

Addenbrooke's Hospital Water Main Diversion

An Archaeological Investigation



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Summary

An archaeological trench evaluation was undertaken at the end of October/ beginning of November 2007 to investigate the route of the proposed new water main diversion along the northern field boundary of the Addenbrooke's Hospital 2020 Lands re-development, just west of Robinson Way and south of Long Road Sixth Form College. Almost no archaeology was found along 225m of field edge, the exception being a single cluster of Early Anglo-Saxon pits and a well at the western end of this which contained small amounts of domestic and craft-working refuse and some 5th-6th century decorated hand-made pottery. The latter might represent the very fringes of Saxon settlement in the area which straddles the Roman Road that passes from NW to SE through the Long Road College playing field and the southern end of Hutchison site.

Introduction

An archaeological trench evaluation and excavation was undertaken by the Cambridge Archaeological Unit (CAU) between the 29th and 31st October and the 2nd to 8th November 2007 prior to the re-routing of a water main pipeline adjacent to Addenbrooke's Hospital. The work followed the archaeological methods statement (Evans October 2007) and specification approved by the Archaeology Section, CAPCA, Cambs. CC for the client Bidwells and the Cambridge Water Company. This involved the digging of a 1.1m wide trench over a distance of c. 225m, the latter following the exact line of the proposed new water main pipe diversion which ran parallel to and approx. 6m distant from the existing hedge line and boundary of the field adjacent to the southern edge of the playing field of Long Road Sixth Form College (Figure 2). The re-routing of the hospital water main was to be undertaken in advance of the construction of a new MRC building on this site as part of the Addenbrooke's 2020 Lands re-development.

Originally this evaluation was to be limited to the narrow zone of destruction within which the 1.5m deep pipe trench would remove potential archaeology (at or below 600mm), with the option of further excavation within the 10m wide working strip if significant archaeological remains were found. Following the discovery of these, a second 2m wide and 150m long trench was dug, the north side of which lay 3.6m to the south of the centre line of Trench 1. Both the length and position of this matched the proposed area of future archaeological excavation on the MRC site, the north edge of which lay only 10-15m to the south of here. In the mean time the position of the proposed water main had also been moved another 3m to the south, and the working strip extended to 13m, the latter distance measured from the inner (southern) edge of the field boundary ditch. Thus the 45m² boxed-out area to the south of Trench 1 (180m from its eastern end) which was marked out and then excavated following the discovery of archaeological features still lay within this 13m wide strip.

At the beginning of December 2007 a short watching brief was undertaken during the digging of the 1m wide water main trench over a 37m long stretch from the site entrance on Robinson Way southwards along the inside of the field boundary and landscaped embankment up to the point that this crossed to meet the roadside verge on Robinson Way.

Both the trench evaluation and small open area excavations have been included within this report, referred to jointly as the Addenbrookes Water Main Investigation.

Geology and topography

The natural (pre-construction) topography of the field to the south of the proposed water main diversion route lies within the range 14.3m to 15.5m OD, the land rising gradually from around 14.3m OD at the south end (close to the existing road crossing) to about 15m OD in the north-west corner (in the proximity of the railway line and the western end of the proposed water main diversion). The ground surface within the middle of this grassy field is undulating and appears to be artificially elevated on

account of the large amount of earth spoil and chalk marl which had been carted here and dumped during the construction of Addenbrooke's Hospital. Cutting diagonally across this is the line of the existing water main.

Landscape features in the form of low earth banks abut the eastern margin of Robinson Way whilst the older field boundary which follows alongside the northern pipeline route and the boundary with Long Road College consists of a shallow ditch as well as a barely perceptible low bank. The fields to the south of here which comprise the 2020 Land development lie on the north-east margin of the Addenbrooke's plain, the former flood plain of the Hobson's Brook. To the south-east of this lies Nine Wells, a slight rise in the chalk and the source of the Conduit, whilst behind this rises the chalk ridge of the Gog Magog Hills and Wandlebury.

The underlying geology on the west side of Addenbrooke's consists of chalk marl (The West Melbury Marly Chalk Formation of the Lower Chalk) overlain in places by thin patches of relict gravels which belong to the Third Cam Terrace (BGS 2000). The chalk is cut in places by sand and silt-filled palaeo-channels as well as shallow silt-filled solution hollows.

Archaeological background

The archaeology of the environs of Addenbrooke's Hospital has been the subject of a comprehensive study, the background and history of fieldwork for this being fully outlined in the desktop by Evans (2002). This includes reference to the previously known archaeology of the site such as the presence of a NW-SE Roman Road which passes through the middle of the hospital complex (see Figure 1) and to early excavations on an Iron Age settlement carried out by Cra'ster in the late 1960s during the original building of 'New Addenbrooke's' (Cra'ster 1969). Crop-marks identified from air photographs and believed to be part of a prehistoric field system were noted within the grounds of Long Road Sixth Form College immediately to the north of the current evaluation. These were then investigated in a trench evaluation, but the features remain undated (Abrams 2000). They also do not appear to extend southward beyond the boundary Long Road Playing Field. Hinman (2001) stressed the pre-Iron Age importance of this area of South-East Cambridge, although Evans has questioned his idea of the Gog Magog/ Addenbrooke's plain being part a 'special' prehistoric landscape.

Since 2002 four evaluations and one excavation have been undertaken by the CAU within the immediate hinterland of Addenbrooke's (Figure 1). This includes the evaluation fieldwork carried out in 2004 across the Bell Language School paddocks to the south-east of the hospital which recovered elements of a Romano-British field system and evidence of later Iron Age settlement (Brudenell 2004), and the 2002/2003 Hutchison Site excavations immediately to the north-east of the current site (Evans et al. 2004). The latter uncovered some moderately dense archaeology which included phases of later Mesolithic/Neolithic 'activity', some later Bronze Age settlement, and a main period of occupation dating to the later Iron Age and Early Roman ('Conquest Period') which included both pottery kilns and a cemetery (cremation and inhumation) that lay just to the north of the Roman Road. Three of the evaluations concern the 2020 Lands re-development of the Addenbrooke's site



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— Cropmark — Evaluation trench

547100/254400

Figure 1. Location plan, cropmarks and previous archaeological

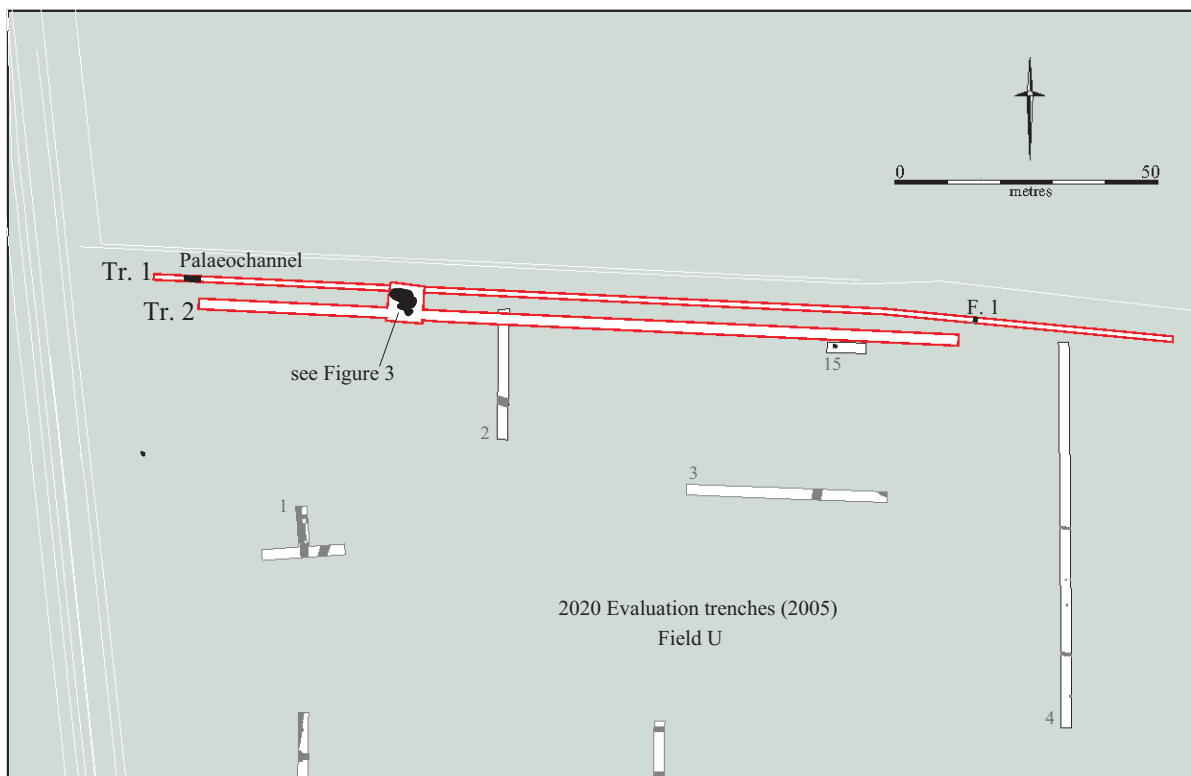


Figure 2. Trench plan

centred on the three fields (Fields K, L & U; see Figures 1 & 2) located to the west and south-west of the hospital (between Robinson Way and the railway line). The first of these evaluations consisted of a single trench (the Elective Care Evaluation) placed alongside the Robinson Way hedge which revealed Roman ditches and pits containing pottery of the 1st to 3rd centuries AD (Tipper 2003; Mackay 2004), whilst a second and larger area was evaluated for the part of the Guided Busway route which lay between the railway line and Robinson Way (the junction of Fields K, L & U), the latter revealing a similar archaeology dominated by pottery of 2nd to 3rd century date (Cessford & Mackay 2004). Subsequent to this targeted fieldwalking was undertaken within the Addenbrookes environs in 2004 to investigate the interior of specific cropmark enclosures, whilst between November 2004 and January 2005 the whole area of the 2020 Lands was investigated through fieldwalking, selected geophysical survey (including a magnetic susceptibility survey as well as a magnetometer survey focussing on a complex of cropmark enclosures within Field K (Site I) (see Johnson 2005)), and approx 2725m of trenching (a 2.5% sample of the area) across all three of the fields (Evans & Mackay 2005). Within the southern half of this area (Fields K & L) four main sites or grouping of archaeological features and cropmarks were identified. This included an interesting complex of double ditched enclosure ‘cells’ and surrounding paddocks located close to the railway line within Field K (Site 1), one suggestion being that this was part of an Early Roman military encampment or shrine complex, although the absence of Roman and presence of Late Iron Age pottery implies instead that this was an Iron Age settlement (Evans & Mackay *ibid.*). South of this was a complex of pits, ditches and a well/watering hole (Site II) associated with pottery from the 1st century BC to the 1st century AD suggesting a continuum of occupation from the Late Iron Age through to the Early Roman period, whilst several hundred metres to the north-east of this towards the top of Field L was a series of interlinking ‘ladder-like’ paddocks suggesting a further settlement complex (Site III) dating to the Late Roman period (3rd century AD), whilst at the far eastern end of Field L was yet another small area of Late Iron Age settlement (Site IV).

