres of *Verulamium*, the Nene Valley, and from the Oxfordshire industries, both of the latter flourishing in the later Roman period. Nene Valley grey wares were in use between the mid 2nd and 4th centuries (Perrin 1999, 78), and a small quantity of black-burnished ware (BB1), with a source in the south-west of the country, was reaching Buckinghamshire from the late 2nd century. The type was already well established in the Oxfordshire markets by this time (Marney 1989, 126), and remained current well into the 4th century.

Oxidized wares, both locally produced and traded, form part of the range of wares occurring on Roman sites, and represent a significant proportion of the assemblage. They span a wide range of dates and originate from a number of sources, although the Oxfordshire industry is best represented, with just a single sherd from Much Hadham, Hertfordshire. Oxfordshire colour-coated and white wares (Young 1977) were prevalent during the Late Roman period. All the examples recovered are common products of the industry during the late 3rd-4th centuries, including a number of mortaria with high beads and small flanges.

Miscellaneous non-local wares of uncertain source comprise sherds of mica-gilded ware, colour-coated ware, and black micaceous ware, the latter of possible London type.

Continental imports include a small quantity of

olive oil amphorae imported from southern Spain, and samian from central, southern and eastern Gaul (see Wild below). The small quantity of amphora appears typical for a low order rural site (*cf.* Evans 2003, 70). Five sherds from a Cologne colour-coated beaker, a type found in Britain up to the mid-3rd century also occur, along with a small quantity of Gallo-Belgic white ware, the latter a 1st-century import.

Conclusions

Despite its modest size the pottery assemblage from Plot 0.01 indicates Early to Middle Iron Age occupation and enhances the evidence for settlement of this period in the Vale of Aylesbury. This perhaps reflects the situation in the north of the county, where an increase in settlement has been noted, in contrast to an apparent reduction in the Chilterns and Thames area (Kidd 2007, 3-4).

The ceramic assemblage from Plot 4.02, although predominantly Late Iron Age and Early Roman in date, includes 100 Middle Iron Age sherds, providing further evidence for settlement of this date in the vicinity. Particular note is drawn to 38 sherds from a round-shouldered jar (Fig. 17, No. 1) recovered from boundary ditch 42123, and seven sherds from an ovoid jar found in pit 42037. Although these two instances have been interpreted by the excavators as residual, they may well indicate a degree of continuity from the Middle into the Late Iron Age, as observed at Bierton (Knight 1986, 21).

The presence of a quantity of pierced pottery of both Iron Age and Roman date is noteworthy. The perforations were evidently made pre- or post-firing, and placement position varied, suggesting different vessel function/use. For example, positioning on the shoulder may indicate that the vessel was suspended in use, some perforations may be repairs, while vessels with perforated bases may indicate use as strainers, perhaps for cheese-making/dairy related activities.

The relative paucity of Late Iron Age material from Plot 5.03-5.05 and the sizeable Roman assemblage suggest that this settlement may have been established immediately before, or shortly after the Roman conquest. Although the Roman pottery recovered from the fills of the two roundhouses may be intrusive, there is evidence for continuity of roundhouse forms into the Roman period in Buck-

inghamshire (Fulford 2010, 9; Williams & Zeevat 1994, 207–8).

CATALOGUE OF ILLUSTRATED POTTERY (FIGS 17-18)

Fabrics are summarised by date below, with the full type and fabric series held in the archive.

Middle to Late Iron Age (Fig. 17)

1. Calcareous inclusions (limestone): rough, hard fired fabric with buff brown-grey surfaces and core. Frequent quartz, sparse red iron ore. **Jar** with heavily pitted interior, especially lower portion. Plot 4.02, Pit 42060, Period 2.2
2. Grog fabric: soft soapy fabric with smooth surfaces, ranging in colour from brown-grey, with mid-dark grey core. Contains frequent poorly sorted orange-brown grog and rare sub-rounded quartz. **Bowl** flat-topped rim with finger impressions. Plot 0.01, Ditch 1602, Period 2.2
3. Fine mixed fabric: fairly hard fired moderately smooth dark grey fabric, with patchy buff orange brown exterior surfaces. Contains sparse to moderate shell, common quartz, sparse iron and occasional limestone. Rare voids from vegetable matter. **Jar** flat topped rim going into a lug. Plot 0.01, Ditch 1728, Period 2.2

Late Iron Age (Fig. 17)

4. Grog and sand: hard fired slightly harsh fabric, reduced throughout to grey-black or grey brown colour. Abundant black or light buff grog inclusions; frequent medium quartz. Fine silver mica in fabric and grog (visible under microscope). Wide-mouthed **jar**. Plot 0.10a, Pit 9124, Period 3.2
5. Grog-tempered in the 'Belgic' tradition (Thompson 1982). **Jar** – hand made with horizontal tooling on interior. 6599, posthole 6600. Plot 5.03-04, Period 3.3, Phase 1
6. Grog-tempered (as No. 4). Everted rim **jar**. Plot 5.03-04, 6609, ditch 6610, Period 3.1
7. Grog-tempered (as No. 4). Cordoned **jar** with post-firing hole (5mm diameter). Plot 0.10a, Pit 9178, Period 2.2
8. Grog-tempered (as No. 4). Cordoned **jar** with at least two post-firing holes in base (diameter 10mm). Plot 0.10a, Ditch 9149, Period 3.2
9. Shell and grog: fairly smooth buff brown-grey fabric with grey core. Occasional orange patches externally. Very fine shell and grog tempering, weathering causing small voids. Neckless **jar**. Plot 4.02, Well 42014, Period 3.2

Roman (Fig. 18)

10. Black burnished ware (Tomber and Dore 1998, 127). Everted rim **jar**. Plot 5.03-04, 6668, pit 6672, Period 3.3, Phase 1
11. Grog/sand grey ware: fairly coarse fabric, light grey to buff brown, hard or soft fired with occasionally powdery surfaces. Frequent well sorted quartz, powdery buff grog particles and sparse black iron ore. Necked **jar** with post-firing hole. Plot 4.02, Pit 42135, Period 3.2
12. Grog/sand grey ware (as No. 11). Necked **jar**, hand-made with wheel-made upper. Very well burnished with clear horizontal strokes on shoulder and vertical strokes below. Plot 4.02, Pit 42135, Period 3.2
13. Coarse grey ware: coarse gritty fabric containing abundant ill sorted quartz, sparse black iron ore. Necked **jar**. Plot 5.03-04, 6489, pit 6492, Period 3.3, Phase 1
14. Soft pink grogged ware (Tomber and Dore 1998, 210); equivalent to MK type 2A (Marney 1989, 65, 174; Taylor 2004, 60–66). Storage **jar** with very large roll rim. Plot 5.03-04, 3001=6634, destruction debris, Building 1, Period 3.3, Phase 2
15. Pink fine ware: pink, fairly hard and smooth fabric, with frequent powdery surfaces. Moderate quartz in fine micaceous background. **Bottle** – narrow necked with handle. Plot 5.03-04, Pit 6492, Period 3.3, Phase 1.
16. Gallo-Belgic white ware (Tomber and Dore 1998, 22–24). **Beaker** – egg-shell thin, vertical combed bands on shoulder. Plot 4.02, Ditch 42123, Period 3.2
17. Coarse grey ware (as No. 13). Rectangular rimmed **bowl**. Plot 5.03-04, 6489, pit 6492, Period 3.3, Phase 1
18. Micaceous grey ware: very smooth fabric, generally light grey, although can be darker with occasional red cores. Mica is the predominant inclusion; also contains common quartz and red/black iron ore. Everted rim **bowl**; handmade. Plot 5.03-04, 6586, ditch 6588, Period 3.1
19. Silty grey ware: particularly fine 'silty' light coloured, occasionally with pink core. Few visible inclusions: very fine mica, quartz and red/black iron ore. Rectangular rimmed **bowl**. Plot 5.03-04, 6669, pit 6672, Period 3.3, Phase 1
20. Nene Valley grey ware (Marney 1989; Perrin 1999; Howe *et al* 1980). Flanged **bowl**. Plot 5.03-04, 6484, pit 6492, Period 3.3, Phase 1
21. Oxfordshire white ware (Tomber and Dore 1998, 175; Young 1977, 93). Flanged **bowl**; Young type W50.1; faint traces/streaks of red paint on interior of rim and on base sherd; sooting over spall on exterior; sooting on interior of right flange. Plot 5.03-04, 6668, Period 3.3, Phase 1
22. Black burnished ware (as No. 10). Flanged **bowl** lattice burnished exterior; with atypical mottled

