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**Romano-British Settlement and Land Use on the Avonmouth
Levels: the evidence of the Pucklechurch to Seabank pipeline
project**

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Romano-British Settlement and Land Use on the Avonmouth Levels: the evidence of the Pucklechurch to Seabank pipeline project

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With contributions by Paul Tyers (with J. Bird, B. Dickinson and K. Hartley) and Hilary Cool

INTRODUCTION

The Avonmouth Levels constitute one of a number of areas of former wetland fringing the Severn estuary which, before the construction of coastal defences, would have been covered by tidal mudflats and marsh and subject to periodic marine inundation. In other parts of the Severn estuary Levels, for instance the Wentlooge (Allen and Fulford 1986) and the North Somerset Levels (Rippon 2000a), drainage and reclamation in the Roman period made a dryland economy possible, and the evidence for settlement and cultivation is extensive. Much of this research is reviewed by Rippon (1997). Less evidence is available for the Avonmouth Levels, which undoubtedly reflects a relative lack of research and the problems attending archaeological investigation in the area, where sites are frequently buried beneath alluvial deposits; but a different history of land use may also be relevant.

The site at Crook's Marsh (discussed below) has been known since 1980, but all the other evidence for the Avonmouth Levels during the Roman period comes from more recent investigations undertaken in response to developments, the most significant being those carried out in advance of construction of the Second Severn Crossing (Barnes 1993; Gardiner *et al.* 2002). This paper presents new evidence from work carried out on the route of a pipeline across the Levels, before reviewing its implications for the character of Romano-British land use in the area. Outstanding issues to be addressed include the extent to which the landscape was transformed by reclamation during the Roman period, what role settlements played in the regional economy, and how the Avonmouth Levels compared with other parts of the Severn Estuary Levels.

This report has been compiled by the authors from the archive report of the pipeline project produced by McGill Archaeological Consultants (McGill 2001) and from primary site records. It also draws on and summarises the work of numerous specialists whose full reports are included in the archive report: Geraldine Barber (faunal remains), Naomi Crowley (ceramic building material), Rod Burchill (medieval and post-medieval ceramics), Paul Davies (molluscs), S.J. Dobinson and N.G. Cameron (diatoms), Gerry McDonnell and Paul Maclean (metal-working slags), Mike Godwin (foraminifera), Heather Tinsley (pollen) and Adam Welfare (quern stones). Individual contributions dealing with the pottery (Tyers *et al.*) and other finds (Cool) are included below.

THE PUCKLECHURCH TO SEABANK PIPELINE PROJECT

Archaeological mitigation of the construction of a gas pipeline between Pucklechurch and Seabank power station was carried out by McGill Archaeological Consultants during 1997 and fell into three phases of investigation. Initial evaluation comprised excavation of trial trenches and test pits along the proposed route. Further excavations were carried out where the evaluation had identified significant remains and no alternative route could be found for the pipeline. Subsequently, a watching brief was carried out on the pipeline construction works. The route of the pipeline where it crosses the Avonmouth Levels is shown in Fig. 1.

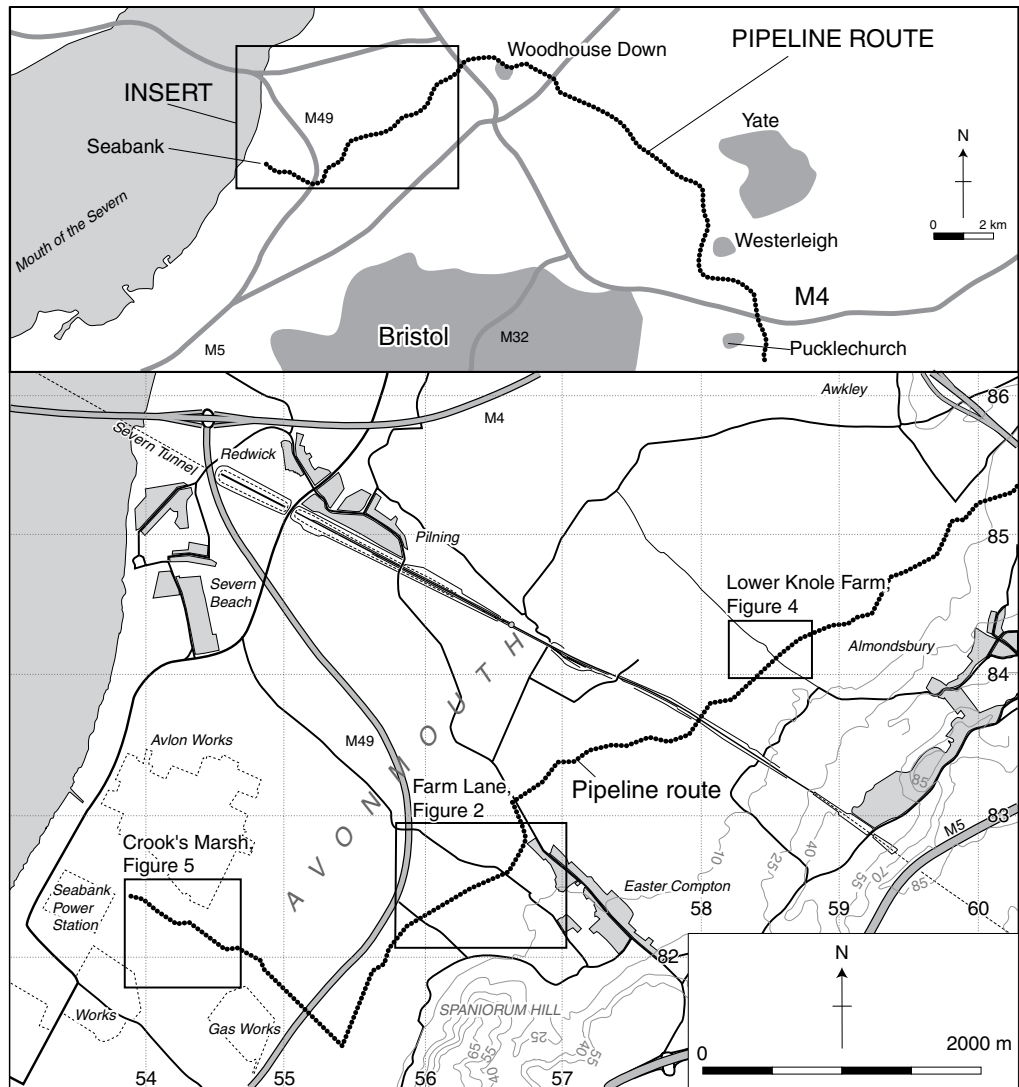


Fig. 1. Avonmouth Levels: Romano-British sites from the Pucklechurch-Seabank pipeline project.

In the course of these investigations, evidence of Roman-period activity was identified in four locations on the Levels. Two of these sites are situated on the Levels' edge, near the foot of the ridge that borders the alluvium to the south-east. At Farm Lane, Easter Compton (see Fig. 2), the results of trial trenching prompted further investigations in which two phases of ditches, dating to the mid 2nd and mid 3rd centuries respectively, were excavated. At Lower Knole Farm (Fig. 4) a land surface associated with a ditch and late 1st-century A.D. pottery was found buried beneath alluvial and colluvial deposits in an evaluation trench. The other site lies further out in the midst of the alluvial floodplain at Crook's Marsh (Fig. 5), where features were recorded in the watching brief phase of the project in two locations. To the north-west, beside Minor's Lane (detailed in Fig. 6), ditches were recorded containing pottery of late 3rd/4th-century date. Further to the south-east, in Field 151, a small assemblage of pottery dating to the late 1st century A.D. was recovered, apparently in a residual context. Two other Romano-British sites identified by the project on the high ground to the south-east of the Levels at Westerleigh and Tockington Park Farm are discussed in a separate report (Masser and McGill 2004) and another report deals with evidence for the sediment stratigraphy of the Levels (Carter *et al.* 2003).

Farm Lane (Fig. 2)

The site at Farm Lane is located on the edge of the Levels at the foot of Spaniorum Hill to the west of Easter Compton, in fields currently used for pasture at around 6.5 m above O.D. Following its initial discovery in an evaluation trench (Trench 174) at O.S. Nat. Grid ST 56548254, the pipeline in its vicinity was laid using a tunnelling technique at a depth sufficient to avoid disturbance to the archaeology. Four 10 × 2 m trenches, 173, 136A, 136B and 137, were excavated where pits were to be dug for the entry and exit points of the pipeline. Following removal of the topsoil by machine, hand excavation in Trench 136A was concentrated initially on two deposits of material, [05] and [07], which contained concentrations of Roman pottery, animal bone and evidence of iron working. Later it became apparent that these deposits overlay silting deposits within two ditches; other ditches crossing the trench were also recognised. In all four trenches the remaining archaeological deposits were then excavated by machine, and the cut features and deposits recorded in section.