The northern half of the site (Field U) had proportionately less archaeology. Some fourteen shorter evaluation trenches within this area encountered Roman ditches on an E-W and NE-SW alignment at the south and eastern ends of the field, whilst Iron Age pottery was recovered from features encountered only at the north and north-eastern ends (Trenches 1, 2 & 4). Of particular interest however was the discovery of gullies and pits containing Saxo-Norman pottery (Ipswich wares) within Trenches 1 & 3 (Figure 2). These were believed to be *in situ* finds, suggesting the presence of Middle Saxon occupation within this area, perhaps even a settlement somewhere within the north-west corner of this field, and close to the site of the current evaluation. Similar evidence for this period of occupation was found at the Hutchison site less than 200m to the north-east (Evans et al. *ibid.*).

Although only eight sherds of Middle Saxon pot were recovered from Field U, this was still considered significant because of the paucity of material from occupation sites of this period. The two scenarios suggested were as follows. Either there was one large Mid Saxon settlement complex continuous with the Hutchison, or else the Field U site was a separate small hamlet (Evans & Mackay *ibid.*) If the latter, then the location of this immediately to the south of the line of the Roman Road may well be relevant to the position of the Hutchison settlement straddling this to the north. This

juxtaposition may serve to illustrate the continuity of this road alignment and area of settlement into the Early Medieval period.

To the west of Addenbrooke's and the railway lie the lands of Clay Farm, a large area evaluated by fieldwalking and trial trenching by the CAU in 2005 (Anderson & Evans 2005, Evans et al. 2006) with smaller areas of this excavated in full, such as on the line of the Guided Bus Route (Collins *forthcoming*) and the proposed Addenbrooke's Link Road (Timberlake 2007). The edges of Roman and Late Iron Age field systems were picked up on the margin of the chalk outcrop on the eastern side of the valley of Hobson's Brook (part of the Addenbrooke's plain), just to the west of the railway line, although there appeared to be no continuation of this westwards over the (once formerly damper) 'bottomlands' of Hobson's Brook. However, on the western side of the valley within the fields adjacent to Trumpington and Shelford Road significant groupings of cropmarks indicate the presence of fieldsystems and settlement, some of these indicating a significant Middle to Late Bronze Age presence with evidence of substantial ditches and pits which extend through into the Early Iron Age, then above this a superimposed Late Iron Age alignment of NNE-SSW of trackway(s) and fields along the edge of the Third Terrace. The latter reflect a possible continuity through into the 'Conquest' Period and a change to an Early Roman alignment, with the construction of paddocks and also horticultural beds similar to those also encountered within the 2020 Lands (Site III) and Bell Language School evaluations (Evans and Mackay 2005).

Methodology

The original 225m long evaluation trench (Trench 1) was dug from the west end of the northern field boundary, leaving a stand-off of approx. 15m from the railway fence line (for safety reasons), and a further stand-off of 5m from the line of the existing active water main. The trial trenching was undertaken using a 360° 13 ton tracked machine with a 1.1 m wide toothless bucket. The line of the proposed water main trench was first CAT scanned, then dug in sections, with the topsoil and sub-soil being dumped separately for the purposes of backfill and partial re-instatement prior to re-excitation for the pipeline. The topsoil and sub-soil layers were periodically scanned by eye and by metal detector for pottery and metal objects. A basic tape measure plan at 1:100 scale was made of the excavated trench, whilst the limited number of archaeological features were 50% hand excavated and recorded in section (at 1:10 scale) with layer and feature details entered on context sheets as well as in a site notebook.

Following the discovery of archaeological features thought originally to be pits related to a Grubenhau, a 7m x 6.5m boxed area was opened up on the south side of Trench 1 between 179m to 186m (from the east end of the trench). This was dug using a 7.5 ton 360° tracked digger using a 1.8m wide toothed bucket. The pit features within this were excavated by hand and 80-100% sampled by means of quadrants and a central north-south slot, leaving baulks 0.2 to 0.5m wide in between for the purposes of section recording. A base plan for the pit group was drawn at a scale of 1:20 whilst all the sections were drawn at 1:10. The CAU-modified MOLAS recording system was used throughout.

A second evaluation trench (Trench 2) was cut parallel with and 3m to the south of the first. This continued for about 150m to the east of the west end of the pipeline route. This was approx. 2m wide and dug using a 360° 13 ton tracked machine with a 1.8 m wide toothless bucket. A berm of about 2m was left around the margins of the excavation, thus Trench 2 was cut in two separate sections of about 40m (west end) and 104m (east end). Both of these were immediately backfilled after first checking for any archaeology, the levels and position of the ends of the trenches located using GPS.

The December watching brief involved monitoring of the digging of the 1m wide pipe trench, which given the depth of this, was simply a record of the depth to the truncated surface of the natural.

All work was carried out in strict accordance with Health and Safety legislation and with recommendations of SCAUM. The site code was AWM07.

Results

Trench 1

The geology and other non-archaeological features such as tree throws and modern deep ploughing scrapes were recorded in brief on a measured sketch plan over the 225m length, whilst depths to natural from the present ground surface were recorded at irregular intervals, but in particular where the topography of this changed. Apart from checking for possible archaeological features and buried soils the purpose of this recording was to obtain a reasonable E-W section across the natural surface in this field in order to better understand the sub-surface geology and topography and to calculate the possible influence of this on the location of archaeological features. This would provide a useful reference for any future archaeological work.

A number of tree throws were located within the first 30m at the eastern end, all of these apparently sterile, and none obviously ancient, whilst thin patches of gravel alternating with red silt covered the buried weathered surface of the chalk. Some of the silts appeared to be remnants of a fossil soil. A band of this (c.20cm deep) was sectioned some 73m from the E end and proved to be sterile, along with a number of shallow solution features (at 80m, 88m, 101m, 106m, 114m, 117-124m and 140m) variously filled with a chalky breccia, gravel, red silt and a fossil soil. Between 124 and 126m the base of a NNE-SSW empty channel cut through the top of the chalk (1.3m below the modern ground surface), whilst a much larger patch of gravel, sand and silt between 55m to 180m probably represented a small relict outlier of the Third Terrace. Patches of red silt give way to yellow silt and sands overlying the chalk between 140m and 225m with a major sand and coarse silt filled N-S palaeo-channel up to 1.9m deep (proved by sondage) cutting through the chalk outcrop between 211m and 224m (less than 20m away from the railway line). The latter channel possibly represents the very edge of the Second Terrace deposit which fills the former flood plain. The depth to natural along the line of the trench (and field edge) varied from 0.6m at the east end to 1m in the middle (120m), 1.25m (155m), 1.3m close to the palaeo-channel (214m), and 0.8m at the west end. The water table was encountered approx. 1.85m below ground level.

Modern deep-ploughing scrapes formed by a plough maul used for breaking up the sub-soil layers were encountered between 1m-2m, 18m, 31m, 50m and 120m from the east end at depths of up to 0.8m below ground surface. These followed a NE-SW strike. At the far eastern end other plough furrows were noticed at more regular intervals (1.5m apart) within the sub-soil at depths of only 0.5m, striking east-west. This plough ridging could also be seen in section across the uneven boundary between the topsoil [001] and the subsoil [002] along the length of the trench. This plough soil contained rare fragments of clay pipe stem, Victorian china, brick and occasional pieces of redeposited Roman tile and pot. The subsoil also contained a mixture of modern and abraded Roman brick, but was generally quite compacted, presumably on account of this field boundary having been used as a corridor for heavy machines during the building of Addenbrooke's and the dumping of vast amounts of soil and chalk marl on the surface of the field to the south. None of this dumped material was encountered within the trench sections, although the ends of several of the 2005 archaeological evaluation trenches (Tr. 2 & 4) were visible on the south side.

Only four archaeological features were encountered:

F.1 A N-S to NNE-SSW 'U' shaped shallow ditch cutting the natural gravel and silt some 66-67m from the eastern end (see Figure 2). The cut [006] for this was up to 0.95m wide and 0.34m deep, with moderately steep concave sides and a sharp upper break of slope; this contained a single primary fill [003] consisting of a dark grey silt with gravel-sized stones and a small amount of broken animal bone (food debris), plus two small slump horizons [004] and [005] adhering to the east and west sides of the ditch (respectively), both consisting of a mixture of gravel and stones set within a chalky marl silt. There were no dateable finds. However, based on its orientation, a Roman or Iron Age date seems likely (it is possible that these may be matched with ditches F.37 or F.38 encountered within Trench 10 of the 2005 evaluation).