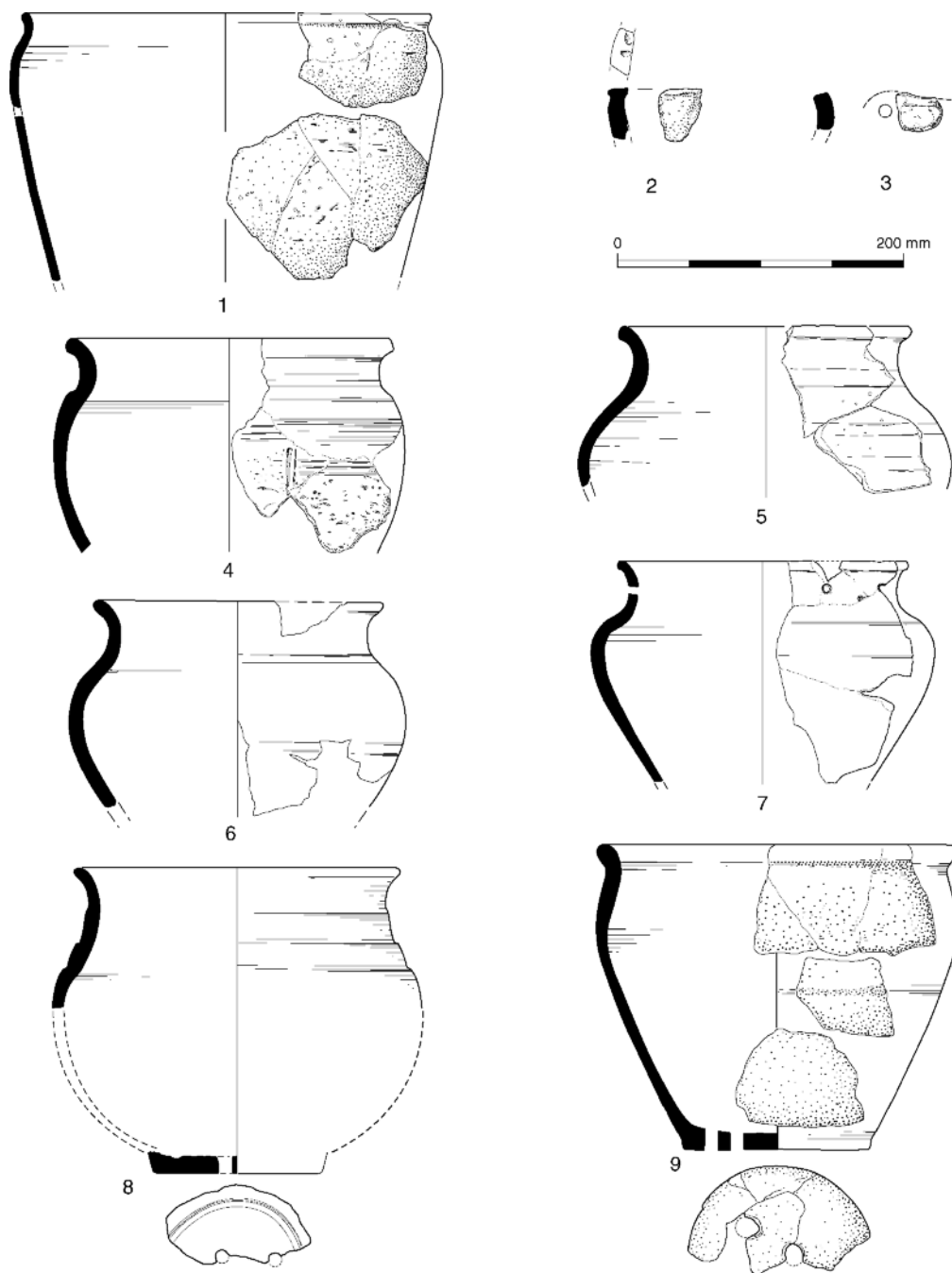


FIGURE 17 Middle to Late Iron Age pottery (Nos 1-9). Scale 1:4

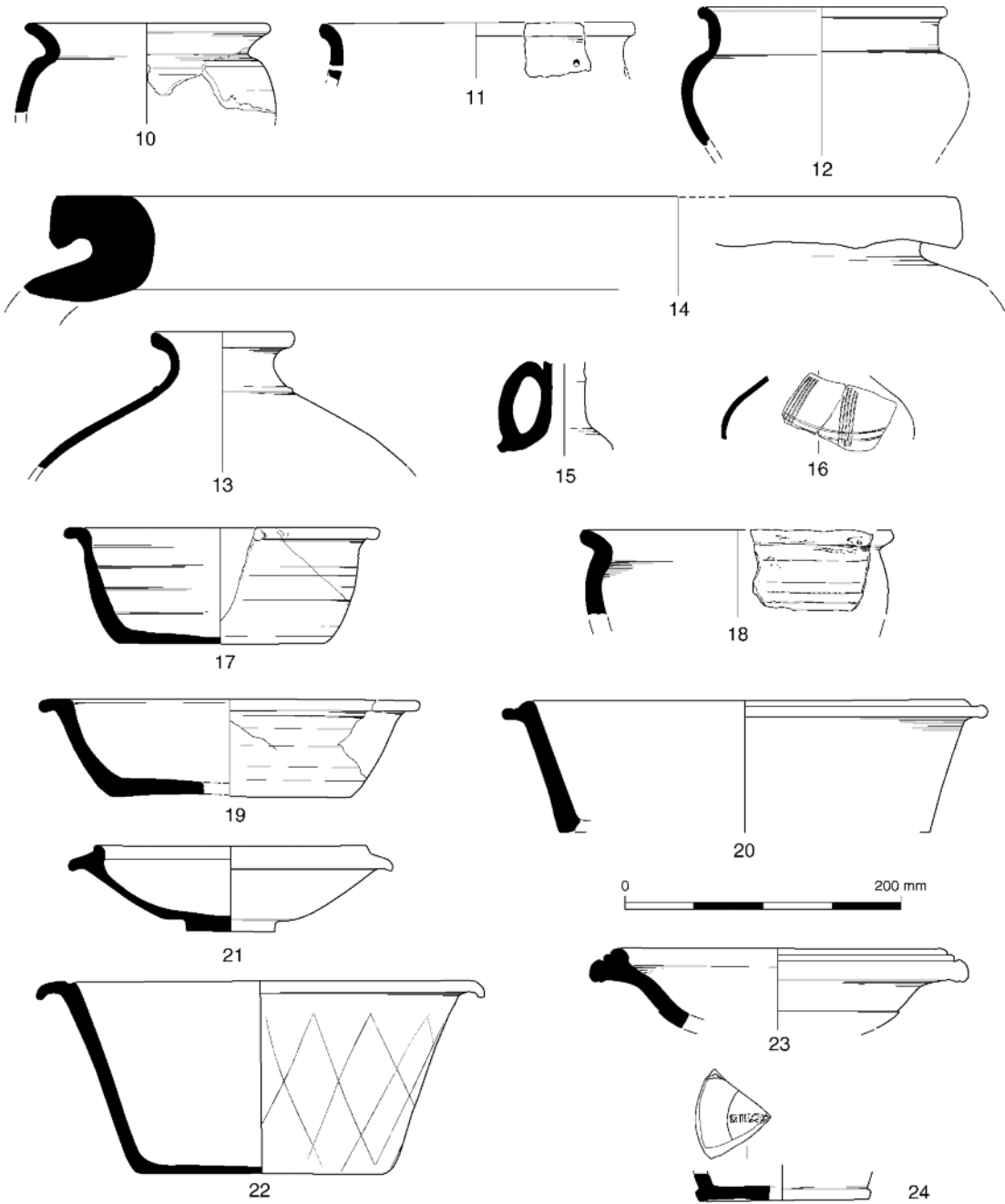


FIGURE 18 Romano-British pottery (Nos 10-24). Scale 1:4

grey-white appearance. Plot 5.03-04, 6715, construction of Building 1, Period 3.3, Phase 1

23. Roman. Oxfordshire white ware mortaria (Tomber and Dore 1998, 175; Young 1977, 56). **Mortarium**. Pit 6672, Period 3.3, Phase 1
24. Roman. Oxfordshire colour-coated ware (Tomber and Dore 1998, 176; Young 1977, 123). **Base sherd** with worn illiterate stamp. Evaluation. 3001, destruction of Building 1, Period 3.3, Phase 2

SAMIAN WARE by Felicity Wild

A total of 70 sherds of samian ware from a maximum of 44 vessels were recovered, all of which came from Plot 5.03-04. Of these, ten sherds from eight vessels are South Gaulish (18.2% by vessel count), 53 sherds from 31 vessels are Central Gaulish (70.4%) and seven sherds from five vessels East Gaulish (11.4%). Of the Central Gaulish sherds, only one, of form 33, is in the fabric of Les Martres-de-Veyre. There are sherds from only six decorated bowls, 13.6%, a figure fairly typical for minor settlements and rural sites in the area (Wild in Luke forthcoming).