Pre-Roman Alluvial Deposits

The reddish alluvial clay into which the Roman features were cut overlay an organic layer interpreted in the field as a buried soil, the top of which occurred at 5.02–5.20 m above O.D. and which sealed two cut features. One of these features was radiocarbon dated to the Neolithic; however, it is unclear whether the layer observed in this trench is directly equivalent to the Neolithic buried soil horizon identified in Trench 136B at around 2 m above O.D., as it may have been sealed by alluvium at a much later date (Carter *et al.* 2003). The alluvial clay overlying this horizon corresponds to the upper Wentlooge Formation, the product of an extensive marine transgression which affected most of the Avonmouth Levels from the late 2nd millennium B.C. onwards and which has been recognised on other sites in the Severn Estuary Levels (Allen 2000, 21). In Trench 136A, 1.4 m of deposits overlay the organic horizon (see section, Fig. 3); they appear to have been laid down entirely in the prehistoric salt-marsh. The fact that deposits containing Roman pottery occurred immediately below the modern topsoil, at 6.1 m above O.D., indicates that the ground surface in the Roman period must have been comparable to that existing today. There is no evidence for any significant accretion of sediment having occurred in historic times, and the modern topsoil can be assumed to derive largely from prehistoric alluvial sediment modified by pedogenesis and cultivation.

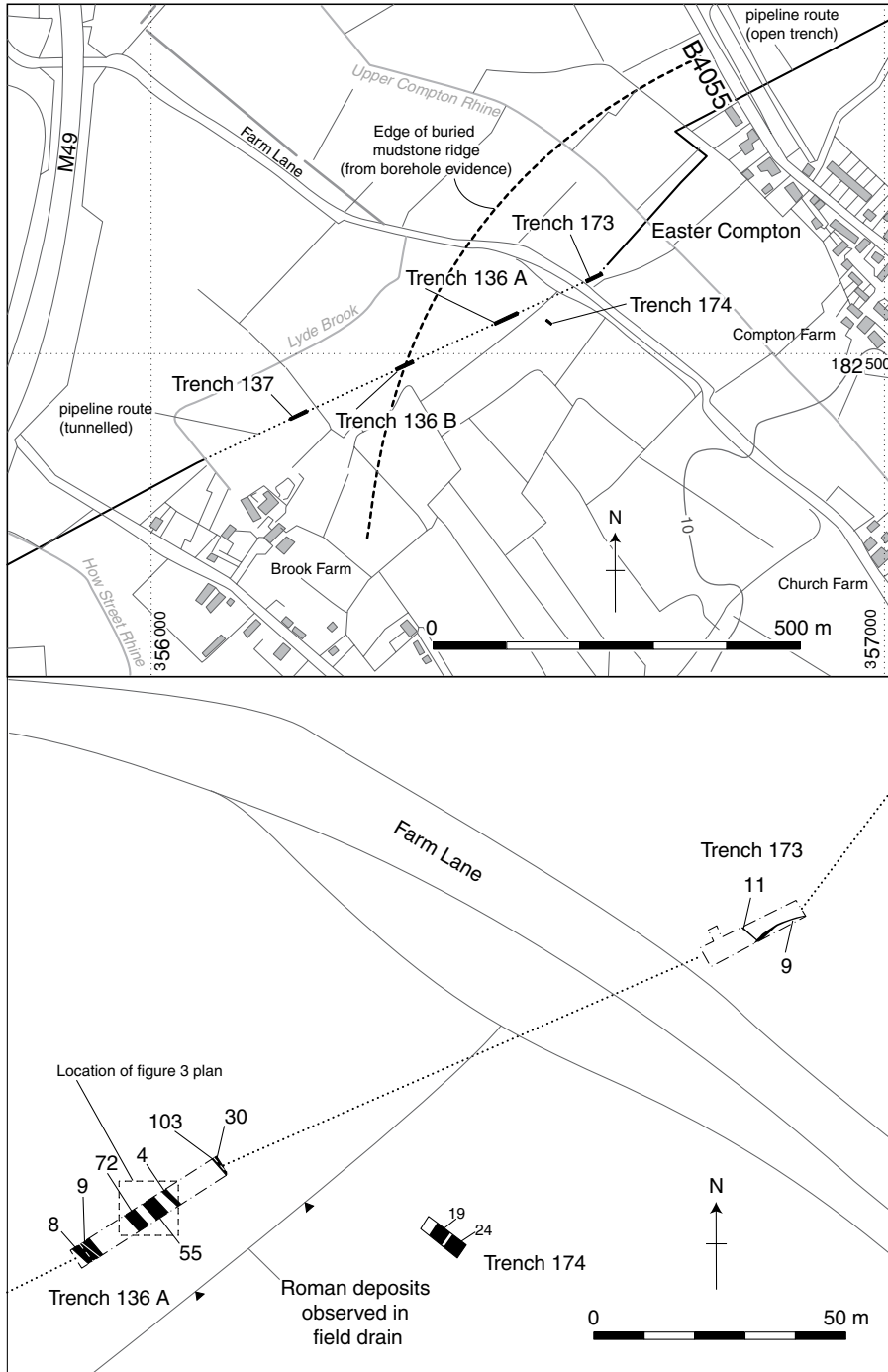


Fig. 2. Farm Lane: locations of Trenches 136A, 136B, 137, 173 and 174.

Second-Century A.D. Features

A phase of occupation in the mid 2nd century is represented by two parallel ditches, [55] and [72], in Trench 136A (Fig. 3). Ditch [55] was the latest of a series of recuts of the line of the ditch, truncating two earlier cuts, [57] and [59]. Ditch [72], adjacent to [55], was closely comparable in size, 2–3 m wide and cut around 1 m deep below the level of the topsoil. The fills of both ditches consisted of silty clays and contained considerable quantities of mid 2nd-century pottery, principally coarse wares and Black Burnished ware; samian ware was conspicuous by its absence.

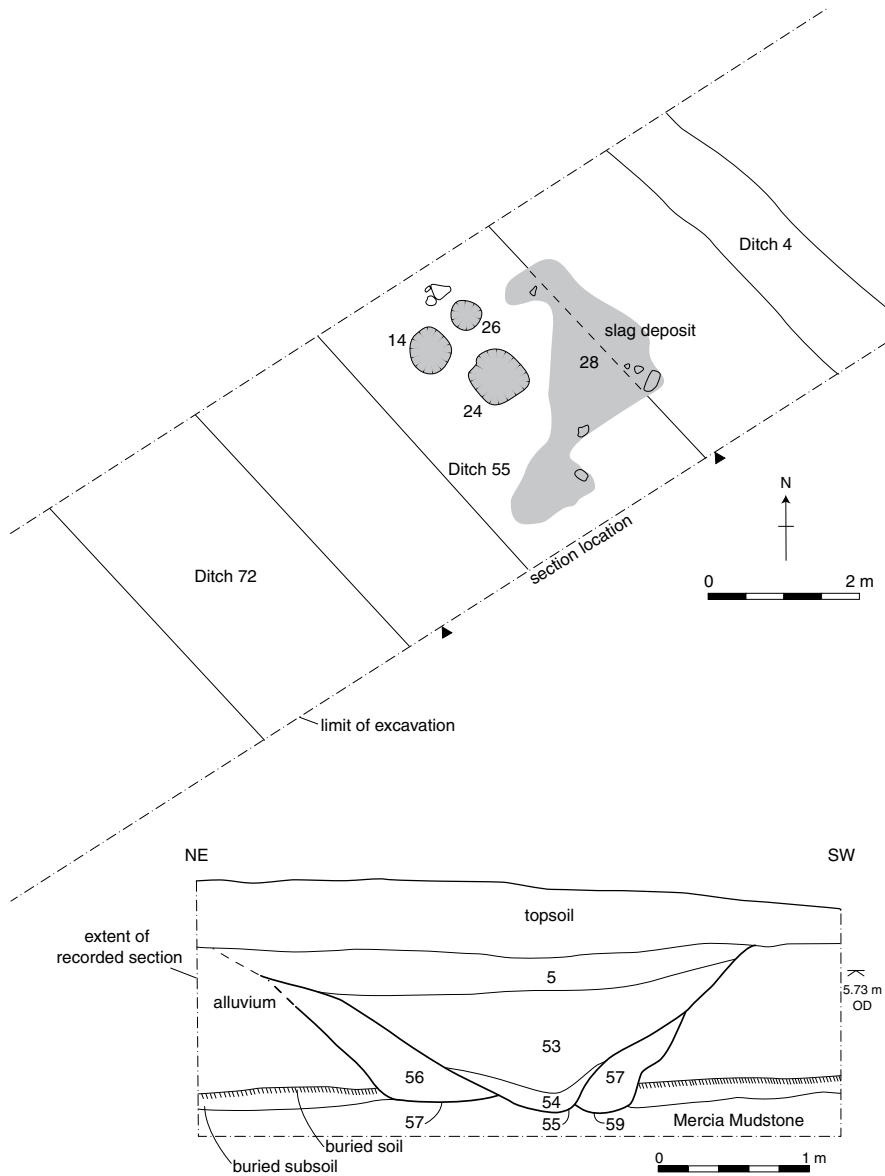


Fig. 3. Farm Lane: 2nd-century A.D. features in Trench 136A.

Sherd links between the two features indicate that they were open at the same time. During the machine excavation of the ditches, 161 sherds were recovered from [55] and 261 sherds from [72].