F.2, F.3 and F.7 A group of three inter-cutting pits cut into the chalk 180m to 185m west of the east end of the trench (Figures 2 & 3). Only the north sides of these were cut and sampled. All three pits were filled with (covered by) an ubiquitous dark earth layer [009] containing charcoal, much animal bone, burnt stone, unburnt daub, some corroded fragments of iron (nails?), undiagnostic fragments of lava quern, whilst from the lower layer (012) came a single sherd of hand-made Early Anglo-Saxon (5th-6th century AD) decorated pottery. Pit F.7 (0.6m wide and up to 0.3m deep) with steeply cut sides and a rounded base appeared to be the earliest, the top of which had been truncated by the larger sub-rectangular pit F.2 (2m long) which contained several small slump fills of chalky material [018] plus a lower horizon [012] consisting of a dark grey silt with gravel, degraded lumps of chalk and occasional charcoal. Above this level the feature was cut by the edge of another deep funnel-shaped pit F.3. This contained an upper fill of dark earth with charcoal [009] separated by lenses of silt and chalky laminae [009b] which overlay a mid-brown naturally accumulated silt [37]. The latter filled the whole of the base of this steep, almost vertically sided feature.

It was not possible to fully excavate the above features within the given area of Trench 1, nor within the timescale that this remained open. However, on the basis that these could have been part of a group of Anglo-Saxon Grubenhaus (SFB) and/or pits, a larger area (7m x 6m) was boxed-out on the south side (and up to 0.5m on the north side) of the trench and then fully excavated (80-100% sample). All of these features are described in more detail under *Box 1 Excavation*.

Trench 2

No archaeological features were uncovered, either within the western or eastern sections of the trench. Towards the eastern end of the trench a number of small patches of an earlier soil horizon were identified overlying the natural. Whilst not forming any recognisable feature, these layer(s) of sediment were distinctly darker, containing charcoal, bone and some (Roman?) pot. None of the natural features were recorded given the proximity of Trench 1 and an existing log of the geology and depth to natural.

Box 1 Excavation

An open area excavation undertaken within this 7m long (E-W) and 6.5m wide (N-S) box revealed a dark-earth filled complex of 16 intercutting pits, apparently with no other features beyond (Figure 3). The sequencing of these would have been difficult to determine without full excavation, similarly to establish the presence or absence of any underlying Grubenhaus. Pits F.4 and F.6 were most clearly visible in plan (Figure 3) since both were late pits which cut the ubiquitous dark earth fill of the earlier features and were broadly speaking sub-circular in shape.

The pit group was excavated in total by means of successive quadrants (Figure 5). The former north-facing section of Trench 1 was re-cut and the northern edges of F.7, F.2 and F.3 were fully dug and a long E-W section (3a) drawn. The western half of this was then removed southwards and the remainder of features F.7, F.2, F.16 and the whole of F.15 and F.11 and the top of F.12 on the west side were excavated leaving sections to the south and east on a 0.5m wide E-W and a N-S baulk (section 6). Pits F.5 and F.10 and F.14 to the south of this were then partially excavated and the south and west-facing sections recorded (section 5). To the south of this the surface of the chalk (natural) rose steeply, thus the floor level for machining was shallower, leaving a step of about 15 cm (up) to the south side. Pit F.4 was 75% excavated from this level leaving an E-W baulk at the north end (section 2). On the north-east side another quadrant was removed, partially excavating F.9 and revealing the edges of F.6 and F.8 within the south and east-facing sections (section 3b). Within the north-east quadrant at least 50% of pit F.6 was excavated, catching the edges of F.9, F.8 and F.12 (section 4). This left an unexcavated N-S baulk between 0.9 and 1m wide in the centre. This was then excavated from the south end by means of a 0.7m wide slot, removing section 2 and exposing pits F.13 and F.8 within the floor and the whole width of the large deep pit F.12 at its north end. The western baulk provided a complete x-section through the pit complex at this point, including a section down to the bottom of F.12 which turned out to be a shallow well. This was excavated down to the water table and then below this down to a presumed base.

The following features are described broadly in accordance with the suggested sequence of pits and intercutting:

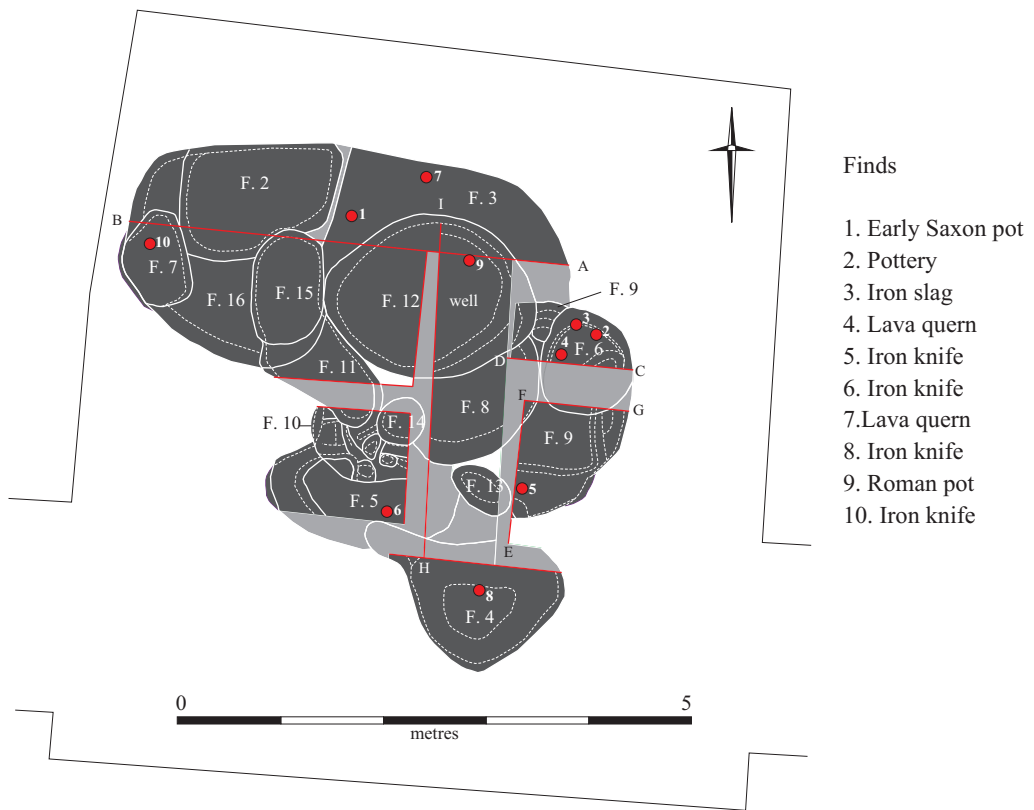


Figure 3. Plan of Early Anglo-Saxon pit clusters and finds

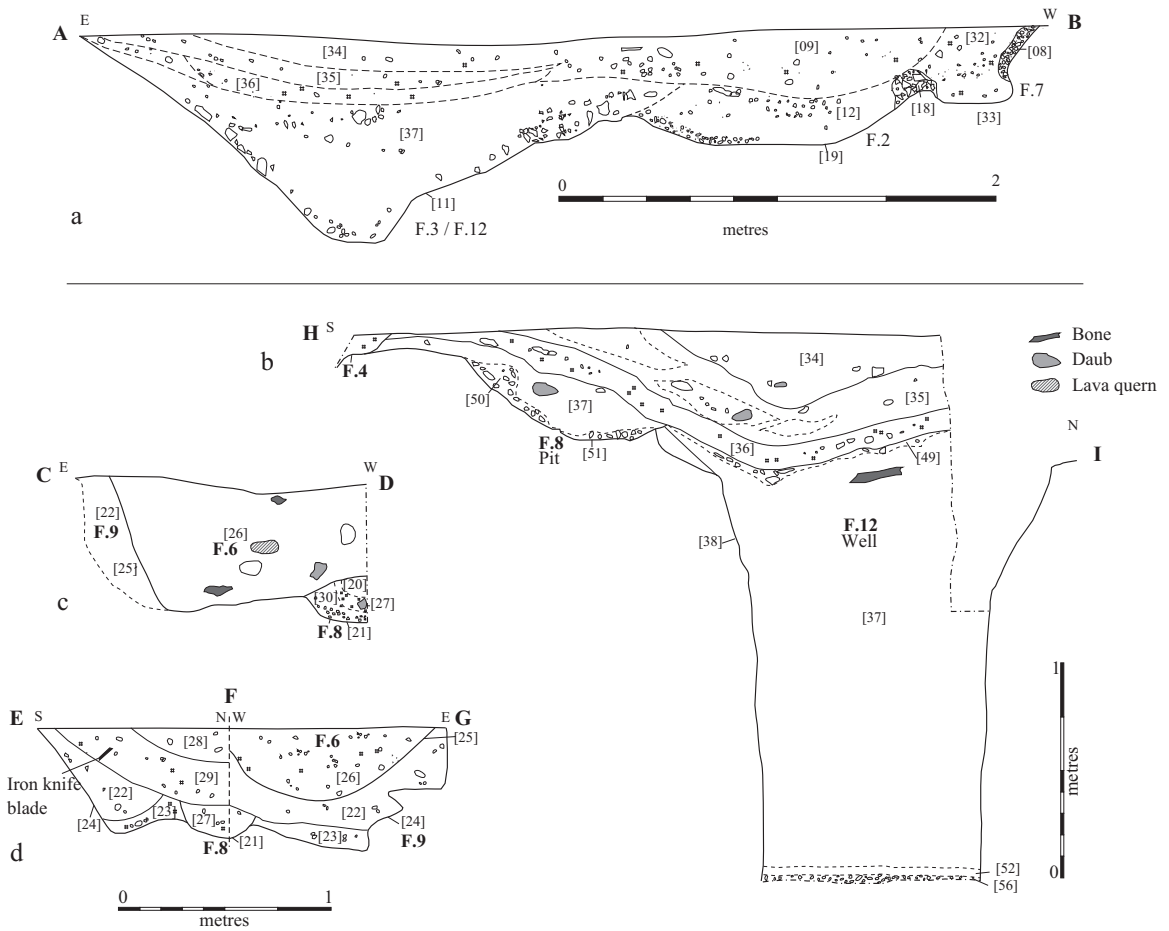


Figure 4. Archaeological sections through pits and well



Figure 5. View of pit cluster and well (looking Southeast)

F.7 - A small circular to sub-rectangular pit, 0.4m long, 0.45m wide and 0.34m deep, with steep sides slightly undercut to the west, and a sharp to gradual basal break of slope leading to a flat slightly concave base [033]. The lower fill consisted of a slump deposit of chalky material [018] resting upon the edge of the pit overlain by a primary fill [032] consisting of a soft black silt with moderate sized stones, flecks of charcoal throughout, animal bone and degraded daub (this latter layer was similar, possibly the same as the dark earth horizon [009] which covered/infilled the features on site. A corroded and broken iron knife blade was recovered from the above layer (Small Find 10). The top of this pit was truncated by F.2 and F.16.