The earliest South Gaulish pieces (e.g. Fig. 19, No. 1) are likely to date to the early Flavian period. With the possible exception of the single sherd from Les Martres-de-Veyre, the rest of the material is Antonine, suggesting that the arrival of larger quantities of samian on the site only started around the middle of the 2nd century AD. The Hadrianic-early Antonine forms 27 and 18/31 are conspicuously absent. The East Gaulish pieces, although few in number, suggest that importation continued until well into the 3rd century.

In terms of the samian's contribution to the dating of the various features on site, only one sherd came from Period 3.2, of form 33 in the fabric of Les Martres-de-Veyre, dating to the first half of the 2nd century AD (pit 6663). Two contexts in Period 3.3 produced samian, in both cases including material of Antonine date: pit 6681, which also produced a sherd of South Gaulish form 18 of Flavian date, and the disuse fill of a boundary/field system (6498). Most of the samian came from Late Roman contexts (Period 3.3). It is noteworthy, however, that the fill of pit 6641 contained only South Gaulish sherds of Flavian date: six sherds, from five vessels, came from this pit.

CATALOGUE OF ILLUSTRATED SAMIAN (FIG. 19)

In the following catalogue of decorated ware and potters' stamps, figure types are quoted from Oswald 1936-37 (O.) and Central Gaulish decorative motifs from Rogers 1974 (Rogers). Potter and die numbers are quoted from Hartley and Dickinson 2008-12.

Decorated ware

1. Form 29, South Gaulish. Two joining sherds of upper zone showing winding scroll with hare (O.2096) over a row of arrowheads in the lower concavity. A bowl in the Museum of London stamped by Iustus i shows a scroll with the same hare and arrowheads (Mees 1995, taf. 94,4). c.AD 65-85. Plot 5.03-04. Fill of pit 6641, Period 3.3, Phase 1
2. Form 37, Central Gaulish. Six sherds of rim and ovolo (Rogers B12) used most commonly by Criciro v and Divixtus i. A date of c.AD 135-175 would cover the working life of both potters. Plot 5.03-04. Disuse of pit 6492, Period 3.3, Phase 1
3. Form 37, Central Gaulish. Thirteen sherds of a bowl with panel decoration in the style of Secundus v. The ovolo (Rogers B143) with straight line beneath it, borders without junction motifs and use of the dolphin (O.2401) in panel corners and vertical rows are all typical of his work. Panels show the seated Diana (O.111) in medallion, vertical row of dolphins, Perseus (O.234) and hare (O.2117) in festoon. Identical decoration occurs on a bowl from Mumrills (Hartley 1961, 101, fig. 5, 4), where Hartley defines the style of this potter, assigned by Stanfield and Simpson (1958) to Pugnus. c.AD 145-175. SF 129. Plot 5.03-04. 6484, plough drag, Period 4
4. Form 37, Central Gaulish, showing medallion containing Venus (O.322). The type was used by both Cinnamus ii and Doeccus i. Too little survives to identify the ornament to the right of the type, but the bead row is closer to that of Cinnamus. c.AD 150-180. Plot 5.03-04. Destruction layer 6634, Period 3.3, Phase 2

Potters' stamps

5. Form 33, Central Gaulish, stamped HABILISM, die 1a of Habilis of Lezoux. Habilis was at work in the mid-2nd century AD, making form 27 as well as the later Antonine forms 79 and 80. c.AD 150-180. SF 144. Plot 5.03-04. 6668, overlying pits, Period 3.3, Phase 1
6. Dish, East Gaulish, stamped IAN[VARIVS], die 4a of Ianuarius vi. There were various East Gaulish potters of this name, but the presence of this die at Rheinzabern indicates that this potter worked there.



FIGURE 19 Decorated and stamped samian from Plot 5.03-04. Scale 1:1

Few of his products have been found in Britain or on closely datable sites, although a damaged version of this die has been recorded at Corbridge and York. The dish forms made by this potter, including forms 31R, 32 and Lud. Tb suggest a date *c.*AD 160–260. SF 109. Plot 5.03-04. Final fill of roundhouse gully, 6322, Period 3.3, Phase 1

7. Form 33, Central Gaulish, stamped MVXTVLIM (twice impressed), die 2a of Muxtullus (or Muxtulus) of Lezoux. The forms and site evidence show that Muxtullus was at work in the Antonine period. His earliest stamps occur on forms 27 and 18/31, on the Antonine Wall and in the Castleford Pottery Shop of the AD 140s. The absence of forms 79 and 80 make it unlikely that he was at work later than *c.*AD 170–175. *c.*AD 145–175. SF 117. Plot 5.03-04. Unstratified

CERAMIC BUILDING MATERIAL AND FIRED CLAY *by Jackie Wells (analysis), with the late A M Slowikowski (quantification)*

Ceramic Building Material

Excavations at Plot 5.03-04 produced a sampled assemblage of 523 fragments of Roman ceramic building material, weighing 61.1kg, the majority being associated with the destruction of Building 1 (Period 3.3, Phase 2). The latter assemblage comprises 435 pieces of roof tile, brick and hypocaust tile, weighing 55.2kg. These occur in sand- and shell-tempered fabric types, which constitute 95% and 5% of the material (by weight). The largest concentration of building material derived from the destruction layer (3001=6634), which contained 34.1kg. Fifty-four brick fragments (10.8kg) came from this deposit, where their association with box flue tiles (*tubuli*) suggests a likely use for the bricks as *pilae*. The absence of flue tiles from destruction layer 6709, from which 9.4kg of bricks derived, suggests a different use, possibly flooring, for the latter.

Roof tiles total 40% (by fragment count) of the phase assemblage, and comprise 30 *tegula* and 92 *imbrex* fragments, with a total weight of 15.9kg. The normal ratio of *tegula* to *imbrex* by weight for a roof is held to be approximately 3:1 (Mills 2008, 81). *Imbrex* fragments are, however, often more recognisable than those deriving from *tegulae*, and it can be difficult to determine whether indeterminate flat fragments derive from flue tiles, thick *tegulae* or thin bricks. *Tegulae* are also more likely to have been removed for reuse elsewhere, either as

hard core or as part of structures such as drying or domestic ovens, or similar.

Fired Clay

Some 249 redeposited fired clay fragments (3.7kg) came from Plots 5.03-04, the majority deriving from the destruction phase (Period 3.3, Phase 2). Approximately 78% of the assemblage (by weight) comprises amorphous pieces, of no discernible form or function, reflected in a low average fragment weight of 15g. Most are likely to derive from simple ovens or hearths. Diagnostic pieces, such as daub and slabs, suggest the presence of temporary structures of either domestic or agricultural function.

STONE ROOFING SLABS *by Ruth Shaffrey*

A significant quantity of stone roofing slabs was observed on Plots 5.03-04, of which 7.5kg was retained for specialist examination. The entire group came from the destruction layer relating to Building 1 (6634), along with a significant quantity of ceramic roof tile (see above). Stone is believed to have been used for roofing from the mid 2nd century AD onwards (Williams 1971, 106), suggesting a Middle to Late Roman date for the construction of the building.

The stones are variable in shape with two inverted triangles, one rectangular stone and at least one semi-circular stone identifiable: these variations either indicate different parts of the same roof or use in different buildings. Triangular roof stones are unusual, although a Cornbrash fragment from Alchester was of this shape (Booth 2001, 253).

The assemblage is of a single lithology (a sandy limestone) and probably came from the same source – almost certainly Jurassic in age and possibly from the Corallian. It is generally assumed that stone roofing was not transported any great distance, with numerous smaller sources rather than a few larger quarries being exploited (Roe 2007; Williams 1971, 107). Such material was, however, evidently transported significant distances in certain circumstances (Saunders 1998, 96–99). Middle Jurassic formations with potentially usable limestones occur at over 15km to the north of the subject site with another possible source at Fulwell Field, Clevely, some 25km distant (Arkell 1947, 149).