Two cut features in Trench 174, [19] and [24], which were recorded in section only and could be either pits or ditches, also appear to belong to this same 2nd-century phase. The features were intercutting, extending over an area 5 m wide and cut up to 1 m deep into the alluvium, and appeared to be contemporary, containing the same silty clay deposits. A layer of charcoal and ash in the base of [24] produced sherds of a Caerleon mortarium which is of mid 2nd-century date and considered unlikely to have been made later than A.D. 160; mid/late 2nd-century sherds were also recovered from the overlying silts.

The upper parts of the 2nd-century ditches in Trench 136A were filled with deposits [05] and [07], which appear to represent refuse dumped in the hollows remaining after the ditches had gone out of use and almost entirely silted up. These were dark deposits containing concentrations of charcoal and large quantities of pottery and animal bone: 1,049 sherds and 364 fragments of bone were recovered from [06] in the top of [72]. The pottery assemblages were dated somewhat later than those from the lower fills of the ditches, to the late 2nd or early 3rd century, and unlike the earlier material, they included samian ware. Three small circular pits, [20], [24] and [26], between 0.08 and 0.15 m deep, were cut into the ditch fill beneath [05] and contained deposits of iron-working slag, charcoal and fired clay. These deposits were concentrated in a spread [28] beside the pits, were present in [24], and also occurred in the overlying deposits [05] and [07]. The slag, which was classified on a morphological basis from a visual inspection (G. McDonnell and P. Maclean, in McGill 2001 vol. 3, 83–8) included 5.7 kg of smithing debris (including some plano-convex accumulations of hearth bottom slag, which would have formed against a smithing hearth, as well as more randomly-shaped fragments) and 1.7 kg of possible smelting slag (recognised by the presence of smooth, ‘flowed’ surfaces or large charcoal impressions). Very little furnace/hearth lining was present, indicating that although smelting and smithing took place nearby, the actual site of the work was a little distance away from the trench, and the role, if any, of the pits themselves in this process is not clear.

A similar sequence was observed in Trench 174, where the top of the silted-up features [19] and [24] was filled with a dark charcoal-rich deposit containing sherds which included late 2nd-century samian ware. This deposit included other material characteristic of refuse from a settlement, including ceramic building material and a fragment of an upper rotary quern stone made from a quartz-rich conglomerate (A. Welfare, in McGill 2001 vol. 3, 70–2).

A shallow ditch [04], to the north-east of [55], was undated. As it contained fragments of iron-working slag, however, it is unlikely to be earlier than the deposits in the upper parts of the 2nd-century ditches.

Third–Fourth-Century Features

Two intercutting ditches, [08] and [09], were identified within a hand-dug slot excavated in the south-west end of Trench 136A which was later extended by machine to further expose these features. The earlier feature, [09], was 2.2 m wide and 1.15 m deep and was cut by [08], which followed a more westerly alignment and was 0.8 m deep. The fills of both features were described as mid/dark grey clays derived from natural silting. Abundant gravel inclusions in the upper part of [09] may have been introduced from a nearby surface. The pottery assemblage was of mid 3rd- to early 4th-century date. The majority of the 478 sherds from the two features were recovered during machine excavation, but sufficient finds were recovered from individual contexts by hand excavation to establish that cultural material was present throughout the fills of both ditches.

A ditch [30] was recorded in section in the north-east end of Trench 136A, recutting an earlier feature [103]. The full extent of the feature was not exposed, only the south-west edge lying within the trench, but both cuts were at least 1 m deep. The fill of the earlier cut [103] consisted of deposits

of clay that were very similar to the alluvium it was cut through, and no finds were recovered from it. The recut [30], in contrast, contained a deposit of loose sandy silt with gravel and rubble inclusions, concentrations of charcoal, and fired clay fragments interpreted as possible walling material, which had been backfilled on top of a primary silting deposit. Following this episode of dumping, layers of silty clay appear to represent renewed gradual silting of the feature. The majority of the 277 sherds recovered from ditch [30] derived from the backfill deposit and the upper silts and were of mid 3rd- to early 4th-century date, very similar to the assemblage from [08] and [09].

The Extent of the Site and its Subsequent History

Two shallow linear features excavated in Trench 173 (Fig. 4) are probably related to the Roman activity, though no evidence to assign them to either phase was recovered other than pottery from the overlying topsoil which included mid-late 2nd-century Black Burnished ware. Ditch [09] was 0.85 m wide and 0.27 m deep where it was sectioned to the south-east, but became much shallower as it curved round to the east. Its relationship to an ephemeral gully [11] less than 0.1 m deep was not clear. These features were cut into the top of alluvial clay which occurred in this trench at 5.63–5.71 m above O.D., a similar level to that at which the Roman features in Trenches 136A and 174 were encountered. Two linear features sealed beneath this alluvial clay (not illustrated) lie close to the level at which the Neolithic buried soil was reached in the other trenches at 4.98–5.38 m above O.D.; they are interpreted as Neolithic ditches (Carter *et al.* 2003).

No archaeological features were found in Trenches 136B or 137; however, a small assemblage of 2nd-century pottery was recovered from the topsoil in Trench 136B and material of 2nd–4th-century date also occurred in the topsoil in Trench 137. In addition, a soil horizon containing Roman pottery was observed in section extending for 25 m in a field ditch to the south-east of Trench 136A. No further evidence was encountered in the watching brief phase in the next field to the south-west of Trench 137 or to the north-east of Trench 173. The Roman activity at Farm Lane thus appears to cover an area 500–600 m wide, from the vicinity of Brook Farm to the north-east side of Farm Lane itself.

There is no evidence in the pottery from the site for occupation continuing beyond A.D. 350. Types known to have been circulating in the region from the mid 4th century, such as stamped Oxfordshire wares and South Midlands shell-tempered wares, were absent.

Environmental and Economic Evidence

The palynological evidence appears to show a predominantly dryland environment during the 2nd century and despite the proximity to high ground tree pollen was sparse indicating there was little woodland in the area. Pollen from the primary fill of ditch [55] indicates an open grassy environment in the vicinity of the feature, with a variety of weeds of agricultural disturbance, including Poaceae (grasses), *Plantago lanceolata* (ribwort plantain) and Lactuceae (includes dandelion and related Asteraceae). Although some cereal type grains were also recorded there was no supporting evidence for arable cultivation from charred cereal remains. Only 28 pieces of animal bone were recovered from the 2nd-century features, too small an assemblage for any statistically valid analysis, but cattle, sheep/goat, deer and pig were represented among the 12 identifiable fragments.

Although the pollen evidence from the overlying deposit [53] suggests continuity in local conditions, the snail assemblage from the upper fill of [55] indicates brackish water conditions at a time when the 2nd-century ditches were no longer maintained. The presence of *Hydrobia ventrosa* and *Hydrobia ulvae* is typical of an estuarine environment, while the foraminifera species *Elphidium williamsoni* indicates occasional tidal inundation.

Similar environmental conditions appear to have persisted in the 3rd–4th-century features, on the basis of evidence from ditch [103] and its recut [30], although pollen preservation was poor and analysis was only carried out to assessment level. Herbaceous taxa suggest open, disturbed grassland with few trees, and with quantities of charcoal on the pollen slides deriving from anthropogenic activity such as domestic fires. Much of the evidence for crop remains comes from the loose sandy deposit [31] associated with charcoal, fired clay and pottery that overlay the primary silting deposit [65] within [30] (Table 1). Small assemblages of charred cereal remains include *Triticum* (wheat), *Hordeum* (barley) and *Avena* (oat) grains. The presence of processing waste including glume bases of *Triticum spelta* (spelt wheat) and some of the smaller weed seeds such as *Odontites/Euphrasia* (bartsia/eyebright), *Atriplex* (orache) and *Trifolium/Medicago* (clover/medick) implies that crop processing occurred locally. Additional evidence is provided by silicified remains of wheat/barley awns, delicate fragments which survived intense burning. While this cannot be taken as definite evidence for local cultivation, as cereals may have been transported in an unprocessed state, it seems likely that this occurred locally, perhaps on the lower slopes of Spaniorum Hill. Although the animal bone assemblage from this later phase was again small with only 449 fragments recovered, 142 were identifiable to species. Sheep/goat and cattle represented 59% and 35% respectively of this total and are likely to have grazed on the local pasture.

Evidence from diatoms, foraminifera, ostracods and molluscs from the fills of [103] and [30] suggest a range of species with differing salinity tolerances. While the ostracods and some diatom taxa indicate a freshwater environment, brackish water molluscs (*Hydrobia ventrosa*), marine and brackish diatoms (including *Cymatosira belgica* and *Nitzschia frustulum*) suggest marine influence. The foraminifera assemblage, predominantly *Haynesina germanica* and *Elphidium williamsoni*, is typical of a modern high mudflat/low marsh environment (see Haslet *et al.* 2000), although the low diversity of the assemblage suggests that overall salinity levels were low, while the predominance of freshwater ostracods suggests that brackish incursions into the ditch were sporadic. Therefore while these ditch fills supported essentially freshwater flora and fauna, these may have been punctuated by phases of brackish deposition from tidal events or perhaps occasional sluice gate operation.