F.15 - An oval-shaped pit, 1.05m long, 0.85m wide and 0.36m deep, with steep concave sides, undercut at the base, with a flat bottom. Contains a single fill of compact light brown clayey silt with occasional inclusions of stone and lumps of chalk. Some animal bone was recovered. The top of the pit at the south end has been truncated by F.11. Also cut by pits F.2 and the well F.12. Possibly this was contemporary with F.7.

F.2 - The well-defined cut [019] of medium-sized sub-rectangular pit, 1.3m long, 0.85m wide and 0.45m deep, with moderate to steeply sloping sides and a gentle basal break of slope. Slightly steeper on the north side than the south side, and undercut at the west end, possibly quarried. This contained three fills, amongst these being a slump fill [018] made up of lenses of chalk perched on the western and eastern sides of the pit and a remnant of a once extensive slump of chalky sediment from the north side, and [012] a basal layer of dark grey silt with occasional sub-angular gravel inclusions, degraded lumps of chalk and charcoal. From the latter layer came a sherd of decorated Early Saxon 5th - 6th century AD pottery (Figure 6) plus assorted fragments of Niedermeyer lava quern. No further pottery was recovered during the excavation of this pit. The main fill consisted of the later covering layer of sediment [009]. Within F.2 this consisted predominantly of a dark grey silty loam [009 (=034)] with occasional small to medium sub-angular flint pebbles plus rarer large sub-rounded cobbles of sandstone, flecks and lumps of charcoal throughout (but more common towards the base), and lumps of degraded chalk, once again most frequent towards the interface with the lower fill. This layer contained much animal bone (food waste) plus large fragments of unburnt daub. At this point it contained no separate lenses of material. A bulk environmental sample of this was taken for seeds, charcoal and molluscs.

This appeared to be one of the earliest pits located alongside F.16 (with which it was closely related - perhaps as re-cut?). It truncated the top of F.7 and was itself cut by F.3 (and/or F.12), the latter below the level of horizon [009] (see Figure 4a). The steep cut/undercut of this has resulted in the slumping of chalk into the base and down its sides.

F.16 - A large sub-rectangular and asymmetrical pit encompassing (all or part of) F.2; approx. 2.2m long, 2m wide and 0.5m deep, steep along the north side, shallow on the south side with concave-irregular sides [055]. This truncates the top of the earliest pit F.7, but is itself truncated by the well F.12 and pits F.15 and F.11.

F.11 - An elongate-oval 'bath-shaped' pit approx. 1.5m – 2m long, 0.35-0.45m wide and 0.7m deep, with moderate-steep sides, near vertical to undercut (concave) in places, with a flattish to concave base [042]. This contained three fills; a basal compacted mid-grey silt with rare stone [041], a redeposited white marl/slumped natural [040], and a mid-brown sandy silt spread over the top of the feature [039]. No finds were recovered. The complete absence of later fill (such as [009]) attests to the early sequence of this, though the pit clearly truncates F.15 and F.10 (to the south).

F.5 - Irregular oval-shaped pit up to 1.8m long, 0.8m wide and 0.55m deep, with steep undercut sides (some with possible tooling marks) and a flat to concave irregular base [054]. This contained a basal fill of light grey-brown silty sand (similar to [045]) with frequent lumps of chalk, occasional stones and gravel inclusions [057] overlain by the dark earth [034]. This lower fill was sterile, but from the upper covering layer came an iron knife (Small Find 6). The find of the latter was perhaps unrelated to this feature. Excavation suggests that the pit may in part be natural, as indicated by the solution features within the top of the chalk. However, this surface has clearly been dug into, perhaps as a quarry. This is cut by another 'quarry pit' F.10 just to the north. On the east side this was probably truncated by pits F.8 and F.13.

F.14 - A now small circular pit (0.25m long, 0.23m wide and 0.15m deep) with moderately steep sides and a flat base [048]. The surviving base of this was filled with a moderately compact marl with occasional stones veined through with a thin iron pan horizon [047]. Contained no finds. Possibly a quarried pit within an area of partly natural features (solution features) which covers the surface of the chalk. This appears to cut the much shallower pit F.10 as well as F.8.

F.10 - A sub-circular pit approx. 1.2m long, 0.7m wide and about 0.5m deep with irregular and uneven sides, steeply undercut in places, and an uneven hollowed-out base [046]. This contained a primary fill of light grey-brown silt with frequent lumps of chalk, occasional stones and gravel inclusions [045]. Overlying this was the ubiquitous 'dark earth'; a black clay-rich silt with frequent chalk particles, occasional small stones, gravel and flecks of charcoal [034]. As with F.5, this feature appeared to have a partly natural, frequently pitted base, yet with a quarried-away undercut to the east (up to 20 cm under). Truncated on its north side by F.11 and to the east by F.8. Subsequently cut by F.12.

F.9 - A sub-circular pit in plan, irregularly cut in x-section [024]. This was 2m+ long, 1.5m wide and 0.65m deep pit with steep to moderate sloping sides, near vertical in places, with an irregular slope and edges (possibly partly natural), and a flat to irregular base. Contains four fills; a basal soft light brown-grey silty clay with occasional medium-sized stones, rare gravel and a number of large pieces of charcoal [023]. This was overlain by a compact mid red-brown silty clay with occasional gravel and small stones, flecks and lumps of charcoal, and lumps of chalk [022]. The overlying 'dark earth' layers consisted of [029] (= [036]) and [028] (= [035]). Layer [029] consisted of a dark brown-black clay silt with moderate amounts of charcoal flecks (plus larger pieces), patches of chalk, occasional small stones and gravel, animal bone and daub. Alongside this was found an almost complete, bent and worn iron knife blade (Small Find 5). The latter was recorded in section 3b (see Figure 4d). Above this, layer [028] consisted of a dark brown to orange silt with occasional grit and chalk. Finds included a single sherd of (Saxon) pottery from [022] plus the iron knife and daub from [029]. As with F.5 and F.10, it appears that at least part of this feature may be a natural solution feature, even though this been subsequently cut as a pit. The basal layer of charcoal and clay [023] may be *in situ* and part of an original pit fill, but this is now difficult to determine. The pit is cut by F.8 (which also cuts F.10), F.13 and the later pit F.6.

F.8 - An oval to sub-circular shaped pit, 1.8m long, 1m+ wide and 0.4m deep, with moderately steep straight to concave sides leading to a flat base [021]. The profile of this can be seen in the north and east-facing sections (section 4) as well as in sections 3b and 7. The basal lens consisted of a mid brown clayey silt with gravel [050], but elsewhere this was a mid to light brown clay silt with chalky streaks and fragments of chalk [030]. However, the floor of the pit in places was covered by a mid brown to dark grey silt with lenses of darker organic and burnt material which included charcoal, fragmented chalk, degraded daub and inclusions of bone [027] (this may be equivalent to the charcoal-rich dark earth horizon [036]) (see Figure 4d). Overlying this was a light to mid brown silt with a mixture of small degraded daub [020] (= [035]), and above this [031], a light grey silt with daub and chalk (= [034]). This appears to a large shallow pit within the middle of the pit cluster, but is moderately late in the sequence. F.8 cuts F.9, although the later fill of the latter (the 'dark earth') covers both.

F.13 - A small shallow oval-shaped pit (0.35m long, 0.25m wide and 0.15m deep) with steep to moderately steep concave sides [053] located on the edge of F.9. No primary fill was observed although the pit here was covered by the 'dark earth' layers [036] and [037].

F.12 - An oval-shaped pit (1.8m long (E-W) and 1.5m wide (N-S)), funnel-shaped at the top with straight to slightly concave but moderately steep sides [038]. This becomes a well with an approximately cylindrical shaft (2.01m deep and 1.1m in diameter) approx. 0.6m below the upper break of slope (see Figure 4b and 5). The funnel-shaped top of F.12 is filled with a more developed sequence of 'dark earth' fills ([036] – [034]) plus a thin interface layer [049]. The latter overlies about 1.8m depth of natural silt infill [037] (= [010] see section 3a) consisting of a compact mid grey-brown clay with occasional small charcoal flecks, patches of white marl, and some large animal bone towards its top. This same fill however appears to be completely sterile lower down (after 20cm). This then becomes more clay-like, the water table being reached at about 1.4m.

At the base of what appears to be the flat-bottomed well shaft a compact layer of gravel in clay-silt was encountered [056]. The latter horizon had formed a hard ground which could have been sitting within the base of this cut, however, the actual chalk beneath this was not reached, the feature at this depth

being too wet to sample (Figure 7). The bottom of this (> 2m depth) was augered for another 0.2-0.3m but all of it appeared to be natural. No waterlogged wood or other finds were recovered.

Immediately above this gravel had been deposited a thin layer of washed-in sandy silt and clay along with darker grey silt (earthy) patches [052]. At the top of this lay the interface layer [049] formed between this and the charcoal-rich 'dark earth' [036]; a thin layer containing charcoal, flint and occasional chalk. Above this the 'dark earth' formed a laterally extensive horizon of burnt material with lumps of charcoal indicating possible dumped hearth waste and lots of daub. Succeeding this was a layer of more heterogeneous material; individual dump lenses representing pockets of mixed backfill, the latter consisting of a mixture of dark grey and orange-brown silts [035]. This contained both bone and daub. Above lay a more thickly developed and uniform silt [034] (= [009]) from which was recovered a small amount of pot, an iron nail, and a much larger amount of animal bone (food waste) and daub debris. Within this was also found the re-deposited pedestal base of a Roman pot (Small Find 9).