While there is no recent overview of the use of stone for roofing in this region, Williams (1971) examined roofing materials in an area whose eastern boundary was approximately 20km to the west of the current site. This survey found the use of stone for roofing to be quite localised, in comparison to the widespread use of ceramic tiles (Williams 1971, 107). The presence of stone roofing here is therefore noteworthy. Stone was used at Woodeaton villa but its lithology was not identified (Goodchild & Kirk 1954, 26), while an identification of Taynton Stone was provided for the roofing found at Ditchley (Williams 1971, 105–106). Evidence for stone roofing was rare at nearby Alchester (Booth 2001, 253), but the assemblage included a possible fragment of Stonesfield slate as well as fragments of Forest marble and Cornbrash, neither of which could be positively identified as stone roofing (*ibid.*).

The use of stone roofing appears to be unusual in the local area and probably reflects the relative wealth of those responsible for constructing Building 1. Since most buildings would have had ceramic or thatched roofs, a stone roof would have stood out as being markedly different and must have been a deliberate and considered choice.

QUERNS *by Ruth Shaffrey*

Of the four querns found on Plot 5.03-04, three are rotary querns and one is a saddle quern. The rotary querns comprise nearly half a probable millstone of Millstone Grit and smaller hand operated rotary quern fragments of Hertfordshire Puddingstone and Old Red Sandstone. The Millstone Grit fragment came from the main destruction layer relating to Building 1 (SF 161/162) and has been identified as a millstone on the basis that its projected diameter (at 590 mm) is too great for it to have been easily rotated by hand. This destruction layer also produced an Old Red Sandstone quern (SF 163) typical of outcrops located in the Wye Valley. The quern is of flat-topped type, by far the most typical design of Old Red Sandstone quern (Shaffrey 2006, 34) with a widespread distribution, including an example from nearby Alchester (Shaffrey 2006, 126).

A single quern of Hertfordshire Puddingstone of indeterminate size and form, but with a steep conical hopper, was found in Late Roman pit 6641. It is almost certain to relate to 1st-century AD

activity on or near the site (Major 2004). A fourth quern fragment is the central portion of a formed (*i.e.* shaped) saddle quern of Millstone Grit (SF 201), recovered from a possible disuse or destruction layer (6714) associated with Building 1. It is of quite unusual shape having been used on both sides for grinding and apparently also along the edges, probably for sharpening larger blades.

With no local exposures of stone suitable for the manufacture of querns, they all had to be imported and most had travelled some significant distance. The Old Red Sandstone rotary quern came the furthest (approximately 100km), but despite this, querns of this type were a common choice across the area during the Roman period. At Alchester, it was the most popular quern material (Roe 2001, 248). Hertfordshire puddingstone querns are less numerous than Old Red Sandstone querns generally, tending only to be found in single or small numbers with their main focus of distribution in eastern England (Green 2011). Precise provenancing for puddingstone querns is not possible, because *in-situ* exposures of it are so rare, with most querns being made from surface boulders (Green 2011). Despite this, it is clear the subject quern was transported over several kilometres at least – its presence at the pipeline site is particularly significant since it lies on the western periphery of Hertfordshire Puddingstone quern distribution (Green 2011, fig. 1). Few puddingstone querns are known in western Buckinghamshire and Oxfordshire although an example came from Mount Farm, Berinsfield (Roe 2010, fig. 73). Numbers increase eastwards into Buckinghamshire with significant quantities from sites around Milton Keynes (Hylton 1996, 165; Shaffrey *in prep*; Zeepvat *et al* 1994, 131). Millstone Grit rotary querns are more common in the region than puddingstone querns, with one example from Alchester (Roe 2001, 250) and others from sites across Oxfordshire and Buckinghamshire.

Of the other pipeline sites only Plot 0.10 produced identifiable worked stone in the form of a highly worn sarsen saddle quern (from the subsoil), a hone stone and a possible tessera; the latter two items are of grey sandstone and are both unstratified.

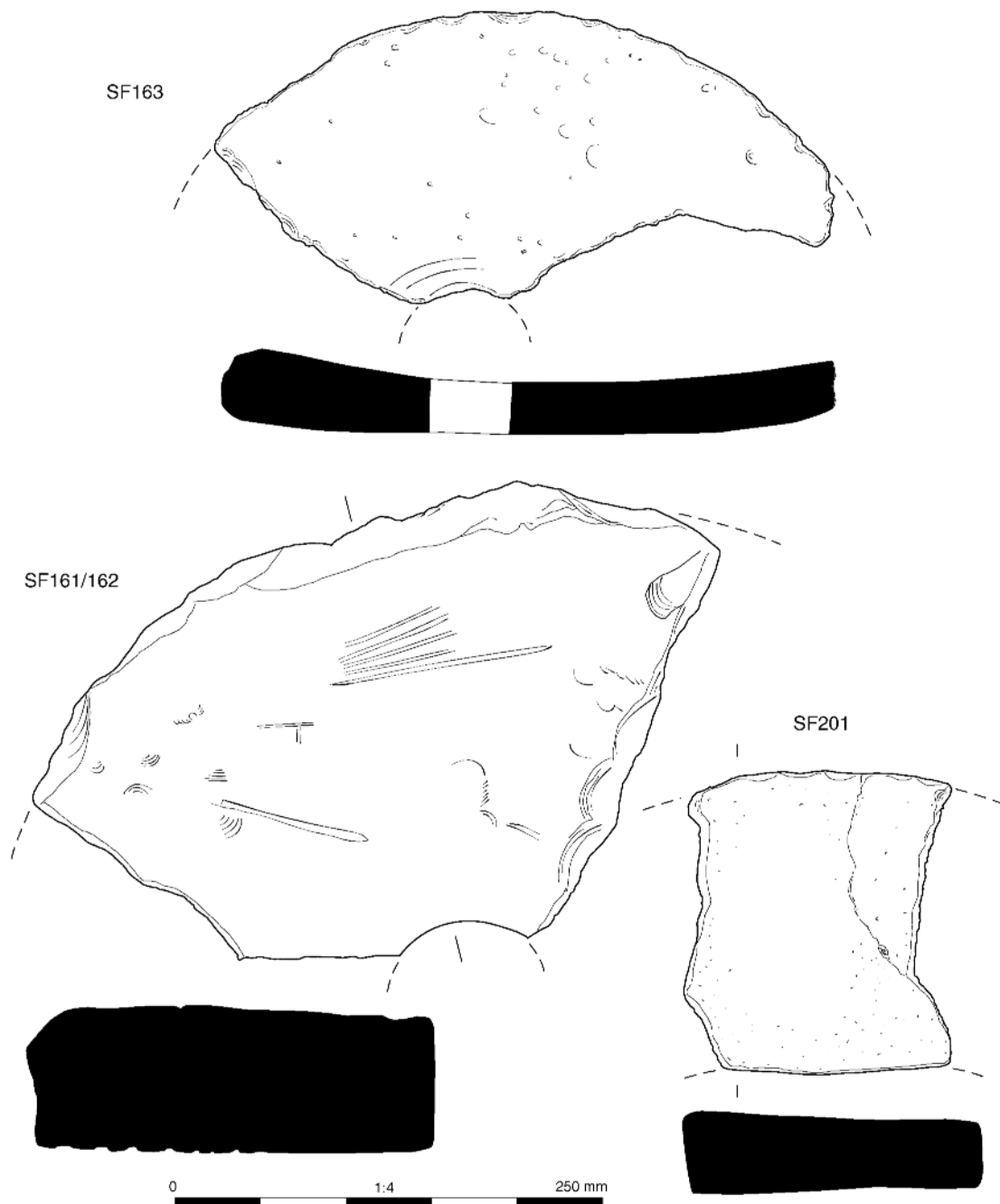


FIGURE 20 Querns from Plot 5.03-04. Scale 1:4

CATALOGUE OF ILLUSTRATED ITEMS
(FIG. 20)

SF161/162 Lower rotary quern or millstone reused as a whetstone. Millstone Grit. The grinding surface is slightly convex and has deep spaced pecking typical of Millstone Grit querns. This is worn away completely to a smooth surface in some areas. There is a wide cylindrical eye measuring 90mm diameter. The edges of the stone are very damaged. The base is roughly flat but worn smooth and concave from secondary use and has a few grooves from use as a whetstone. Measures 70mm max thickness at centre x 590mm diameter. Plot 5.03-04. Destruction layer 6634 overlying Building 1, Period 3.3, Phase 2