Microfossil assemblages such as these can be taphonomically complex, with diatom assemblages in particular often of mixed character, especially in a situation such as a ditch system where allochthonous (introduced) diatoms are mixed with the autochthonous (*in-situ*) flora, from transportation during periodic inundations of tidal waters. An additional problem can occur from re-deposition from earlier alluvial deposits, although many of the delicate diatom silica frustules are unlikely to survive well. However, in these ditch fills at Farm Lane, good preservation and high concentration of the remains suggest that the estuarine diatoms were introduced by episodes of salt-water flooding.

Lower Knole Farm (Fig. 4)

The site at Lower Knole Farm (O.S. Nat Grid ST 58538415) occupies a similar topographical situation to Farm Lane, on low-lying ground at the foot of the slope bordering the Levels at 6.8 m above O.D. The only evidence for Romano-British activity identified in the project was a small ditch associated with a buried land surface in Trench 168. Since then, an evaluation carried out by the Glamorgan-Gwent Archaeological Trust (GGAT: Lawler 2000) has revealed other associated features that enable this discovery to be set in a wider context.

The buried land surface in Trench 168 occurred at 5.3 m above O.D., 1.5 m below the present-day ground surface. It was recognised as a layer of bluish-grey clay 0.1 m thick, containing frequent

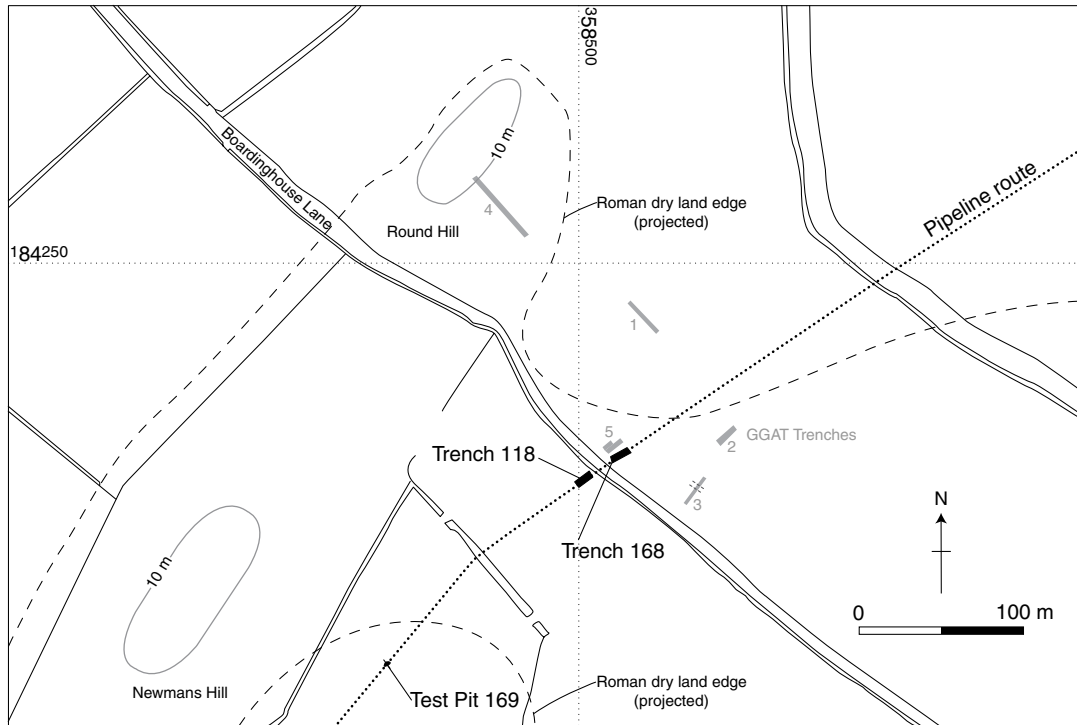


Fig. 4. Lower Knole Farm: locations of Trenches 168 and 118 and Test Pit 169.

stone fragments, derived from weathering of the underlying Mercia Mudstone, and Roman coarseware sherds. This horizon was cut by a ditch [09], 0.4 m wide and 0.18 m deep, containing dark grey clay silt with frequent charcoal but no other finds. Sealing the ditch and the land surface was a layer of blue-grey clay 0.2 m thick, above which was 0.6 m of pinkish-brown clay from which sherds of a Severn Valley Ware tankard, of probable 1st-century A.D. date, were recovered. Above this, and buried beneath 0.4 m of topsoil and reddish-brown subsoil, was another layer of blue-grey clay 0.3 m thick.

A trench excavated by GGAT 10 m to the north-west of Trench 168 (trench 5 in Fig. 4) encountered a comparable sequence of deposits, with the same buried land surface occurring at a depth of 1.38 m. No datable artefacts other than bone are reported, however, and the ditch was not found to continue to this point. Related archaeological features, a ditch and a shallow pit of 2nd-century date, were identified in GGAT evaluation trenches 2 and 3. The features identified in both projects appear to be exclusively of late 1st- to 2nd-century date, although it is likely that they form part of a larger site, extending towards the higher ground to the south-east, which may have been occupied over a longer period.

The variable clay deposits overlying the ditch in Trench 168 may derive from the interdigitation of alluvium and colluvium: certainly, as the site is at the foot of a slope, in a relatively elevated position compared to other parts of the Levels, some colluvial deposition should be expected. GGAT trench 1, to the north of Trench 168, revealed a much greater depth of alluvium, and

boreholes along the pipeline route also showed the buried land surface of the Mercia Mudstone dropping away beneath alluvial deposits to the south-west and the north-east. The combined evidence of the GGAT evaluation, boreholes along the pipeline route and the modern topography allow tentative reconstruction, as shown in Fig. 4, of the boundary between permanently dry land and areas of alluvial floodplain which could have been subject to some estuarine influence. No other archaeological evidence was seen along the route of the pipeline to the north-east or south-west. Trench 118, on the south-west side of Boardinghouse Lane, contained a similar sequence of deposits to Trench 168 on the north-east side while Test Pit 169, 350 m to the south-west, revealed a considerably greater depth of alluvium overlying the Mercia Mudstone at 3.43 m above O.D., 2.86 m below the present-day ground surface.

Crook's Marsh (Fig. 5)

Previous Work

Romano-British occupation at Crook's Marsh was first identified by Everton and Everton (1980), who recorded a number of ditches (the southern group of features in Fig. 5) that had been revealed in the side of a clay pit; a brief account of the evidence is also given by Allen and Fulford (1986, 116). Substantial quantities of pottery recovered from these ditches were dated to the 4th century A.D. and included some very late 4th- or early 5th-century shell-gritted wares. Juggins (1982) inspected another clay pit to the north-west and discovered additional ditches, which he sampled for molluscan analysis, as well as a group of shallow linear features which contained pottery comparable to that from the Evertons' investigations and coins also indicating a 4th-century date. No illustrations indicating the exact location of the features were included in the Evertons' report, and recent efforts to locate their archive have been unsuccessful: the features as represented here are reproduced from Juggins. More recently a watching brief on cable-laying works adjacent to Minor's Lane by Bristol and Region Archaeological Services (BaRAS 1997) has located a ditch containing Romano-British pottery, consisting of Severn Valley wares and grey wares of broadly 2nd-century date, at O.S. Nat. Grid ST 54008229 and recovered similar sherds from subsoil at ST 54088191. As the features from all these investigations were generally recorded in section only, it was not possible to establish the overall layout of the system(s) of ditches, but they clearly extend over a considerable area. The area studied by the Evertons, where higher concentrations of settlement debris were reported from the ditches than elsewhere, appears to be near the core of a 4th-century settlement. However, the cumulative evidence suggests continuous or intermittent occupation from the 2nd to at least the late 4th century, during which time many changes to the structure and role of the site may have occurred.

Late Roman Features discovered on the Pipeline Route

During the watching brief phase of the project, three ditches were observed in section in the pipe trench to the north-west of the features reported by Juggins (Fig. 6). Late 3rd/4th-century pottery was recovered from two of these, and on this basis they appear to represent a related phase of activity, perhaps somewhat earlier than and/or contemporary with the features previously documented by the Evertons and by Juggins.