The above sequence ([036] – [034]) represents the most complete and clearest to interpret development of this 'dark earth' fill, also the location of its maximum accumulation within the subsidence above the silted-up and buried well. This well, or the last phase of it which we see now, is one of the latest features, centrally located and cutting many of the other pits on site.

F.3 - Whilst this could still be a pre-cursor pit or earlier cut for this well, it seems likely that this feature is no more than the northern edge of this shaft and well rim (F.12) picked up on the edge of Trench 1 (Figure 4a). Here the edge of the 'dark earth' complex consists of only 30cm of deposit, with less clear evidence of the burnt horizon [036], the orange-brown and grey silts ([035] and [034]). The remains of a ledge around the northern rim of this feature, either connected with the main phase, or an earlier use of the well, continues to be ambiguous. Possibly over-dug and simply the remains of a slumped edge, this might have been a ledge to stand on, or else the edge of an earlier well associated with the earliest pits.

F.4 - The cut of a sub-oval shaped pit at the southernmost end of the cluster of pits which is 1.7m long, 1.3m+ wide and 0.61m deep [017]. This was both sub-rounded and slightly irregular in outline around its north-west margin, with near vertical upper edges and steeply sloping sides towards its base. A gentle basal break of slope led into a slightly rounded base. Contained four fills; [016] a light grey soft and sticky clay with frequent charcoal flecking, frequent small grit and flecks of chalk, and finds of fired clay (daub); [013] a compact grey-brown silt and chalk slump fill against the west side of the pit, consists of rare medium stones and occasional charcoal flecking, but no finds; [014] a soft and very dark grey and black clayey silt with frequent charcoal flecking, moderate chalk flecks and occasional medium sized stones, [015] the uppermost fill on the east side, consisting of a compact mid brown silty clay with moderate chalk inclusions, occasional charcoal flecking and moderate small stone inclusions, with finds of bone and burnt bone. From the main fill [014] came finds of iron (nails and broken knife fragment (Small Find 8)), animal bone, redeposited Roman brick/tile, daub and burnt bone. Some of these contexts may be contemporary with the activity of the pit. This appears to have been dug through pre-existing dark earth sediments infilling earlier pits. May be contemporary with F.6 and amongst the last features on site.

F.6 - A sub-circular pit (1m long, 0.8m wide and 0.6m deep) with steep straight sides and a gentle to sharp basal break of slope leading to a flat, slightly concave and uneven base [025]. This pit cuts through the ubiquitous 'dark earth' layers ([036] – [034]), and at its base the chalk. Its outline is visible at surface. The single fill [026] consisted of a dark brown to dark grey clay silt with (in places) patches of a dark brown-orange sandy silt. Contained moderate amounts of small to medium sized stones and chalk inclusions, occasional small fragments of charcoal, and much degraded (unburnt) daub (see Figure 4c). This also contained minor burnt stone and burnt daub, rare fragments of calcined bone, lots of animal bone (incl. bovid), some rare pieces of iron slag, small unidentifiable fragments of corroded iron, a few small sherds of pottery and fragments of lava quernstone (broken up). One of the two latest pits (F.4 & F.6), F.6 cuts F.9, F.8 and F.12 (F.3).

Watching brief

No archaeology was observed during the digging of this 1m wide water main trench alongside Robinson Way. At its north end the trench was 2m deep and this truncated the natural at a depth of 0.8m, whilst at the south end it was 3.5m deep. However, at this point the depth to natural could not be detected.

Discussion

The discovery of this pit group and well, backfilled with soil and a burnt dark earth containing 5th - 6th century Anglo-Saxon pottery, bone waste, iron knife blades and fired and unfired clay provides us with an unusual cluster of features in what otherwise seems to be an archaeologically empty area (immediately to the west and east). Currently there is nothing to suggest a broader Early Anglo-Saxon settlement context. However, the recovery in 2005 of what was then referred to as 'Saxo-Norman' pot from evaluation trenches less than 50m to the south of here begs the question as to whether the latter (pottery types) may actually have been earlier, thus from earlier features, or whether this was just the later continuation of a much earlier settlement presence. More interesting still was the reference to an unexcavated 'black pit' (F.74) with Trench 15, the latter lying parallel (alongside) and just a few metres away from Trench 2 of the current evaluation (Evans & Mackay 2005). This description could have been referring to the existence of yet another one of these quite characteristic dark earth filled Early Anglo-Saxon pit cluster(s) for which pretty close parallels can also be found amongst the hundreds of intercutting pits at the Early Saxon settlement of Bloodmoor Hill, Carlton Colville in Suffolk (Lucy et al. 2008 *forthcoming*).

Despite expectations to the contrary no traces of Grubenhauser (SFBs) were found located amongst or beneath the pits at Addenbrooke's. It seems likely however that one or more may be located nearby, perhaps even just a few metres away, as was noted with the distribution of pits and SFB's at Bloodmoor Hill. At the latter site individual clusters of dark earth filled pits were invariably located on the north side of individual dwellings, which suggests some sort of connection between these and the quarrying, workshop and refuse dumping activity, as well as an accepted sense of hut/ settlement plan and the existence of defined activity areas. Of some significance are the rather similar sorts of discarded material found within the pits at Addenbrooke's. This included amongst other things the presence of butchered animal bone, unfired clay (perhaps associated here with the making of daub or the discard of hut walling), loom weight debris, worn iron knife blades, hand-made Saxon pottery, redeposited Roman pottery, iron slag, and finally broken and discarded fragments of lava quern (the latter either Roman or Saxon in date). Only four fragments of iron slag were recovered from the pits on the Addenbrooke's Water Main. This suggests that metalworking was not a major component of the workshop activity taking place on this part of the settlement. At Bloodmoor Hill certain of the pit (clusters) had considerable amounts of iron as well as non-ferrous metalworking debris associated with them, suggesting possible metalworking or craft functions for some of these pits or for the buildings nearby. Others however showed no particular evidence for any sort of specialised activity, not even their use as middens. It was concluded therefore

that these were probably dug as small quarries for the extraction of sand for use in the making of paths, stamped earth floors, or else in the making of pottery or daub (Lucy et al *ibid.*). Indeed the oval-irregular shape of some of the pits and the undercutting of their sides, followed by rapid backfill, is very characteristic of small-scale quarrying. However, the persistent re-digging on more or less the same spot, thus the re-cutting of the same pits, is still a little confusing. We find exactly the same situation at Addenbrooke's with Pits F.2 – F.14. The central well shaft (F.12) on the other hand shows a greater similarity to the Middle Saxon wells found at the Hutchison site just 300m to the east of the water main. All of these were unlined and only marginally deeper (approx. 2.8 – 3.4m) than F.12 (2.1m), but otherwise were of similar width (2.2m)

The majority of the clay fragments found within the Addenbrooke's (AWM 07) pits were unfired. Many of these showed clear indications of woven hazel wattling, suggesting that these could have been examples of discarded or destroyed hut walling, yet the complete absence of any evidence for the firing of the clay, or for that matter the recovery of significant amounts of charcoal or large pieces of burnt wood from the dark earth, dictates against the idea that these pits were used for the dumping of the charred debris from burnt huts. In fact none of the pits showed any evidence for *in situ* burning. However, the presence of thin layers of silt or clay within their bases *might* still suggest some sort of secondary use for these pits, perhaps to hold water or liquids for washing, retting, tanning or some other similar type of activity. In fact the marly chalk layer from which most of the pits were cut would probably have retained water if well stamped down, whilst the presence of a well in the centre of the group suggests that the need for a water supply and the subsequent functions of these pits were somehow intimately connected. In fact it would have been easy to have ladled water from the well to one then to another of the open pits in turn. Moreover, the presence of these potentially midden filled pits adjacent to the well implies that the latter was probably not used as a source of drinking water. Instead a craft-working domestic/industrial activity for these seems the most likely explanation. However, the exact nature of this primary/ secondary function can not be determined from the existing archaeological evidence. What is much clearer though is the nature of the ubiquitous dark earth layers (034 – 036) which cover and infill the upper parts of all the earliest pits, only to be re-cut by the latest pits (e.g. F.4 & F.6) in places.

An environmental sample taken from pit F.2 revealed the presence of large amounts of burnt grain (spelt and emmer wheat, rye and barley) as well as masses of intensely burnt parenchyma tissue (chaff, straw and roots). This suggests that we are looking at a deposit of partly burnt mixed organic refuse consisting of large amounts of dumped oven or burnt threshing material, an alternative source for this being the burnt thatch from hut roofs. If the latter, then this probably represents straw which has been replaced, burnt then dumped, if the former, then we are looking at these pits being used as some sort of midden following on from their 'industrial/ domestic' use, and previous to that, their excavation as quarries. The proportions of emmer and spelt wheat, barley and rye grain are entirely consistent with an Early Anglo-Saxon date.



Figure 6. A large sherd of decorated Early Anglo-Saxon pottery from pit F.2



Figure 7. Augering the base of the still water-filled well (F.12)

Very similar assemblages of highly carbonised cereal grain combined with weed seeds were recorded from West Stow, nr Bury St. Edmunds, Suffolk. Here this deposit was interpreted as being the remains either of an accidental granary fire or else the intentional burning of contaminated grain (see Murphy, P. in West 1985). Meanwhile, the recovery of large amounts of animal bone from the Addenbrooke's pits supports the notion of the later low intensity use of these as middens.