SF 201 Saddle quern, formed. Coarse poorly sorted Millstone Grit with some large inclusions of pink feldspar. Central fragment of well-shaped and well used saddle quern with slightly curved but vertical sides. Both faces are shallow and dished so that overall the quern gives an impression of being flat. The sides have been reused for sharpening blades. Measures >140mm long x 170mm max width x 39-47mm thick. Weighs 1760g. Plot 5.03-04. Floor makeup 6714, Building 1, Period 3.3, Phase 2

SF 163 Upper rotary quern fragment. Old Red Sandstone from the Wye Valley with numerous quartz pebbles including pink quartz plus purple siltstone and green quartzite inclusions. Approx 15% survives. Thin quern of flat-topped type with slightly tapering thickness. Very worn concave grinding surface, pecked upper and pecked straight vertical edges. Measures approx 450mm diameter x 24-44mm thick. Plot 5.03-04. Destruction layer 6634 overlying Building 1, Period 3.3, Phase 2

ZOOARCHAEOLOGICAL AND BOTANICAL
EVIDENCE

Human Skeletal Remains by *Malin Holst*

Two cremations and two inhumations of Late Bronze Age and Roman date were revealed in different excavation plots. The Bronze Age burials consisted of a cremation (9702) in Plot 10c, and a crouched burial (sk. 1625) in Plot 0.01. A cremation (6525) associated with numerous hobnails (Plot 5.05) probably dated to the 1st to 2nd century, while a supine extended inhumation (42114) of potentially later (2nd to 4th century) date was found close to a well in Plot 4.02.

The cremations were highly fragmented, preventing detailed comment. Heavy fragmentation and poor preservation also limited the osteological potential of the two inhumation burials, although

dental analysis suggests that the Bronze Age individual was a young adult and the Early Roman skeleton was a young middle adult. The teeth of the earlier individual exhibit moderate deposits of dental plaque, which are more severe than those of the later person, and may suggest that the Bronze Age individual had lower standards of dental hygiene or a diet higher in protein.

Animal Bone by *Chris Faine*

NAL Sites

An assemblage of 531 fragments of animal bone was recovered from the NAL sites, of which 197 bones could be identified to species (37% of the total sample). The Middle Iron Age assemblage from Plot 0.01 consists of roughly equal amounts of cattle and sheep remains, with smaller numbers of pig, horse and dog. This pattern is typical of contemporary assemblages in the upper Thames Valley and further afield (Hambleton 1999). Similar proportions of the main domesticates occurred at a number of contemporary sites in the area, such as the Asheville Trading Estate (Wilson & Hamilton 1978). The remains appear to represent secondary processing of meat-bearing elements, with general stock keeping and slaughter taking place elsewhere.

Late Iron Age material was recovered from Plots 0.10 and 4.02. This small assemblage consists of cattle remains, along with a few bones of sheep and horse.

The largest assemblage by fragment count (10 NISP and 54 NISP respectively) came from the Romano-British phases at Plots 0.10 and 4.02. Cattle are again the dominant taxon, with smaller numbers of sheep/goat. This pattern has been cited by King (1978) as indicative of a 'Romanised' settlement, although the small size of the assemblage limits any further conclusions. Similar species proportions can be seen in the Early/Middle Roman phases from Alchester (Powell & Clark 2002). The elevated number of horse remains (13 NISP) from Plot 4.02 is unusual, but may simply be due to the more robust nature (and hence survivability) of horse elements. Overall, the Roman assemblage represents primary processing of complete carcasses, with no evidence for on site breeding. Pig is a minor taxon in all phases, probably being bred for meat.

The only wild species present was red deer,

represented by naturally shed antlers from the Middle Iron Age (Plot 0.01) and Roman phases (Plot 4.02).

OAE Plots 5.03-05

Some 566 fragments of animal bone came from the OA East evaluation and excavation at Plots 5.03-05, with 172 of these identifiable to species (31.7% of the total sample). The assemblage is dominated by domestic mammals, the majority from Romano-British contexts. Cattle is dominant in the Late Iron Age and Roman phases, along with far smaller numbers of sheep/goat remains. Pig is always a minor taxon. Horse remains are present in similar numbers to pig, a feature noted in other Roman assemblages from the region such as Fenny Lock (Hamilton-Dyer 2001), Alchester (Powell & Clark 2002) and Oxford Road, Bicester (Mould 1996).

The small Iron Age cattle assemblage consists of lower limb elements and loose teeth, along with a mandible from a young adult animal (*i.e.* over 3 years of age at death). All skeletal elements are represented, indicating that live animals (or at the least whole carcasses) were present on the site. Whilst a small number of juvenile animals were killed, the majority appear to have been culled when they reached around 3 years of age, continuing to be killed at regular intervals from then on, perhaps indicating a seasonal cull.

Sheep/goats consist of largely adult remains recovered almost entirely from Romano-British contexts. Four ageable mandibles came from animals around 2-3 years of age, with one extremely old individual around 8-12 years of age at death. Relatively few meat-bearing elements are represented, with those recovered largely being cranial and lower limb elements.

Pig remains are scarce, consisting largely of loose teeth and mandible fragments. A single ageable mandible came from an animal around 1-2 years of age at death. A number of the loose teeth are extremely large canines, suggesting male animals. Horse remains are similarly scarce, consisting of adult lower limb, cranial fragments and loose teeth. A single mandible came from an animal around 6-7 years of age.

While this is an extremely small assemblage in comparison to other much larger sites in the area, species distributions between these and the NAL sites appear similar. Cattle are the dominant species in the assemblage, being kept and slaughtered on

site, largely for meat. There is some evidence for the presence of younger animals, but not necessarily on-site breeding. Sheep were butchered on site, with the meat-bearing elements subject to secondary processing elsewhere. Again, there is no evidence for on-site breeding. Pigs were probably bred for meat, with secondary carcass processing taking place elsewhere.

No wild species were present at the OAE sites.

Plant Macrofossils by Val Fryer (NAL) and Rachel Fosberry (OAE)

Plot 4.02

Of 54 plant macrofossil samples taken from features at the NAL sites, most remains appeared to be derived from scattered or wind-blown refuse. The waterlogged/de-watered fills within the Roman timber-lined well (42014) at Plot 4.02 were more informative.

Charred cereal grains and chaff occurred at a low density within all four of the well assemblages (fills 42139, 42143, 42144 and 42145). Both oat (*Avena* sp.) and barley (*Hordeum* sp.) grains were recorded along with wheat (*Triticum* sp.) chaff, and a few double-keeled spelt wheat (*T. spelta*) glume bases.

The few charred weed seeds are all of common segetal weeds including brome (*Bromus* sp.), goosegrass (*Galium aparine*), grasses (Poaceae), knotgrass (*Polygonum aviculare*) and vetch/vetchling (*Vicia/Lathyrus* sp.).

The well assemblages are dominated by seeds of grassland herbs and ruderal weeds. Taxa noted include fool's parsley (*Aethusa cynapium*), musk thistle (*Carduus* sp.), thistle (*Cirsium* sp.), hemlock (*Conium maculatum*), dead-nettle (*Lamium* sp.), meadow/creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus*), small-flowered buttercup (*R. parviflorus*), dock (*Rumex* sp.), sow-thistle (*Sonchus asper*) and stinging nettles (*Urtica dioica*). The occurrence of a single seed of sainfoin (*Onobrychis viciifolia*) within the assemblage from fill 42145 is of interest as it provides a further early example of a plant previously thought to be a later medieval introduction to Britain (Fryer, forthcoming). Wetland plant remains are scarce, with only a single possible parsley piert (*Aphanes arvensis*) seed being found, along with a small number of sedge (*Carex* sp.) nutlets. Tree/shrub macrofossils include sloe type (*Prunus* sp.) fruit

stone fragments, bramble (*Rubus* sect. *Glandulosus*) 'pips' and elderberry (*Sambucus nigra*) seeds.

The predominance of ruderal weeds and grassland herbs suggests that the well lay within an area of poorly maintained, rough grassland. There is limited evidence, in the form of seeds of annual weeds such as orache (*Atriplex* sp.), that some ground in the immediate vicinity was disturbed, although this could have occurred when the well was constructed. Somewhat surprisingly, there is little to suggest that the well contained any depth of standing water and by the time the studied deposits had accumulated, the feature was at least partly overgrown with thorny scrub and colonising shrubs.