Ditch [19] was recorded in section within a 10 × 2 m wide trench which was machined to a depth of 1.8 m across the route of the pipeline (section, Fig. 6). The feature was 1.6 m wide and 0.5 m deep, with steep edges and a flat base, cut from a horizon at 5.6 m above O.D. which probably approximates to the late Roman ground surface. Within the ditch, and spreading beyond it to cover the whole area of the trench, was a series of deposits containing 3rd–4th-century pottery and other

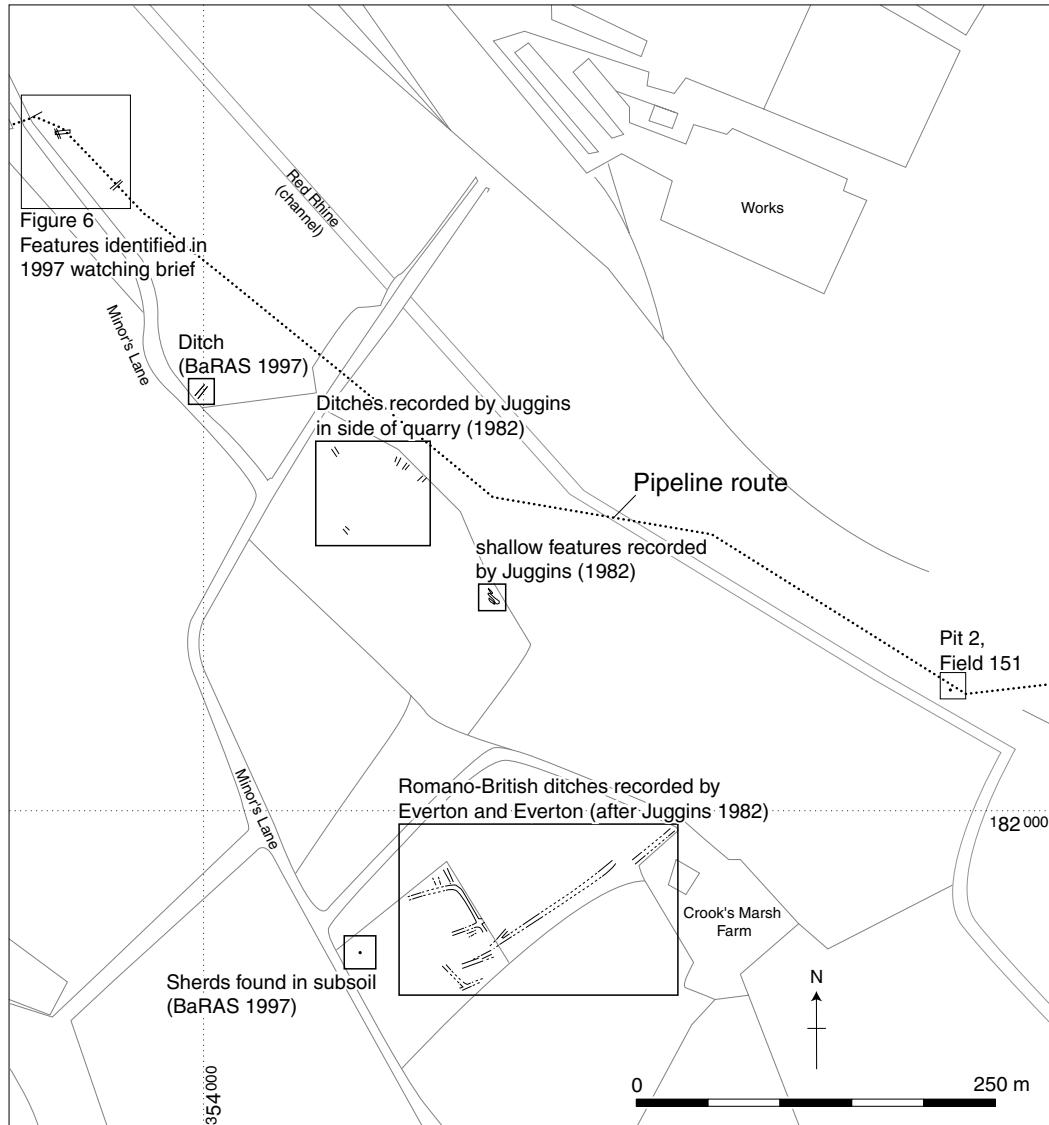


Fig. 5. Crook's Marsh.

finds. Layers of blue-grey clay [12], [06] and [08], interpreted as alluvium deposited during episodes of flooding, were interleaved with two thin horizons of humic material [10]/[11] and [09]/[15] which probably represent periods when the feature was dry enough for soil formation to take place in its base. Pottery of late 3rd–mid 4th-century date occurred throughout these deposits. Overlying the top of the latest layer of alluvium, [01] and [02] were mid grey-brown clay silt deposits which are possibly of alluvial origin but which have been reworked by later cultivation: [02] was described as a mixed and 'dirty' deposit from which 161 Roman sherds were recovered.

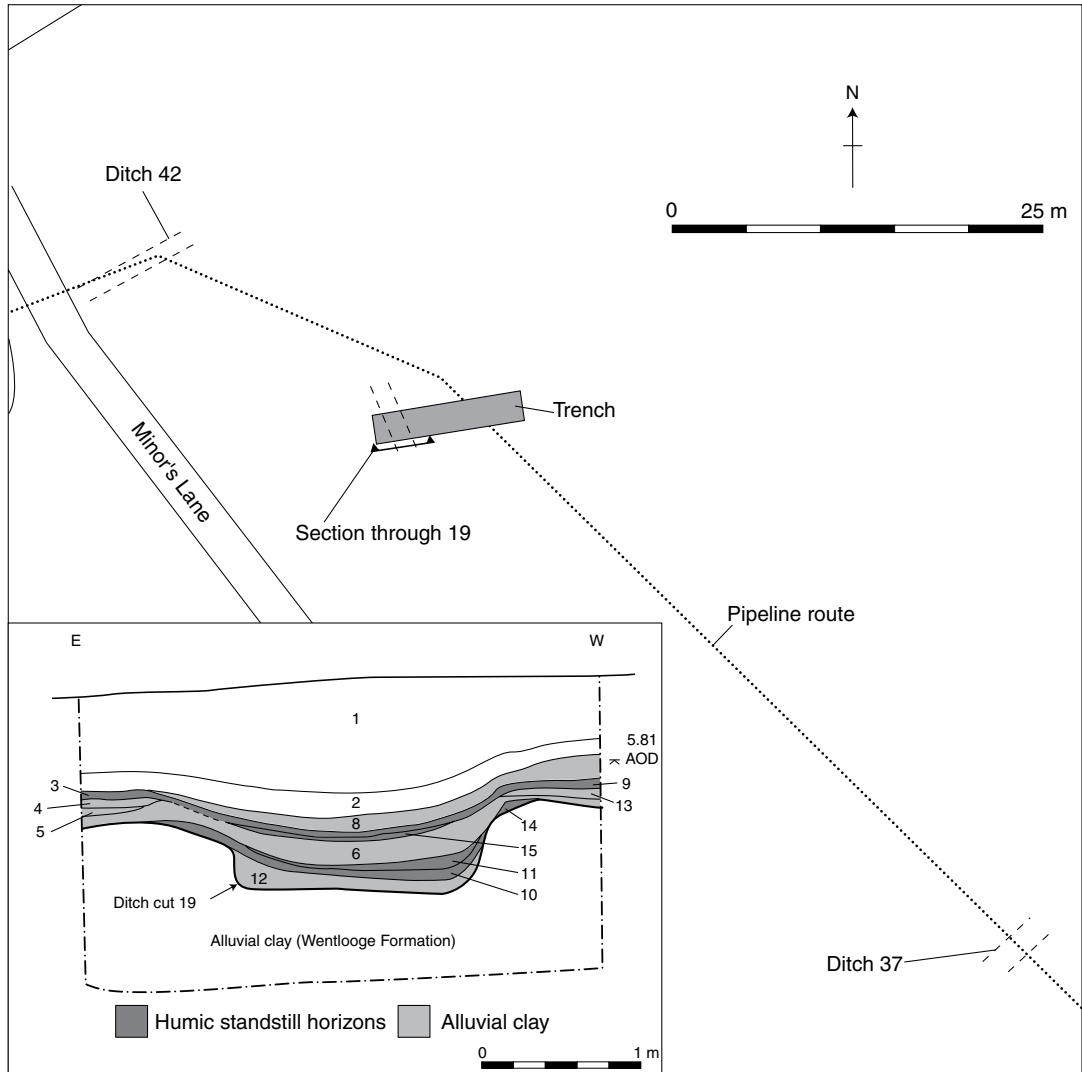


Fig. 6. Crook's Marsh: 3rd/4th-century ditches identified in the 1997 watching brief.

Another ditch [36], with at least one phase of recutting [37], was recorded in the section of the pipe trench 50 m to the south-east of [19]. The feature was cut from a similar depth as [19], at 5.7 m above O.D., and was 1.0 m deep. The lowest 0.4 m of the ditch contained deposits of bluish-grey alluvial clay, overlying which were layers of brownish-grey clay silt. Only a single sherd of Roman coarseware was recovered from this feature.

Ditch [42] was not recorded in detail, but was noted in section as aligned east-west and containing deposits of grey to orange-grey silty clay. The 100 sherds recovered from the feature were of mid 3rd- to 4th-century date, closely comparable to the assemblage from [19].

Environmental and Economic Evidence

A suite of environmental analyses was undertaken on the fills of ditches [19] and [36]/[37]. Pottery of late 3rd–mid 4th-century date occurred throughout the deposits in [19], compared to only one sherd of Roman coarse ware from [36], so there is no direct evidence that the two features were open at the same time.

Ditch [19]

Sampling for pollen from the lower fills of ditch [19] (Fig. 6, contexts [06], [11], [10] and [12]) shows that the environment around the ditch was open, free of trees and dominated by grassy communities containing a range of herbaceous types, in particular grasses and plantain. The presence of 60% buck's horn plantain (*Plantago coronopus*), a low growing perennial of short turf of coastal habitats in [6], with less well-preserved *Plantago* present in the other fills, confirms the site's proximity to the coast.