The animal bone assemblage came almost exclusively from domestic food species, the vast majority being cow and mostly juvenile to young adult, although the presence of older adults amongst them implies the retention of oxen as draught animals for use in ploughing or traction. The age range of cattle was entirely consistent with these animals being kept and butchered on site; the other species included sheep and goat, horse, pig and a single goose – all very typical of the domesticated food animals kept during this period. Some of the bones had the marks of butchering on them whilst many of them had been split for marrow extraction. Gnaw marks on some were consistent with the presence of dogs at the settlement.

The small amount of decorated hand-made early Saxon pottery (Figure 6) helps to confirm the 5th - 6th century date for the site (the probable local sources of this pottery have not been determined: S.Lucy *pers.com*). However, the worn knife blades are also fairly typical accompaniments of pit fills or hut (SFB) floor deposits of this period (see Fig.240. Vol.2: West 1985). Little can be said of the very degraded fragments of Niedermeyer lava quern. Quite possibly these are redeposited fragments of Roman quern (no quern was reported from the 2020 Lands evaluation in Field U, though future excavation may reveal this). Given the continuity in their manufacture, distinguishing quern stone from the two different periods can prove quite difficult. Nevertheless, up to 103 small fragments of lava quern referred to as being of Anglo-Saxon origin were recovered from the fills of several 9th – 11th century AD wells excavated on the Hutchison site. In spite of this the presence of re-deposited Roman pottery at both sites attests to the considerable disturbance of earlier archaeological levels during the Saxon period. Certainly this seems to be the case with the dark earth filled pits on the line of the water main, the latter containing at least four Roman and one Late Bronze age pottery sherd plus a handful of worked flint including one Neolithic flake (see E. Beadsmoore in Appendix). In all probability this deposit was at least partly formed through the digging-up and shovelling-in of soil from around the pits; this might have been an intentional process of mixing leading to the composting down and burial of mixed organic/ inorganic refuse material.

In conclusion, apart from a single NNE-SSW ditch which remains undated, no Iron Age or Roman archaeology was encountered along the line of the proposed new watermain route. However, the discovery of a group of intercutting Early Anglo-Saxon pits and a well towards its western end (close to the modern field boundary) suggests that we could be picking up at this point the most northerly/southerly fringe of an Early Saxon settlement. Elsewhere the complete absence of archaeology of this period indicated by the evaluations undertaken in Field U and at Long Road implies that any settlement in this area (if it exists) would probably have been small and perhaps just a precursor to the Middle-Late Saxon settlement suggested at the Hutchison Site and within the current field less than 50m to the south of this watermain (i.e. Middle Saxon features in Trenches 1 and 3: Evans & Mackay 2005).

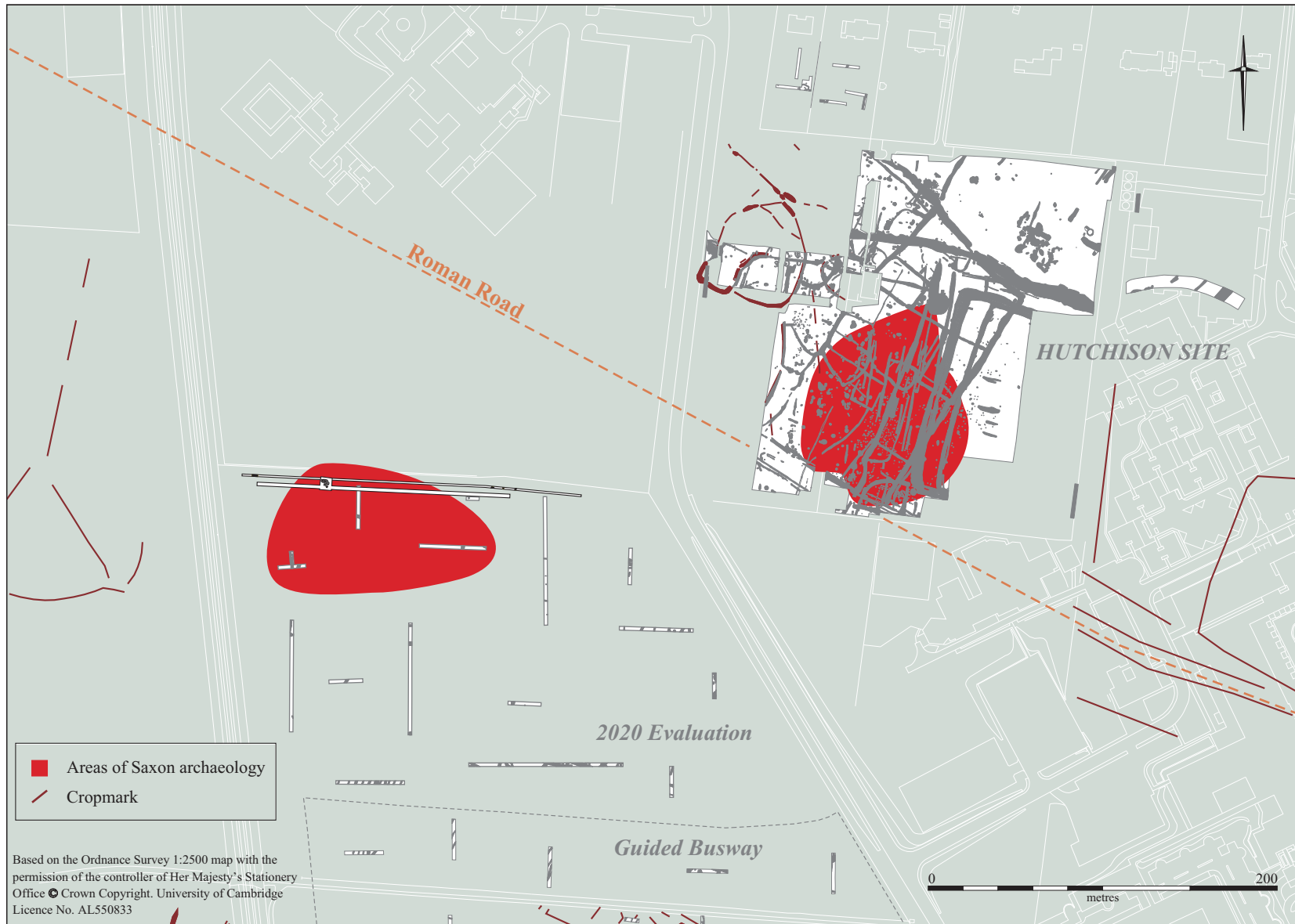


Figure 8. The suggested locations of Anglo-Saxon settlement along the line of the Roman Road at Addenbrooke's

These Anglo-Saxon settlements may once straddled the line of the Roman Road which is thought to have passed in a NW-SE direction through Long Road Sixth Form College playing field and eastwards across the southern edge of the Hutchison site (Figure 8). The presence of Late, Middle and now Early Saxon in this area would seem to suggest some continuity in the use of this road right through the Anglo-Saxon and perhaps into the Early Medieval period. It seems the focal points of these small ribbon-like settlements shifted slightly between Early and Late Saxon times.

The earliest settlement probably consisted of scattered groups of Grubenhaser (SFB) closely associated with clusters of intercutting pits similar to those found at Bloodmoor Hill, Carlton Colville. These pits may have been dug as quarries for daub, flooring or path material, but then used, at least in the short-term, for various craft-working functions; probably as tanks or water-filled pits for retting, tanning, the preparation (soaking) of thatch or wattle, or for the making of daub. All of these activities may have required a centralised well or water-supply. Some of the pits will have been abandoned rapidly and then partially infilled as others were being dug close-by, the hollows thereafter being used as dumps for burnt domestic refuse, granary or thatch material, as well as old wattle and daub, much of the latter being mixed back in with re-deposited soil.

Future archaeological excavation to be carried out in advance of the construction of the new MRC Building at Addenbrooke's (equivalent to the west side of Field U) may yet reveal the southerly extension of this settlement, in particular the Grubenhauser which are almost certainly associated with these pit clusters

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APPENDIX

SPECIALIST REPORTS

Slag and iron-working *Simon Timberlake*

Three lumps of slag and a hearth bottom associated with iron-working were recovered from the dark earth fill of the earlier pits and upper part of the well shaft (F.12) and from the later pit F.6. None of these appeared to be primary accumulations of iron-working debris and all may have been re-deposited.

<065> F.12 (well) [36] A proto-hearth or hearth bottom (see Cowgill, J. in West 1985 for classification) consisting of a dense heavy and moderately magnetic iron-rich vesicular slag with a low-silica (fayalitic) content (112g and 70mm x 60mm x 50mm deep with a flat mushroom-shaped top). This is a quite distinctive product of secondary smithing, perhaps associated with the manufacture of a new iron object from an old one, most probably within a workshop forge located somewhere nearby on site.

<041> dark earth layer [34] A small lump of cindery smithing slag, most probably a piece broken off the cindery silica-rich top of a hearth bottom within the furnace. This is cindery and perhaps fayalitic but with a low free iron content (8g and 20mm x 20mm x 10mm thick).

<030> F.6 [26] Two pieces of iron smithing slag lump (SSL), probably originally associated with a hearth bottom. These were recovered close together from the recorded east-west section through pit F.6. and may have been adjoining pieces. One of these pieces is dense and magnetic and has a quite high iron content (73g and 55mm x 40mm x 20mm thick), whilst the other is much lighter and more cindery (16g and 40mm x 30mm x 10mm thick). However, both have fragments of an accreted gritted clay lining attached to their convex underside, the latter with fragments of crushed flint, chalk and sand suggesting an immediately local provenance for the clay.

These products are typical of small workshop secondary smithing debris associated with the forging of new iron objects from old. This type of slag and small hearth bottom is fairly typical of Early Saxon iron-working (Cowgill, J. in West 1985) though the number of slag fragments is small compared to the number and size of the pits. This suggests that iron-working was taking place on site, but not within the immediate vicinity.

Worked Stone and Burnt Stone *Simon Timberlake*

Burnt stone - A single lump of burnt stone was collected. This was part of a large slab of cracked sandstone, almost certainly a sarsen boulder recovered from the gravels, one which may have been used as a hearth stone (Wt = 1556g; 120mm x 110mm x 65mm thick). There was no evidence for any former use of this as a quern. This was found within the upper (dark earth) fill [9] of pit F.2.