Although evidence for the wider environment is somewhat limited, the character of the remains suggests that the well was situated reasonably close to other domestic/agricultural features. The composition of the charred assemblages suggests that the production and possibly the processing of cereals were of some importance during the relevant period. However, as with other contemporary sites, it seems likely that these activities were not a major economic factor, but rather the day-to-day processing of grain to meet the basic requirements of the local inhabitants. The large amount of charcoal within fill 42144 suggests that some remains were deliberately dumped within a feature which, by this stage, served little other purpose.

Plots 5.03-05

At Plots 5.03-05 some 56 bulk samples were taken from pits, postholes, ditches and gullies which were predominantly Roman in date. Preservation is by charring and is generally poor to moderate. Charcoal fragments are present in most of the samples in varying quantities.

Charred plant remains are rare and occur in only 16% of the samples. Cereal grains are present in only five of the samples and chaff (predominantly in the form of glume bases) occurs in six samples. The morphology of the grains and glume bases indicate that Spelt wheat (*Triticum spelta*) is the only crop present in this assemblage. Legumes are represented by small peas (*Pisum* sp.) that were found only inside a pot. This Black Burnished ware vessel (Fig. 18, No. 22) was associated with Building 1 (Period 3.3, Phase 1, 6715). The sample from its fill contained the most significant charred

plant remains from the site, comprising almost equal quantities of chaff to cereal grains, suggesting that this vessel was used as a receptacle for crop-processing waste. The additional presence of charred peas is interesting since pulses are less likely to be burnt accidentally than grain as they do not need to be exposed to heat for storage as cereals do. A possible explanation is that the plant remains were burnt after they had been placed in the vessel. The vessel itself was broken and several fragments were coated in a carbonised residue, which may substantiate this suggestion.

Weed seeds are rare in the assemblage generally, occurring mainly as single specimens in only five samples. Dock (*Rumex* sp.) and small grass seeds (*Poaceae* sp.) predominate. The bulk of the charred plant remains in this assemblage probably derived from the scatter of dietary refuse and hearth remains.

WORKED WOOD by Mike Bamforth

The timber-lined Roman well found at Plot 4.02 (Fig. 9) consisted of three main parts: a base plate or support cradle of four timbers, the square timber lining (21 surviving timbers from 30 timbers recorded on site, laid in eight courses, the largest timbers first), and six additional timbers later provided for additional support. The two long elements of the base plate appear to be the trunks of small trees, whilst the remaining timbers are suggestive of limbs. The timber was locally available, low quality material (shaped oak timbers, some with side branches still attached) and could have been constructed with an axe, the timbers having been reduced by various types of splitting and with no evidence for finishing. The presence of a withy tie suggests that at least the base plate was prefabricated and lowered into the cut. The evident collapse in antiquity was caused at least in part by the cutting of mortise joints in poor quality timber, which would have lowered the load-bearing capacity of the base plate timbers.

The well lining is unusual in that it was not constructed on the base of the well, but instead was supported by a base plate and suspended almost a metre above the base of the feature. The timber construction is also unusual, in that its tapering form left only a narrow gap to gain access to the shaft from the top of the lining.

The basic level of woodworking demonstrated

would not have required a specialist carpenter. Roman well linings ranged from skilfully made, large robust examples, such as that found at Skeldergate, York (Carver *et al* 1978), to more primitive examples such as that from the subject site. The latter shares many of the common features or 'standard' Roman well design, dictated by necessity and Roman carpentry principles. This is typified by the use of split timbers, set in a square or rectangular lining with halving and lap joints utilised to key the timbers together.

DISCUSSION

Chronology

Other than residual worked flint, the earliest evidence for activity at the site took the form of unstratified Middle Bronze Age finds from Plot 5.03-05: very few Early to Middle Bronze Age metal objects have yet been recovered in the county. A knife-dagger found on Aston Hill in Aston Clinton is the only example anywhere near the subject site (Kidd 2008b, 17).

Two Late Bronze Age burials were present at Plots 0.01 and 0.10c, although it was in the Early to Middle Iron Age that settlement commenced at Plot 0.01. Small quantities of residual pottery of these latter periods were also found at some of the other sites. By the Late Iron Age, minor settlements and/or field systems were spread out along the course of the pipeline route (Plots 0.01, 0.03a, 0.10a, 5.03-05 and 7.01).

The fate of these different sites varied during the transition from the Late Iron Age to the Roman period. The earliest activity at Plot 4.02 was assigned to the Late pre-Roman Iron Age to Early Roman period, although the presence of Early to Middle Iron Age pottery suggests possible early activity in the vicinity. During the 1st to 2nd centuries AD, settlement and associated agricultural activity intensified at Plot 5.03-04, while at Plots 0.01 and 0.10a the farmsteads were evidently abandoned and the land was given over to fields. The field system at Plot 0.03 developed, while the waterhole at Plot 7.01 fell out of use. Plot 10b may have come into use as fields for the first time. These gradual changes probably reflect the combined effects of settlement nucleation, the presence of new roads and developing agricultural practices, such as the cultivation of new crops and

the introduction of the heavier plough, which opened up new land. Only the now dominant settlement at Plot 5.03-04 continued into the Late Roman period, with very limited traces of contemporary activity elsewhere along the route (at Plot 4.02).

Death and Burial

Other than a few isolated burials, there was little evidence for a 'ritual' aspect to the pipeline landscape, although the Middle Bronze Age dagger may hint at ceremonial use. The Late Bronze Age cremation burial found in Plot 0.10c joins the very few contemporary cremations recorded in this part of Buckinghamshire, although closer to Milton Keynes, Bronze Age cremations occurred at Gayhurst Quarry and Warren Farm (Kidd 2008b). Further west a single example, contained within a Deverel-Rimbury urn, was found at Site A, Alchester (Booth *et al* 2001).

The Late Bronze Age inhumation at Plot 0.01 – a young adult – was laid on its right side in a crouched position, this burial rite often being interpreted as a return to the womb and/or Mother Earth. The burial conforms to a recognised Bronze Age funerary practice in which individuals were placed in shallow oval and unfurnished graves in crouched positions (Lyons *in prep.*). Females were usually buried on their right sides (Ray 1999), suggesting the sex of the pipeline burial.

Of the two Roman burials found, one was of the 1st to 2nd century, while the date of the other remains unclear. The earlier burial (Plot 5.05) was a cremation associated with hobnails, suggesting that the individual was clothed on the pyre. During the Late Iron Age the pipeline sites would have lain within the territory of the Catuvellauni, a tribe whose burial practices included both furnished (Aylesford(-Swarling)) and unfurnished cremation. The burial type continued to be used for some time after the Roman Conquest, as at Plot 5.05 often including evidence for hobnailed footwear. The rite was gradually replaced during the 2nd century by Romanised traditions such as inhumation. In Aylesbury, Roman cremations have also been found at Great Brickhill and Billings Field (Zeepvat & Radford 2009). Many sites of the period provide evidence for mixed burial rites, containing both cremation and inhumation burials (Lyons 2011, 118–119); this may reflect the ethnicity or affiliations of the individual concerned.

The date of the inhumation burial found at Plot 4.02 remains uncertain. It was initially assigned an Early to Middle Roman date on the basis of the pottery contained in the grave, although the notable presence of a 2nd- to 3rd-century or later clasp knife handle with a possible Chi-Rho symbol *may* indicate a Late Roman date (4th century). This burial was, however, aligned north-east to south-west, rather than east to west in normal Christian fashion. Although north to south aligned Late Roman burials are uncommon, they are not unknown: three such examples were recorded, for example, at Little Keep, Dorchester (Egging Dinwiddy 2007). As discussed above, identification of the symbol on the pipeline knife – and thereby the date of the burial – remains equivocal.

Iron Age Settlement

As in much of southern Britain, the region north of the Chiltern Scarp was characterised by the expansion and intensification of settlement and agriculture during the Iron Age to Roman periods, with a gradual movement towards larger, nucleated settlements (Green & Kidd 2006; Kidd 2008a; Williams 2002). The pipeline sites conform to this changing settlement pattern, although only one site (Plot 5.03-04) provides potential evidence for nucleation.