Examination of diatoms and foraminifera preserved in the same ditch fills provides evidence for the local environment of the ditches. Low concentrations of foraminifera from [10] and [11] show taxa of a low marsh or high intertidal environment, whilst analysis of diatoms shows a similar flora with an abundance of polyhalobous (marine) and mesohalobous (brackish) taxa constituting 50% of the total assemblage, which could be expected in a brackish estuarine environment. Polyhalobous taxa include *Cymatosira belgica*; mesohalobous taxa, *Navicula digitoradiata* var. *minima*; while *Navicula cincta* has a salinity optimum in freshwater-brackish environments. Again good preservation and high concentration of the remains from [19] suggest that the estuarine diatoms were introduced by episodes of salt-water flooding into the ditch system.

All layers within and overlying the ditch were sampled for plant macrofossils. With the exception of the basal layer [12] all layers produced charcoal and assemblages of charred cereal grain, chaff and weeds (Table 2). The richest assemblages came from the thin horizons of humic material [10]/[11] and [09]/[15] which are thought to correspond to drier conditions in between episodes of flooding. Other inclusions such as bone, fired clay and cassy concretions were also more abundant here. Concentrations of cereal grain were low in most contexts, although both wheat (*Triticum*) and barley (*Hordeum*) occur. Glume bases and spikelet forks of *Triticum spelta* confirm the presence of spelt wheat, with some of the grains of the oval-shaped, parallel-sided form more typical of spelt. However, context [15] also contained some grains of a more rounded appearance more indicative of free-threshing bread wheat, a single glume of a free-threshing hexaploid type (*Triticum aestivum* s.l.) wheat confirming this. A few oat grains were also present with a single horseshoe-shaped floret base confirming the presence of wild oats, but preservation was too poor to suggest whether the remaining florets were from cultivated or wild oats. The richest assemblage, from context [15], contained a relatively high proportion of cereal chaff (335 items) and weed seeds (64) to grain (51) suggesting that this material may represent waste from one of the stages of crop processing. This activity includes several stages, such as threshing, winnowing and sieving, to separate the grain from its husk and to remove impurities such as weed seeds which may have been gathered with the crop. Waste material, such as the large numbers of glumes and spikelet forks present in [15], together with the weeds would have provided ideal tinder in a fire. This may account for the large number of awns found in a silicified form in this and some of the other contexts, suggesting oxidation by burning at the high temperatures typical of the embers of a bonfire.

The weed assemblage included low concentrations of both arable types and those more typical of grassy places. The arable weeds include stinking chamomile (*Anthemis cotula*), scentless mayweed (*Tripleurospermum inodorum*) and cleavers (*Galium aparine*). Grassland weeds include a number of grasses such as crested dog's-tail (*Cynosurus cristatus*), meadow-grass/cat's-tail (*Poa/Phleum*), ribwort plantain (*Plantago lanceolata*); clover/medick (*Trifolium/Medicago*) was particularly abundant.

Table 2. Crook's Marsh: charred plant remains from Field 158 (*continued*).

		Ditch 19								Ditch Recut		
										36	37	
FABACEAE												
<i>Lathyrus/Vicia</i> spp.	Vetch		1		4							DG
<i>Lathyrus/Vicia/Pisum</i> spp.	Vetch/Pea	2							2			DG#
<i>Medicago lupulina</i> L.	Black Medick		1									GR
<i>Trifolium/Medicago</i> spp.	Clover/Medick	2	90	16	2	20	7	2	2	4	15	DGR
<i>Vicia faba</i> L.	Celtic/Horse Bean					1						#
LAMIACEAE												
<i>Prunella vulgaris</i> L.	Selfheal										1	DG
PLANTAGINACEAE												
<i>Plantago lanceolata</i> L.	Ribwort Plantain			1							1	DG
<i>Plantago major</i> L.	Greater Plantain	2										CDGo
SCROPHULARIACEAE												
<i>Euphrasia/Odontites</i> spp.	Eyebright/Bartsia				1			1				CD
RUBIACEAE												
<i>Galium aparine</i> L.	Cleavers									1		CHSo
ASTERACEAE												
<i>Anthemis cotula</i> L.	Stinking Chamomile				1							CDd
<i>Centaurea</i> sp.	Knapweed									1		
<i>Hypochaeris radicata</i> L.	Cat's-ear										1	GW
<i>Tripleurospermum inodorum</i> (L.) Schultz-Bip	Scentless Mayweed	2				3						CD
	Context	12	10	11	06	15	09	08	02	35	33	
	Sample	08	02	01	06	05	07	04	3	007	005	
JUNCACEAE												
<i>Juncus</i> sp.	Rush									1		GMRW
CYPERACEAE												
<i>Carex</i> spp.	Sedge						1					GM
POACEAE												
<i>Anisantha cf. sterilis</i> (L.) Nevski	Barren Brome							1				Cd, Go
<i>Bromus</i> spp.	Brome	2	3			3		1				CD
<i>Cynosurus cristatus</i> L.	Crested Dog's-tail			1								G
<i>Poa/Phleum</i> spp.	Meadow-grass/ Cat's-tail	3	2	1	5	1	1	1			1	G
Poaceae indet.	Grass	1				26			2	3	8	CDG
Poaceae indet. (stem fragments)		1	1									CDG
Poaceae indet. (silicified culm nodes)						few						
Indet.			2									
	Total:	2	104	30	6	64	10	6	6	12	28	
Charcoal fragments		v.freq	v.freq	freq		freq	few	few	freq	freq		

Scale of abundance:

few = <10; freq = 10-50; v.freq = 50-200; abun = 200+.

Habitats, nomenclature and habitat information based on Stace (1991):

C: cultivated/arable; D: disturbed; G: grassland; H: hedgerow; M: marsh; R: rivers/streams; S: scrub; W: woodland.

a: acidic; d: dry soil; n: nitrogen rich soil; o: open habitat.

#: cultivated plant/of economic importance.

The presence of concentrations of cereal processing waste, especially the delicate silicified fragments, indicates that processing occurred on site. The occurrence of grassland species amongst the charred weeds, some of which are also suggested by the pollen record, may also indicate that cultivation was local, with small arable plots invaded by the indigenous flora. It is of course possible that the cereals were transported in an unprocessed state, but the presence of cereal type pollen from [12] indicates local cultivation. The single charred celtic bean (*Vicia faba*) from [15] may also have come from a local field crop. The presence of equipment used in food production, such as querns, provides additional evidence for the use of cereals on the site.

Pollen from Ditch [15] indicates that this was essentially an area of dry herbaceous grassland, the proximity to the coast indicated by taxa of coastal habitats. Estuarine diatoms and foraminifera are likely to have been transported into the ditch system during periodic inundations of tidal waters. That occupation occurred nearby is clearly shown by the presence of cultural material, including abundant pottery in the ditch fills. Evidence for crop processing from charred cereal remains is most abundant from the humic standstill horizons, interleaved between the layers of alluvial clay. Clearly occasional episodes of marine flooding did not greatly affect the activities of the community, the construction of drainage channels and ditches allowing some control of water flow around small field plots.

Ditch 36 and Recut 37

Pollen and diatoms were not analysed from [35], the fill of ditch [36], as only bulk samples were recovered. However a terrestrial molluscan assemblage characteristic of short-turved grassland (including *Vallonia costata*, *Pupilla muscorum* and *Vertigo pygmaea*) again supports the reconstruction of an open landscape dominated by pasture. A freshwater environment with periodic marine incursions is indicated by foraminifera and ostracods in the fill, with the assemblage also suggesting that salinity fluctuations were not particularly strong. The freshwater ostracods and the dominance of the foraminifera *Elphidium williamsoni* suggest that the waters in the ditch were relatively well oxygenated and that a current flow was maintained through the feature for much of the time.

Only the basal fill of ditch [37], the recut of ditch [36], was sampled for pollen and diatoms. The pollen was less well preserved than in [19], but nearly half of the grains counted were of the plantain family (preservation did not allow determination to species) and appears to accord with the assemblage there, consisting mainly of herbaceous species. The low numbers of molluscs present were also consistent with dry short-turved grassland. Diatom preservation was also poor, but again included species from across the salinity spectrum. Preservation of charred cereal remains from the two ditches was limited to occasional occurrences of wheat and barley grain, occasional wheat chaff and a similar weed assemblage to ditch [19].

Animal Bone

In total 100 fragments of animal bone were recovered from ditches and other features at Crook's Marsh. Thirty fragments from this small assemblage were identifiable to species; they were dominated by sheep/goat and cattle in roughly equal proportions with horse also present. Although this faunal assemblage is too small to support any detailed economic analysis, taken together with the plant macrofossil evidence it implies a dryland mixed agricultural economy (G. Barber, in McGill 2001 vol. 3, 3–14). The animal bone recorded by Juggins (1982) shows an apparent predominance of cattle over sheep and the presence of extremities, heads and metapodials, suggests slaughtering nearby.