Burnt flint - Five pieces of burnt flint were recovered from the dark earth horizons ([34] and [36]) covering the pits. One of these was only slightly burnt (F.12 [36]) whilst the other four were more or less calcined (<040> [34]). These may have been re-deposited.

Worked stone

<014> F.2 [9] Six fragments of lava quern (total weight = 278g). The largest piece (off of which the others have fragmented) probably has one original ground surface, although this is still fragmentary and flaky (size: 85mm x 45mm x 40mm thick). The stone appears to have been burnt, but is not discoloured. It is not possible to be certain of the original stone's dimensions. If a Roman rotary quern then the average thickness (40mm) would be consistent with it being part of an upper stone.

<032> F.6 [26] Eleven fragments of a highly fragmented piece of lava quern stone (total weight = 431 g). The largest fragment is 90mm long, 50mm wide and approx. 40mm thick. This is of similar shape to the fragment in <014> suggesting that this is the product of the spheroidal flaking or disintegration of a similar-sized piece of rotary quern stone brought about as a result of it having been burnt in a fire. The location of this fragment is recorded in the E-W section across pit F.6.

<050> F.12 [36] A small rounded fragment of burnt lava quern stone (55g). No worked surfaces are visible.

<009> F.2 [006] Eight fragments of a small piece of fragmented lava quern (total weight = 220 g). No worked surfaces were visible but this seems to be of a similar thickness to the rest (approx. 40mm)

<054> F.11 [40] Nine small fragments of lava quern (total weight = 139g). No worked surfaces are visible.

All of these pieces of fragmentary lava quern appear to have been burnt and/or chilled in water. As a result little in the way of any primary grinding surface remains. However, the moderately constant thickness of some of the larger pieces (of about 40mm) suggests that they may have been derived from the debris of broken-up rotary quern stones. Stones (upper grinding stones) of this thickness turn up at Roman sites within the vicinity, some evidently broken up and used as rubble. However, at the Hutchison Site lava quern imported from the Eifel region of Germany (possibly Niedermeyer in origin) was considered to be Middle Anglo-Saxon in date (Evans et al. 2004). Although intact lava querns of Saxon date are typically up to 70-85mm thick the fragments found at the Hutchison were of similar thickness to the current examples (i.e. 40mm). At the latter site they were interpreted as being considerably worn through use, although there was no mention of them having been burnt.

Unfired clay *Simon Timberlake*

A large amount (approx 1500 g) of unfired clay, mostly as pieces of daub (some with the imprint of enclosed straw) were recovered from the upper fills of most of the associated pits. The following weights were recorded:

<043> [34] 36 pieces; 398g

<012> F.2 [9] 4 pieces, incl with straw impressions; 28g

<003> F.2 [005] 19 pieces, some with straw and flint, perhaps partly fired?; 480g

<034> F.9 [29] 11 pieces; 11g

<047> F.12 [36] 1 piece, partly burnt; 28g.

<037> F.7 [32] 30+ pieces, most of these daub (with straw); 564g

<022> F.4 [16] 9 pieces; 46g

<020> F.4 [15] 6 pieces; 28g

<017> F.4 [14] 15 pieces, incl some larger pieces with inclusions of burnt stone; 628g

<027> F.6 [26] 7 pieces, partly burnt; 27g

Most of these pieces were daub. These consisted of a pale chalky (marl) clay puddled with small amounts of grass or straw (of which only the imprint remains) and occasionally fragments of gravel or burnt stone. Some of these pieces had flat surfaces suggestive of their being fragments of old hut walling, yet none of the wooden wattling or even the imprint of this was present. A few such as from pit F.6 showed indications of burning. However this was slight and probably accidental, the clay assemblage on the whole being conspicuous amongst the dark/burnt earth on account of its pale colour and sometimes soft and flaky consistency.

It seems likely that the daub was dumped, most of it into the dark earth accumulating within the tops of these pits, then further mixed-up by digging and the spading-in of soil. The source of this may have been degraded hut-walling which would have been periodically replaced as part of regular repair. Some of the pits may have been used for the preparation of daub, yet there is no *in situ*. evidence for this.

Worked flint *Emma Beadsmoore*

Six (<35g) worked and unburnt flints were recovered from the site. A fragment of a Neolithic flake was recovered from pit F. 6, whilst F. 10 yielded two flakes that were the products of a far more expedient flake reduction/core production strategy, and are likely to be later prehistoric. The remaining material from the site is chronologically non-diagnostic.

Animal Bone *Vida Rajkovaca*

The quantity of animal bones recovered totalled 685 fragments. Following zooarchaeological analyses of the material this report presents results that infer patterns of exploitation and use of domestic animals on the site. Faunal remains were hand collected: the material from bulk soil samples was not included.

The zooarchaeological investigation followed the system implemented by Bournemouth University with all identifiable elements recorded (NISP: Number of Identifiable Specimens) and diagnostic zoning (amended from Dobney & Reilly 1988) used to calculate MNE (Minimum Number of Elements) from which MNI (Minimum Number of Individuals) was derived. Ageing of the assemblage employed fusion of proximal and distal epiphyses (Silver 1969). Identification of the assemblage was undertaken with the aid of Schmid (1972) and reference material from the Cambridge Archaeological Unit, Grahame Clark Zooarchaeology Lab, Dept. of Archaeology, Cambridge and the Zoology Museum, Cambridge. Taphonomic criteria including indications of butchery, pathology, gnawing activity and surface modifications as a result of weathering were also recorded when evident.

Bone preservation was variable across different parts of the site. The bone assemblage showed very mixed overall preservation: of 15 contexts involved in the analyses, four were identified as demonstrating 'quite good' preservation. This indicated bones with minimal or no weathering or bone damage. In contrast, eight contexts demonstrated 'mixed' preservation and only three contexts were quite poorly preserved. This equates to a total number of 148 fragments showing quite good preservation,

compared to 523 fragments demonstrating mixed preservation and only 14 fragments with bone damage or signs of weathering. The overall conclusion is that the material was very well preserved in terms of weathering, but highly fragmented.

Results

Species representation

In total 685 fragments were analysed from the site with 503 (73.4 %) identifiable to element and 140 (20.5 %) further identified to species (Table 1). The low percentage of fragments identifiable to species is due in part to the relatively high numbers of fragmented limb bones which could only be assigned to a size category (Large, Medium or Small Mammal). This was compounded by a generally mixed level of preservation. Of the identifiable elements all were assigned to domesticates with no wild fauna, fish or small mammals evident within the assemblage. Cow accounted for the greatest proportion of the identifiable fragments, followed by sheep/goat, horse, pig and finally domestic goose.

Of domesticates recovered cattle were by far the most abundant within the context of both NISP (111 specimens) and MNI (six individual animals) (Table 1; Table 2). This was followed by ovicaprids with 13 fragments (MNI: 2) and horse with 11 fragments (MNI: 2). Domestic goose (NISP: 2) and pig (NISP: 3) had MNI counts of only one individual animal (Table 2).

The level of preservation has undoubtedly affected the likelihood of recognising taphonomic modifications. For example, of the 111 cow elements recorded, 17 were either fragmented, eroded or fragmented and eroded. However, four butchery records were noted all on a cow elements. Carnivore gnaw damage was also noted on a cow calcaneum and ulna.

Species	NISP	% NISP
Cow	111	16.3
Sheep/Goat	13	1.9
Horse	11	1.6
Pig	3	0.4
Domestic Goose	2	0.3
UUM	182	26.6 ($\Sigma=685$)
ULM	271	74.6 ($\Sigma=363$)
UMM	77	21.2 ($\Sigma=363$)
USM	9	2.5 ($\Sigma=363$)
UUB	6	1.7 ($\Sigma=363$)

Table 1: Species frequency by NISP (Number of Identifiable Specimens)

Key: USM, UMM & ULM = Unidentified Small, Medium and Large Mammal / UUM = Unidentified Fragment.
NB: Species percentages are out of 685. These differ from the unidentified counts as these are calculated on the basis of element identification (for USM, UMM & ULM) and total fragments (for UUM).

Species	MNI	% MNI
Cow	6	50
Sheep/Goat	2	16.7
Horse	2	16.7
Pig	1	8.3
Domestic goose	1	8.3

Table 2: Species frequency by MNI (Minimum Number of Individuals)

The cattle assemblage was represented by the majority of carcass portions. The occurrence of distal extremities such as phalanges, skull and mandibular elements would indicate that whole animals were transported to the site ‘on the hoof’ and processed as needed. Furthermore, the butchery evidence from one cow humerus indicated skinning / disarticulation, supporting the hypothesis that animals were brought in as livestock to the site. The elements of the forequarter are better represented than the hindquarter, although this is as likely to have been a product of recovery bias or simply that there are more recordable upper limb elements than lower.

The age range, derived from teeth and fusion data (though only 12 mandibles were present and therefore the results are ambiguous) would indicate the presence of both young and old animals with a slight predominance of young adult animals (3-4 yrs). There is only one juvenile cow mandible (1-8 months). This would suggest that individuals were kept for traction (although the oldest age range termed ‘senile’ was not evident). This pays testament to the multipurpose nature of this species and its diverse role within an economic setting.

Little can be said regarding the presence of ovicaprids on the site as the element frequency was unrepresentative. However, one juvenile mandible was recovered from this assemblage as evidenced by the presence of the fourth deciduous premolar. This particular tooth is usually a good diagnostic indicator of whether the mandible is derived from a sheep or goat (cf. Payne 1985 and in particular Halstead *et al* 2002) and in this case was from juvenile sheep. As with cattle the individual animals fell within a wide age range from juvenile to adult on the site, however, again duplicating the pattern seen in cattle, no ‘senile’ individuals were present. Sheep would also have been used as a multipurpose animal, for wool, milk and meat.