Other than the scattered traces of Bronze Age activity noted above, the earliest evidence for settlement was found at Plot 0.01, which saw the creation of a farmstead in the Early to Middle Iron Age. While no roundhouses were found, the character and quantity of the finds assemblage suggests that domestic settlement lay nearby. This may have been linked to other settlements and outlying field systems by possible tracks/droeways. Two C-shaped enclosures were found and commonly occur on sites of the period; they may have served a range of functions such as livestock enclosures or activity areas. A similar enclosure associated with a roundhouse at Broughton Manor Farm near Milton Keynes, for example, was used for pottery manufacture while others, as at Plot 0.01, contained four-post structures (Atkins *et al* in prep.). Such four-post structures are ubiquitous at Iron Age sites, and are normally interpreted as raised granaries/stores or excarnation platforms. Given their setting and square form, those found at Plot 0.01 are likely to have served an agricultural function. Other examples recorded locally include

those at Coldharbour Farm and Aston Clinton Site B (Parkhouse & Bonner 1997; RPS 2005).

At Plot 0.10a, various parallel beamslots or gullies and ‘working areas’ found in association with evidence for metal working may suggest the presence of a related building. It has proved difficult to find parallels for this suggested structure, particularly at this early date. A possible Romano-British smithy found at Love’s Farm, St Neots (Cambridgeshire) is of quite different form (Hinman & Zant, in prep.), although this may simply reflect its later date.

Plot 5.03-05 contained the only evidence from the pipeline sites for the presence of Late Iron Age roundhouses, in this instance associated with possible haystacks. This settlement may have had a craft/industrial, as well as agricultural function (*i.e.* metalworking, see below).

The two roundhouse gullies found at Plot 5.03-04 had internal diameters of between 6m and 10m, falling within the range of roundhouse sizes recorded at Alchester (Booth *et al* 2001, 57) and Bicester Fields Farm, Bicester (Cromarty 1999, 167, 227). Of note at the latter site are the penannular gullies recorded to the east of the roundhouse, interpreted as possible haystack rings. Three similar shaped although larger gullies were recorded in the eastern part of the Grendon Underwood site. At Alchester Site D a number of penannular gullies were recorded (Booth *et al* 2001): few internal features were observed and, whilst they may have represented roundhouses, at least one was very similar in size and form to the putative haystack rings identified in Plot 5.03-04. Part of a similar feature was also exposed during evaluation of Berryfields, Aylesbury (Oxford Archaeology 2002).

In terms of the duration of the settlement it seems that this site is fairly typical of a pattern of population expansion within the region, beginning during the 1st century BC; on this site and at Aston Clinton and Bicester Fields the pottery assemblage comprised sand-, grog- and shell-tempered wares dating overwhelmingly to the Late Iron Age (Wells & Slowikowski, above). This expansion may have been driven by improved trade links which followed the Roman invasion of 55 BC (Masefield 2008, 192).

The Agricultural Economy: Iron Age to Middle Roman

The Middle to Late Iron Age pattern of a mixed agricultural economy centred around the rearing of cattle and sheep and the growing of spelt wheat recorded from the pipeline route is typical of sites in the vicinity, such as the Stoke Hammond Bypass North Link and ABC sites (Edgeworth 2006; Moore *et al* 2007) and Coldharbour Farm, Aylesbury (Bonner & Parkhouse 1997). Indeed, sites associated with the corralling, droving and rearing of cattle are commonly found in Buckinghamshire north of the Chiltern Scarp, a prime example being Aston Clinton Site B (RPS 2005). Evidence from these sites also suggests that the Aylesbury/Milton Keynes region had largely been cleared of woodland by this time and was primarily open grassland, used for grazing and the growing of wheat (Green & Kidd 2006; Kidd 2008a). The presence of only a single waterhole along the pipeline (at Plot 7.01) and the relatively limited evidence for livestock enclosures at this and other plots may suggest that cattle were not as dominant in the economy as at some other sites, which often contain such features; this, however, may simply reflect the position of the excavated areas.

During the later prehistoric period, settlement became widespread and more substantial throughout the county. Stock enclosures, droveways and the increased frequency of cattle bone in faunal assemblages combine to indicate a strong pastoral element to the economy, with sites on the heavy clays perhaps specialising in this niche (Williams 1993). Environmental evidence suggests that a more mixed agriculture was prevalent in the river valleys. Within the Vale of Aylesbury, isolated examples of Iron Age ditches indicate a more structured landscape (*e.g.* Dinton and Princes Risborough) and these may relate to some extent to the suggested co-axial pattern of trackways across north Buckinghamshire. The local area was apparently dominated by such co-axial arrangements of field systems, arranged across the landscape between the various scattered and isolated settlements (Bull 1993; Williamson 2002; Green & Kidd 2006). Several of the pipeline sites contained the remnants of such field systems, typically following a roughly north-east to south-west or north-west to south-east alignment. As is the norm, these often replaced earlier, more curvilinear field systems.

Plot 0.03 appears to have seen more intensive

use during the Early Roman period, when new field boundary ditches created a ladder-type field system, following the same alignment as the earlier Iron Age boundaries and lying next to a track or droveway. Plot 4.02 saw a similar transition in which larger field boundary ditches were established on the same alignment as the earlier one. Additionally a relatively large number of perhaps settlement-related pits were created. The irregular character of one of the ditches here may suggest that it was of segmented form: such ditches are commonly found between the Middle Bronze and Late Iron Ages in south-eastern Britain, perhaps resulting from small quarries dug to produce a continuous bank in which to plant a hedge (Lambrick 2009, 58–60).

There was also intensification of use at Plots 5.03–04 in the Late pre-Roman Iron Age to early Roman period, which saw a formalised land boundary system replace the curvilinear enclosures and roundhouses of the Iron Age. Some of these evenly spaced north-east to south-west aligned enclosure ditches may have formed another ladder-type enclosure system: this appeared to respect the position of the earlier Iron Age roundhouses which perhaps remained in use. Similar ladder type enclosure ditches were recorded at the Berryfields site (Oxford Archaeology 2002, 33–34). Here the east to west spacing between the ditches, at between 25m and 30m, was broadly comparable with those found at the Grendon Underwood site. The overall alignment of the features was also very similar. Given that these ladder style enclosures often demonstrably extend out from spinal trackways (as at Plot 0.03) – parallels include the Berryfields site, Towcester and Alchester (Brown *et al* 1983) – it is suggested that a trackway linking to the Romanised road network lies in the vicinity of Plot 5.03–04.

Throughout all periods, the settlements along the pipeline appear to have been of typical low to middle order, with nothing amongst the pottery or other finds to indicate particular status, nor unusual trade links. In terms of its local and regional importance for the local economy, the key aspect to the site is the evidence for metalworking. Although no furnace or smithing hearth structures were found at the pipeline sites, there is a significant body of evidence for bloomery iron smelting being carried out in the immediate vicinity of the pipeline, particularly in the Late Iron Age. The homogeneous

microstructure and composition of the slag recovered suggests that the same source of ore and more significantly, processing techniques, were used over an extended period of time. This raises the possibility that these were methods passed down through a family group (MacKenzie, above). One implication of this is that perhaps a major source of income for the site in both the Iron Age and Romano-British periods was smithing; an inference reinforced by the unusually large number of complete nails, fittings, miscellaneous ironwork and smith's punch found at Plot 5.03-04 in the Late Roman period (see below).

The only previously recorded example of similar metalworking within the Vale of Aylesbury was at the Aston Clinton Bypass excavations (Masefield 2008, 192). Here smithing, in the form of smelting slag and forge bottoms, was in evidence (albeit as residual finds), meaning that the exact scale and location of the metalworking could not be pinpointed. To the south-east of the pipeline route, possible evidence for on-site smelting was recovered from Walton Court, Aylesbury. This site's location, 1.6km from Akeman Street, may indicate that it served a specialist function with good access to trade routes (Farley *et al* 1981). Further south-east, a large quantity of iron bloomery slag came from a possible villa at Great Missenden (Head 1964, 228–231). To the north, evidence for smithing has also been recovered from *Magiovinium* and the villas at Bancroft and Stanton Low (Zeepvat & Radford 2009).

Romanisation

Whilst the character of rural settlement in this part of Buckinghamshire is not fully understood, the excavation of sites such as Barton Court Farm, Abingdon (Miles 1986) and Oxford Road, Bicester (Mould 1996) has contributed to a growing body of evidence for continuity of settlement from the Late Iron Age into the Roman period. By virtue of distance, it appears that the centralising influence of major settlements such as *Verulamium* waned in this part of the county and, unlike the Chiltern villas, Romanisation of the area appears to have been more gradual with single farmsteads evolving – as at Grendon Underwood – into what might be termed 'cottage villas' (Masefield 2008, 194–196) or minor villas.