First-Century A.D. Material

A feature recognised as an irregular hollow 1.7 m wide and 0.17 m deep, much truncated by machining, was recorded in a watching brief on topsoil-stripping at ST 545821. Although not thought to be Roman, as it also contained medieval pottery and a fragment of 18th/19th-century pantile, 17 residual sherds of pottery of mid/late 1st-century A.D. date were recovered from it, including samian ware and an ovoid beaker. This would appear to indicate some early Roman activity nearby, although its nature is unknown.

POTTERY by P. Tyers with J. Bird, B. Dickinson and K. Hartley

A full catalogue of the Roman pottery from the Pucklechurch to Seabank pipeline project is included in the archive report (McGill 2001 vol. 3, 36–56). The mortaria were examined by Kay Hartley and the samian ware by Joanna Bird and Brenda Dickinson.

Composition of the Assemblages

Fig. 7 shows the percentage of each fabric represented, calculated by weight, from the four main phases which produced sufficient quantities of pottery for quantitative analysis: the 2nd-century A.D. ditches at Farm Lane; the deposits overlying the top of the 2nd-century ditches; 3rd/4th-century features at Farm Lane; and 3rd/4th-century features at Crook’s Marsh.

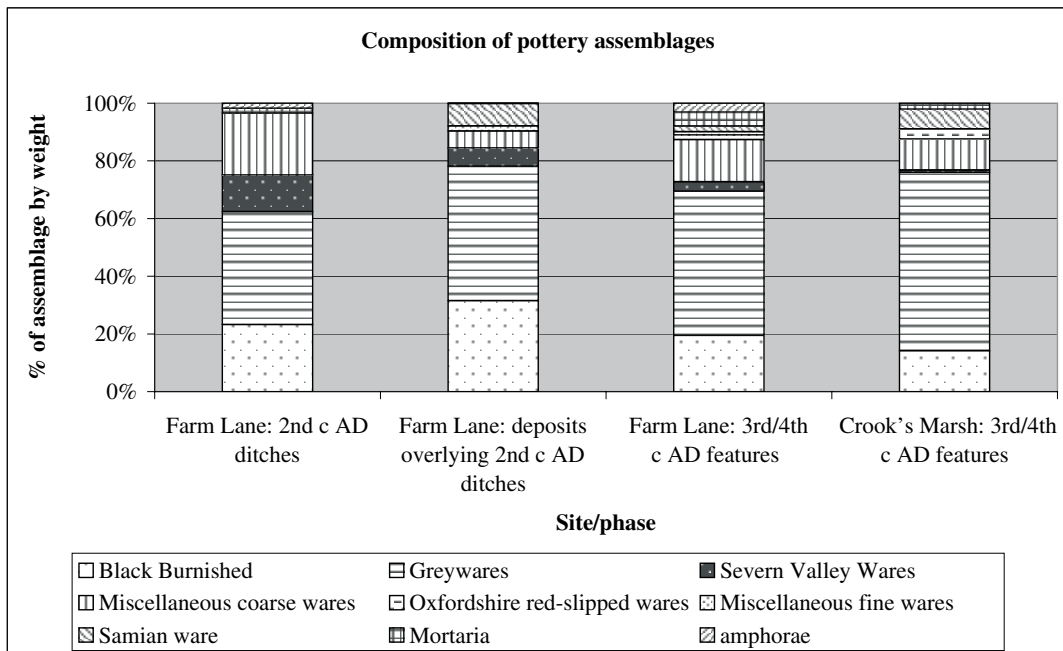


Fig. 7. Composition of pottery assemblages from Farm Lane and Crook’s Marsh.

Romano-British Wares

Black-burnished wares from south-east Dorset are the most common of the major Romano-British regional wares at both Farm Lane and Crook's Marsh. As elsewhere the assemblage is dominated by everted-rim jars with burnished lattice decoration, dishes and bowls. From 2nd-century groups there are jars with burnished-wavy line decoration on a simple flaring rim with acute lattice decoration, associated with flat-rimmed bowls and bead-rimmed dishes. From later groups are jars with flaring rims and narrow bands of 90° or obtuse lattice, flanged bowls and plain-rimmed dishes.

Severn Valley wares are present in most groups, but more common in the earlier (2nd-century) phases and less frequent than at the dryland sites at Tockington Park Farm and Westerleigh (Masser and McGill 2004) excavated in the course of the project. The most common forms in this ware are the tankards, ranging from the 1st-century variants with horizontal grooves near the rim and base, through to specimens with a flaring profile, with vertical burnishing on the outer surface. The other major forms in the ware are necked jars and wide-mouthed jars.

A wide range of grey wares is represented, although it is difficult to assign individual items to known sources. They are the most common category present in all phases, especially at Crook's Marsh where they account for more than 60% of the assemblage. Particularly common in the 3rd-century and later groups are rather sandy textured grey wares with a lighter coloured core. Forms in this variant include everted-rim jars, bowls and dishes derived from the black-burnished repertoire, narrow-necked jars or jugs with a simple 'pulley' rim, and tankards based on the Severn Valley style. Some of the jugs and other jars are decorated with burnished zones on the upper body. Grey wares of a similar style are known from a number of sites in the region, and indeed the tradition can also be found on the north side of the Severn estuary. The kilns at Congresbury are known to have produced vessels of similar forms, although not apparently in the fabrics represented here.

Several examples of Oxfordshire red-slipped wares are present in late 3rd/4th-century contexts from both sites, principally of Young C45 and C51 (copies of Drag 31 and 38) and sherds of beakers (Young 1977). A group of sandy red fabrics with white-slipped surfaces is probably related to the south-west white slipped mortaria discussed below, and from the same source. Most sherds are from flacons, but there is also one folded beaker. This ware is to be equated with Gloucester fabric TF 15. A single sherd of Oxfordshire parchment ware was also recovered from Crook's Marsh.

Samian Ware

The samian ware from the sites is almost entirely of 2nd-century date. Only two earlier sherds are present, both from South Gaulish decorated bowls: a Drag 29 in the style associated with stamps of Meddillus, dating c.70–85 A.D., and a burnt Drag 37 of c.80–110 A.D. Early 2nd-century wares are entirely absent, and the only product of the potteries at Les Martres-de-Veyre is a bowl of Cettus, dated c.125–150 A.D. There is a small amount of other samian of Hadrianic to early Antonine date, but the majority of the vessels are of the mid to later Antonine period. They include the only identifiable stamp, of Romul(ikus) of Lezoux (Fig. 8, no. 1) and decorated bowls by the Lezoux potters Divixtus, Paternus II (two or three vessels) and an unidentified mould-maker working towards the end of the 2nd century. The plain wares reflect this dating, with a high proportion of Drag 31 and Drag 31R and contemporary Drag 33. Only fragments of East Gaulish wares were recovered, including at least one Drag 31/Ludowici Sa and at least two Drag 31R/Ludowici Sb, suggesting that some samian was being acquired at the end of the 2nd or the beginning of the 3rd century.

The samian is of interest for the high number of repairs present. Both the common types of repair are here, sometimes on the same pot: drilled round holes through which lead wire could

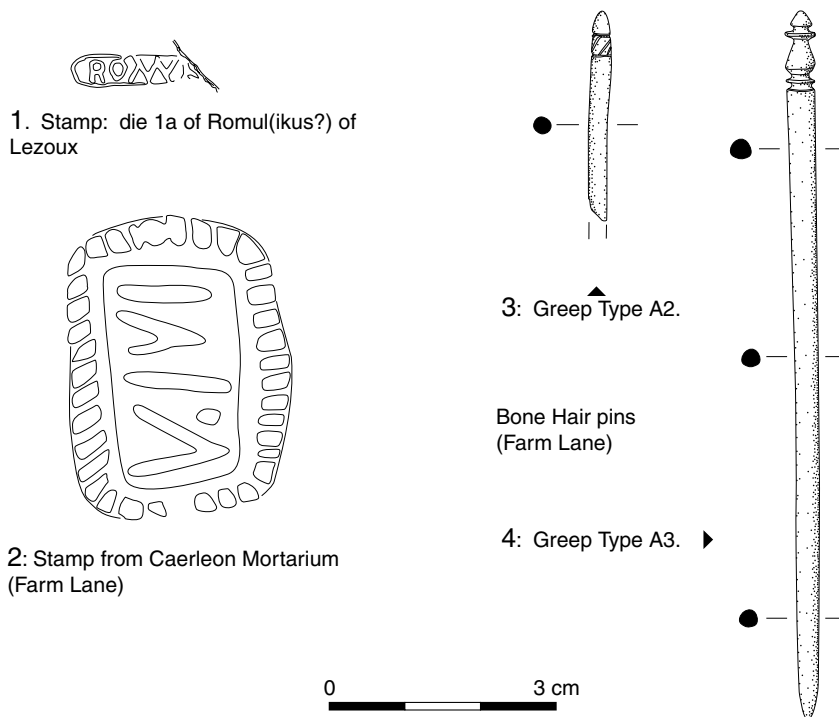


Fig. 8. Pottery stamps and bone pins from Farm Lane.

be passed to link the broken pieces, and swallowtail-shaped holes drilled on the broken edges to hold lead rivets. All the repairs are on decorated bowls, those by Cettus, Divixtus, Paternus II (two) and the unidentified Lezoux mould-maker, an unassigned bowl of Hadrianic to early Antonine date and three Drag 37 fragments. Of the repaired bowls, two also have heavily worn footrings. Such repairs indicate, not surprisingly, that the decorated samian or an acceptable replacement had become difficult to obtain locally in the later 2nd century.