The small sample size precludes any comment about the potential indications of site status from the presence of pig and horse. All the bones came from cranial portions, except one horse pelvis. Two domestic goose tarso-metatarsals were recovered, giving the only evidence for the presence of birds on the site.

As mentioned above, this was an impoverished assemblage in terms of the range of species present. A number of small mammals were evidenced from either limb bone fragments or ribs, but not identifiable to species. Only six limb bone fragments were recognised as bird elements.

Discussion

Although relatively small, this has proved to be an interesting assemblage. As mentioned above, the presence of both young and old cattle would suggest that the animals were kept for traction. However, one juvenile mandible was present with the estimated age of 1-8 months. Also, fusion data is indicating the presence of 11 young adult animals (3-4 yrs) on the site. Cattle being an important provider of meat were thus probably culled before they reach maturity. While both animals (cattle and sheep/goat) would have been significant for secondary products, the potential use of cattle for traction would have made it the more important species economically.

High fragmentation has largely affected recording of any of the taphonomic activities. However, the conclusion one can make is that the bone were split vertically probably for marrow extraction. There was no evidence of canids on the site, except for carnivore gnaw damage (incisors gnawing marks) which was noted on a cow calcaneum and ulna. This may imply presence of dogs on the site.

It is important that future research clarifies age structures and kill patterns from the material with a more in depth analysis of toothwear and fusion data. Metric data are also much needed particularly if the possibility that specific cattle types were present on the site.

It would be inappropriate to over analyse an assemblage of this size, especially as there was insufficient data to plot mortality profiles or attain metrical estimates.

Bulk Environmental Sample *Anne de Vareilles*

The soil sample taken on site (from Pit F.2) was processed using an Ankara-type flotation machine at the Cambridge Archaeological Unit. The flot was collected in a 300µm mesh and the remaining heavy residue washed over a 1mm mesh. The flot and heavy residue were dried indoors and scanned for the presence of charred plant macro remains and other ecofacts.

Sorting was carried out under a low power binocular microscope. Seed identification was made using the reference collection of the George Pitt-Rivers Laboratory, McDonald Institute, University of Cambridge. Nomenclature follows Stace (1997) for plants and Beedham (1972) for molluscs. All environmental remains are listed in Table 3.

Archaeobotanical remains have been preserved through charring. The grains are very heavily burnt, making identification to species difficult. Most of the parenchyma fragments are likely to be bits of grain (both from their size and structure), indicating that the original assemblage was larger and suffered intense burning.

Early Anglo-Saxon Pit, F.2 [9]

Spelt and possibly emmer wheat (*Triticum spelta/dicoccum*), rye (*Secale cereale*) and probably hulled barley (*Hordeum vulgare sl.*) were used; this is not an unusual assemblage for the Anglo-Saxon period. Charcoal only occurred in very small quantities, which suggest that the sample does not represent waste from wood fires. The 'dark, burnt' soil seen during excavation may simply contain heavily burnt grain. It is possible that the parenchyma originates from roots and tubers, though one might expect to find larger fragments.

The sample is rich in molluscs, indicating that there is a good potential for the recovery of such environmental indicators through more appropriate sampling. Further bulk soil samples and monoliths for micro-morphology could be taken from the 'dark, burnt' soil for a clearer understanding of its composition and origin

Sample number		1	1
From Flot or Heavy Residue		Flot	HR
Feature, Context		F.2 [9]	
Feature type		Pit, 'dark, burnt earth'	
Phase / Date		Early Saxon	
Sample volume - litres		9	
Flot fraction examined -%		100	100
Cereal Grains			
<i>cf. Hordeum vulgare sensu lato</i>	Possible Barley (Hulled)	1	2
<i>Triticum spelta / dicoccum</i>	Spelt or Emmer wheat grain	3	
<i>Secale cereale</i>	Rye	2	
<i>Secale / Triticum</i>	Rye or Wheat	6	1
Indeterminate cereal grain fragments		18	19
Chaff			
<i>T. spelta/dicoccum glume base</i>	Spelt or Emmer glume base	1	
<i>Triticum sp. glume base</i>	Glume wheat glume base	1	1
Charcoal			
2 - 4mm		-	
<2mm		+	+
Parenchyma - Undifferentiated plant storage tissue, <1mm		b	c
Wild Plant Seeds			
<i>Atriplex prostrata/patula</i>	Oraches	2	
<i>Silene sp.</i>	Campions	1	
Indet. Poaceae fragments	Wild or cultivated grass frag.	11	4
Indet. Cotyledon, 2mm across			2
Mollusca			
Fresh water species	<i>Lymnaea palustris</i>	-	
	<i>L. stagnalis/truncatula</i>	+	
Damp / Shade loving	<i>Columella edentula</i>	a	
	<i>Vallonia excentrica/pulchella</i>	b	
	<i>Oxychilus / Aegopinella</i>	+	
Dry land species	<i>Helicella itala</i>	++	
Catholic species	<i>Trichia sp.</i>	++	
	<i>Ceciloides acicula</i>	b	

Key: '-' 1 or 2, '+' <10, '++' 10-25, 'a' 25-50, 'b' 50-100, 'c' 100-500 items

The heavy residue did not contain many whole snail shells, these were not recorded.

Most of the parenchyma fragments are vitrified.

Table 3: Archaeobotanical remains from F.2 – cereal grains, wild plant seeds, charcoal and molluscs

Metalwork *Sam Lucy*

The metalwork assemblage comprised four fragmentary iron knives, one tool fragment and one nail fragment. No items of copper alloy or other metals were recovered. Both nail fragments were recovered from F. 12, while the four knives were recovered from four different pit features: F. 4, F. 7, F. 9 and F. 10. Little can be said about the nail, as it is a square-sectioned shaft fragment, missing its head, although the tool <64> may perhaps be a chisel; an x-ray may clarify this. Tools of similar size and form are known from the metalworking assemblage at the Anglo-Saxon settlement site at Bloodmoor Hill, Suffolk (Lucy *et al.*, forthcoming). X-rays will also clarify the dimensions and forms of the four fragmentary knives; all appear, however, to conform with types within Evison's knife typology, dated to the 5th-7th centuries (Evison 1987, 113-6).

1. Fragmentary iron knife blade. Rectangular-section centrally-set tang; surviving length 72mm; x-ray needed to determine form and true dimensions, as heavily corroded. <059> [14] F. 4.
2. Fragmentary iron knife blade. Rectangular section top-set tang (bent at a near right-angle, with further fragment broken off), splaying sharply into blade with straight cutting edge and possibly angled back; x-ray needed to determine true form. Approximate surviving length 90mm <060> [29] F. 9.
3. Fragmentary iron knife blade. Rectangular-section centrally-set tang (broken) splaying gently into blade with straight cutting edge; broken, such that form cannot otherwise be determined. X-ray needed to clarify dimensions and adhesions. Surviving length 67mm. <061> [32] F. 7.
4. Fragmentary iron knife blade. Rectangular-section top-set tang (broken) splaying gently into blade with possibly straight back and rounded cutting edge; x-ray needed to clarify form. Surviving length 105mm. <062> [34] F. 10 (SF1).
5. Iron nail fragment. Square-sectioned and tapering, but head missing, so not identifiable to form. Surviving length 51mm; maximum diameter 7mm. No further work needed. <063> [34] F. 12.
6. Possible iron tool. Square-sectioned shaft leading to round-sectioned working end; broken, with detached fragment. Surviving length 108mm. X-ray needed to clarify details, but possibly a chisel, punch or awl. <064> [36] F. 12.

Early Anglo-Saxon Pottery *Sam Lucy*

A small assemblage of early Anglo-Saxon pottery was recovered, comprising nine sherds weighing 266g. All forms, fabrics and decoration are consistent with an early Anglo-Saxon date, probably later 5th to 6th-century AD, but this material requires further research by an Anglo-Saxon pottery specialist if more information on forms and fabrics is required.

1. Large body sherd of a handmade vessel of rounded profile. Wt 113g. Wall thickness 8mm. Decorated with a series of pendant triangles with two external incised bounding lines, and internal impressed dot decoration. Probably 6th-century in date (Myres 1977, 52, 55), <007> [6] F. 2 (see Figure 6)
2. Base fragment of a handmade vessel; probably early Anglo-Saxon. Wt 38g; wall thickness 8mm. <010> [9] F. 2.
4. Medium-sized body sherd of handmade vessel of rounded profile; probably early Anglo-Saxon. Wt 19g; wall thickness 8mm. <025> [26] F. 6.

5. Four fragments from a handmade vessel: two joining rim fragments, one neck fragment and a body sherd. Total wt 70g, wall thickness 8-10mm. The vessel represented here is probably a biconical jar with straight everted rim, and a zone of single dot decoration just below the neck; probably 5th or 6th century in date. Two further body sherds from different handmade vessels were also recovered from this context: Wt 23g, wall thickness 7mm and Wt 3g, wall thickness 5mm, with possibly grooved surface decoration. Both probably early Anglo-Saxon. <038> [34] F. 12.

Prehistoric pottery *Mark Knight*

One sherd of probably prehistoric pottery was recovered from a feature that also produced an early Anglo-Saxon knife blade; this was presumably residual.

Catalogue

1. Small body sherd of a handmade vessel in flint-gritted fabric; probably LBA/EIA residual. Wt 6g; wall thickness 10mm. <015> [14] F. 4.

Romano-British Pottery *Katie Anderson*

Four sherds of Roman pottery were recovered from two separate features. Feature 10 [45] contained two sherds, the first being a small sandy greyware body sherd, weighing 1g, which could only be dated Romano-British. The second sherd comprised a small South Gaulish East Gaulish Samian sherd, dating 2nd-3rd century AD.

Feature 12 [36] also contained two sherds of Roman pottery, a further sandy greyware sherd weighing 2g and a small pedestal base from a Nene Valley colour-coated beaker, weighing 21g and dating Mid 2nd-3rd century AD.

These small sherds of pottery are most likely to be residual within these later features, rather than necessarily being a result of curation.