This is not to say that the conquest was not without 'immediate' effect locally. Within the Vale

of Aylesbury the establishment of Akeman Street, perhaps as early as the mid 1st century AD (Hands 1993) cannot be underestimated as a determining factor in the positioning of new settlements. The putative small town at Fleet Marston is perhaps a good example of this pattern (Zeepvat & Radford 2009, 57). A wider road network, radiating out from the major line of communication represented by Akeman Street (Zeepvat & Radford 2009, 56; Masefield 2008, 196) is also in evidence with the sites at Fleet Marston and nearby Billingsfield identifying at least one secondary road, constructed in the 1st century AD, running north-west towards the Roman temple at Thornborough (Cox 1997). Further re-alignment of local settlement activity as a result of the improved infrastructure can also be seen at the Berryfields site where a series of rectilinear enclosures fronted onto a ditched trackway dating from the 1st to 4th centuries AD (Oxford Archaeology 2002, 33–34).

Roman Farms and Villas

The layout of the Roman farm at Barton Court in Abingdon (Miles 1986), to the south-west, provides a good parallel for the Late Roman remains found at the Grendon Underwood site (Plot 5.03-04). At Abingdon, the Late Roman farm lay within a sub-divided enclosure measuring 128m by 112m. Bearing in mind the limitations of the Grendon Underwood excavation (*i.e.* the constricted size of the excavation trenches), the settlement boundaries identified here suggest a settlement somewhere in the region of 100m to 150m on its east to west axis. The relative growth of the Barton Court farm over time is also broadly comparable, with a similar expansion and intensification of activity during the 3rd and 4th centuries (Miles 1986, 30–32).

An attempt was made at Barton Court to generate a model for the settlement based on analysis of the building and land attached to the site (after Applebaum 1972) and also site catchment analysis (after Barker & Webley 1977). This determined a 'best fit' model of a farm requiring up to eight permanent adult occupants and five seasonal workers for its maintenance (Miles 1986, 41–42). In this instance one of the factors taken into consideration was the size of the Barton Court farm house, which had eight rooms and a ground floor area of up to 250m² (Miles 1986, 30). Based on the size of its footprint, Building 1 at Grendon Under-

wood was a maximum of 100m². A structure of comparable size and type lay to the east of the main farmhouse at Barton Court (Miles 1986, 31–32). This two-bayed structure, of stone and half timber-frame construction and measuring approximately 9m x 13m, was interpreted as a ‘cottage’, with the possibility that at least part of the building was open ended to facilitate its use as a workshop. Interestingly, a smithing function was considered for this structure, but ultimately discarded (Miles 1986, 31). This comparison suggests that Building 1 at Grendon Underwood, which also appears to have been open ended, may have similarly represented a satellite structure associated with a larger building lying beyond the limit of the excavation. The recovery of a relatively large assemblage of ironwork and the smith’s blank also suggests a probable workshop function (Crummy, above).

Elsewhere, the Roman settlement at Alchester boasted a far greater number and range of structures (Booth *et al* 2001, 435–438). Structurally, the closest parallel to the Grendon Underwood building recorded at Alchester was Building N, which was constructed in the early 4th century, and measured approximately 8m x 7.5m (Booth *et al* 2001, 435–438, fig. 5.100 and 5.101). Here, the northern wall, which was actually a re-used element from an earlier phase, was the only stone-built foundation in evidence, the remaining walls being post-built around a superstructure based on six putative post pads.

Roman Constructional Techniques and Building Status

It was suggested at Alchester that composite stone/timber construction and mass walling material such as cob were commonly used at these low/middle order settlements (Booth *et al* 2001, 436) and perhaps representative of a continuation of Late Iron Age traditions into the Roman period. Also of note is that, at least in part, the large quantities of stone recorded at Alchester represented remnants of surfacing rather than collapsed superstructure. Building 1 at Plot 5.03-04 seems to broadly fit this model. It had attributes typical of both stone and timber-framed construction and the analysis of the building stone recorded a number of possible floor stones, roofing stones and large quantities of brick, which may have been used as flooring or wall bonding.

There is generally little to suggest that the

Grendon Underwood site was of particularly high status, making the choice of stone roofing for the building somewhat anomalous; there is very little evidence for the use of this material locally with the closest source of possible material lying 15km to the north, which rules out expedience as the deciding factor in its use. The implications of this are twofold. Firstly, whoever was responsible for the construction was sufficiently wealthy to source and transport the roof stone. Secondly, they were consciously constructing a building that would stand apart from the thatched or ceramic tile roofed buildings that would have been prevalent in the area. The only other available evidence suggestive of relative wealth is the large number of box flue tiles and bricks recovered from the destruction layers, which imply the presence of a hypocaust in the vicinity, yet there is little in the finds assemblages to set this site apart from other low to middle order settlements within the region (see below).

It is suggested that the remains recorded at Grendon Underwood represent a satellite dwelling/workshop associated with a larger and presumably more opulent villa type construction. Possible reasons for constructing such a building in a similar style to the main household could include a territorial function and the display of wealth this would demonstrate, or simply a reflection of the re-use of discarded or excess building materials associated with the original construction of the main household. Such secondary usage of materials might also explain the presence of large quantities of brick and hypocaust tiles that are normally associated with villas.

The ‘Villa’ Economy

A small scale, craft-industrial function (such as metalworking) would perhaps explain the relatively plain, undecorated pottery assemblage from Plot 5.03-04. Despite the site’s probable association with a villa, the proportion of Samian within the pottery assemblage (2.3% of the total) was very similar to, or even marginally lower than, that recovered by the excavations at the Aston Clinton bypass (Masefield 2008, 194) and Alchester (Booth 2001, 277) where Samian wares comprised 2.4% of the total assemblage. Neither can the fragment of an Early Roman Hod Hill brooch, possibly associated with the Roman army (Crummy, above), be taken as an indicator of elevated social standing;

at Alchester, at least six fragments of militaria were recorded (Booth *et al* 2001, 442). At Aston Clinton a button and loop fastener, also commonly associated with military garments were recovered (Masefield 2008, 194).

The Late Iron Age and Roman metalwork from Plot 5.03-04 chiefly consists of ironwork, predominantly nails and other fittings, assemblage characteristics that are typical of rural sites in southern Britain. The general absence of other personalia provides little evidence of the identity, gender or status of the inhabitants of the settlement, but rather points to subsistence living, with no engagement with traded goods or the conspicuous consumption typical of contemporary urban living. The exceptions are at least one key, which suggests the need to secure buildings and protect portable property of some value, and a stylus fragment which may indicate an administrative function. The coin assemblage attests to increased activity at the site in the late 4th century.

While cattle, sheep and pigs were kept and processed on site, the faunal assemblage revealed little evidence for animal breeding or husbandry, suggesting that this was not a significant part of the site's economy.

'Villa' Abandonment

The finds evidence points to the survival of Building 1 into the 4th century – the presence of Nene Valley and Oxford wares, along with a single sherd of Hadham ware, suggests Late Roman occupation. The Hadham ware sherd in particular was taken as an indicator of very Late Roman occupation at the Aston Clinton excavations (Masefield 2008, 197). This Late Roman date is corroborated by the presence of four Roman coins associated with the destruction of Building 1 that date to AD 364–78. A mid to late 4th-century bracelet was also found nearby.

As to the manner of the abandonment of the site it is not possible to say whether the demise of Building 1 was deliberate demolition or a result of neglect. Burnt material was concentrated towards the northern part of the Building 1, although seems more likely to have been associated with the function of the building, perhaps the site of a hearth, rather than evidence for its destruction by fire.

From the available evidence it is suggested that continued occupation of the site in the post-Roman period was limited and short lived; the only

evidence for any later activity at Grendon Underwood being the undated sub-circular enclosure truncating Building 2. Although it was characteristic of the post-Roman activity at Barton Court, Alchester and Aston Clinton to re-use Roman settlement forms with little change to the landscape, this was accompanied by admittedly sparse finds assemblages, which were entirely absent from the Grendon Underwood site.

CONCLUSIONS

Taken as a whole, the pipeline sites provide a valuable and important insight into the Iron Age to Roman transition within an area of Buckinghamshire that has been subject to little prior archaeological investigation. The project provides an interesting example of the gradual Romanisation of an area lying beyond the influence of major Roman centres but close enough to major routes, in this case Akeman Street, to benefit from the opportunities for trade that these networks afforded. It is particularly significant that one site appears to have been a satellite or ancillary settlement associated with a villa whose precise location is as yet unknown.

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