Mortaria

Two examples of Caerleon mortaria were identified at Farm Lane, one of which bore a potter's stamp (Fig. 8, no. 2). This is the clearest recorded example of a stamp which reads V.IVI: only one other stamp has been recorded from the same die, from Carmarthen (unpublished). This industry was active within the period A.D. 110–170+, and the rim-profiles would best fit a date before A.D. 160. While the interpretation of most of the stamps from Caerleon is completely obscure, and it can be difficult to attribute dies to individual potters with certainty, it is worth noting that a stamp from Caerwent (unpublished) appears to read V.IVI retrograde, suggesting that it may be by the same potter. A couple of other dies, probably used in the Caerleon potteries, give readings of V.III from left to right (Caerleon) and VIII retrograde (Charterhouse-on-Mendip, Chew Valley Lake [Rahtz and Greenfield 1977, 245, no. 129 and fig. 102, stamp incorrectly drawn]). It would not be impossible to interpret the latter as V.IVI but it cannot be assumed.

However, the two pairs of dies concerned stand out from the general run of Caerleon dies and have enough in common to suggest that they may have been used in one workshop.

Second-century Caerleon mortaria are fairly common in south Gloucestershire. The two Caerleon mortaria from Farm Lane could be up to a century earlier than the rest of the mortaria. Mortaria from the Mancetter-Hartshill potteries do appear on sites in the South-West but were always relatively uncommon because it is outside their major marketing areas. There is also only one example from the potteries which may be near Wanborough, Wiltshire. These potteries served only a regional market and their products were more common in this area than those of the Warwickshire potteries but less common than those of the Oxford potteries which dominated the market in the South-West and in south Wales in the 3rd and 4th centuries (represented by five mortaria in this small sample).

The assemblages from the 3rd/4th-century features at Farm Lane and Crook's Marsh included Mancetter-Hartshill mortaria (a single sherd), Oxfordshire white-ware mortaria (parts of perhaps six vessels, principally of Young type M18), and Oxfordshire red-slipped ware mortaria of types Young C97, C98 and C100. One example of white-slipped mortaria was probably from a source in south Gloucestershire or north Wiltshire.

Other Imported Wares

Imported wares are not common in the pottery assemblage; most of them fall within the period *c.* 150–250 A.D. A single sherd of Trier black-slipped ware, usually dated *c.* 180–250, was recovered from Crook's Marsh ditch [19]. Several sherds of Dressel 20 olive-oil amphorae from southern Spain were present at Farm Lane, but only one rim sherd, probably datable to *c.* 150–220.

Summary of Dating Evidence

Farm Lane

Trench 136A

Ditches [72] and [55] produced pottery assemblages of mid to late 2nd-century date. The groups from [72] include acute-latticed BB1 cooking pots and flat-rimmed bowls which should be mid or late 2nd century A.D., and the BB1 from [55] includes flat-rimmed bowls and cooking pots of 2nd-century type. There are sherd links between the two features and the groups appear to be of similar date. No samian was found in either of the ditches.

A substantial assemblage, 1,049 sherds, was recovered from [06], the deposit in the top of ditch [72]. The BB1 from this context includes a large number of flat-rimmed bowls but only one example of the flat-rim with groove type Gillam 226/227. There are no 'true' flanged bowls. This combination suggests a date after A.D. 200, but before A.D. 250/275, when the flanged bowl appeared. Turning to the cooking pots, there are a few sherds with 90° or slightly obtuse lattice decoration. The transition from right-angles to obtuse lattice decoration on BB1 jars is likely to have taken place during the decades A.D. 200–230, and, on balance, this is the probable date of the group. It clearly post-dates the lower fills of ditch [72], but should be earlier than ditches [08]/[09] and [30]. The material from [06] also includes a large group of Antonine sigillata. Among the dozen or so decorated Drag 37 bowls, as many as five have been drilled for repair with wire or swallowtail rivets. A date for the deposition of the group within the first few decades of the 3rd century leaves open the possibility that some of the samian bowls are heirloom pieces whose useful lifespan has been extended by repair. The pottery from [05] and related contexts in the top of ditch [55] is comparable to that in [06], including sherds of late Antonine samian.

Ditches [08], [09] and [30] represent a later phase. The assemblages from [08] and [09] include BB1 flanged bowls, obtuse-latticed cooking pots and Oxfordshire red-slipped wares, which should place the group in the mid 3rd to early 4th century A.D. The material from [30] includes BB1 flanged bowls and obtuse-latticed cooking pots, one Mancetter-Hartshill mortarium (dated A.D. 260–360) and sherds of Oxfordshire red-slipped wares. These should indicate a date similar to ditches [08] and [09]. There are no examples in either the stratified or unstratified deposits of types such as stamped Oxfordshire wares and South Midlands shell-tempered wares that are known to be circulating in the region from the mid 4th century. An overall upper limit of c.359 A.D. can therefore be suggested on the occupation at Farm Lane.

Trench 174

The stratified material should all be of similar date – mid to late 2nd century A.D. The unstratified and topsoil material includes both 2nd-century and later pieces, including Oxfordshire red-slipped ware mortaria of the 3rd/4th century.

Trench 136B

A very small group of material, probably dating to the 2nd century A.D., was recovered from the topsoil.

Trench 137

A very small group of material, some of it dating to the 2nd–4th century A.D., was recovered from the topsoil.

Trench 173

A small group with few datable pieces was recovered from the topsoil. There is one rim from a BB1 cooking pot that should be mid–late 2nd century.

Lower Knole Farm

Trench 168

A very small group was recovered, including Severn Valley Ware of 1st-century type.

Crook's Marsh

Field 151 (watching brief)

The material from the feature probably dates to the later 1st century A.D., the only assemblage of this period from the project.

Field 158 (watching brief)

The stratified assemblages include BB1 flanged bowls and obtuse-latticed cooking pots and Oxfordshire red-slipped wares. These should date to the period from the mid 3rd to mid 4th century. There is nothing that need be later than this in the unstratified or topsoil material from this area: as at Farm Lane, wares that appear only after the mid 4th century are absent.

OTHER FINDS by Hilary Cool

Farm Lane

The majority of the small finds from the excavation came from Trench 136A. Nails of possible Roman date were recovered from two contexts and there was an unstratified fragment from a blue/green bottle of the later 1st to 3rd century (Cool and Price 1995, 179). A second Roman glass vessel of similar date is possibly represented by colourless body fragments from [06]. The site also produced two bone hair-pins. Both have straight tapering stems and thus fall into Greep's Type A broadly of 1st- to mid 3rd-century date (Greep 1998, 268); one is an example of Type A2 (Fig. 8, no. 3) and the other of the more miscellaneous Type A3 (Fig. 8, no. 4). Both of the head patterns used on these bone pins are common on copper-alloy pins (Cool 1991, 154, 157) for which a 2nd-century date is most common. The presence of these pins at Farm Lane is an interesting example of Romanized habits spreading to the rural population as they indicate that local females had adopted fashionable ways of dressing their hair.

Two small finds were recovered from Trench 174: an iron nail from context [05] and the fragment of a copper-alloy brooch spring from context [21]. The latter may be dated to the 1st or 2nd century.

Crook's Marsh

The watching brief in Field 158 produced three small finds, a fragment of iron plate with a rivet from context [41], a bone spindle whorl and an iron knife, none of which is closely datable. Simple bone spindle whorls, which often make use of unfused epiphyses, have a long history stretching from the Iron Age to the medieval period (MacGregor 1985, 187). Small tanged knives are equally long-lived being a well-known Roman form (Manning 1985, 115, Type 15) as well as a long-lived medieval one (Goodall 1990, 838, Type D) with similar forms still in use today.

DISCUSSION (Fig. 9)

Prehistoric Exploitation of the Wetland Environment

Prior to their reclamation, the Avonmouth Levels would have been a dynamic and changeable landscape, in which small fluctuations in sea level and differences in elevation of less than a metre would have had major consequences for the viability of land-use strategies in different locations. Gardiner *et al.* (2002) highlight the variability and complexity of the environmental sequence reconstructed from the Second Severn Crossing project. From the mid 3rd millennium B.C. onwards, a major marine transgression led to the establishment of mudflat/salt-marsh conditions and the deposition of estuarine silts of the Upper Wentlooge formation, but a drier episode within these generally prevailing conditions made occupation possible in the Bronze Age. Following severe inundation in the Early Iron Age, a hiatus in the accumulation of sediment was recognised in the Late Iron Age, which is associated with renewed activity. The Levels would therefore have afforded a changing and somewhat unpredictable range of opportunities. The environment would moreover have been far from uniform, and an important distinction must be drawn in particular between locations adjacent to dry land, where freshwater flooding and peat formation may have been an issue, and areas near the sea more subject to marine influence. Within such landscapes, the ecotone between dry land and marsh is a particularly favourable location for settlement, giving access to both dryland and wetland resources (Bell 2000, 90–1).

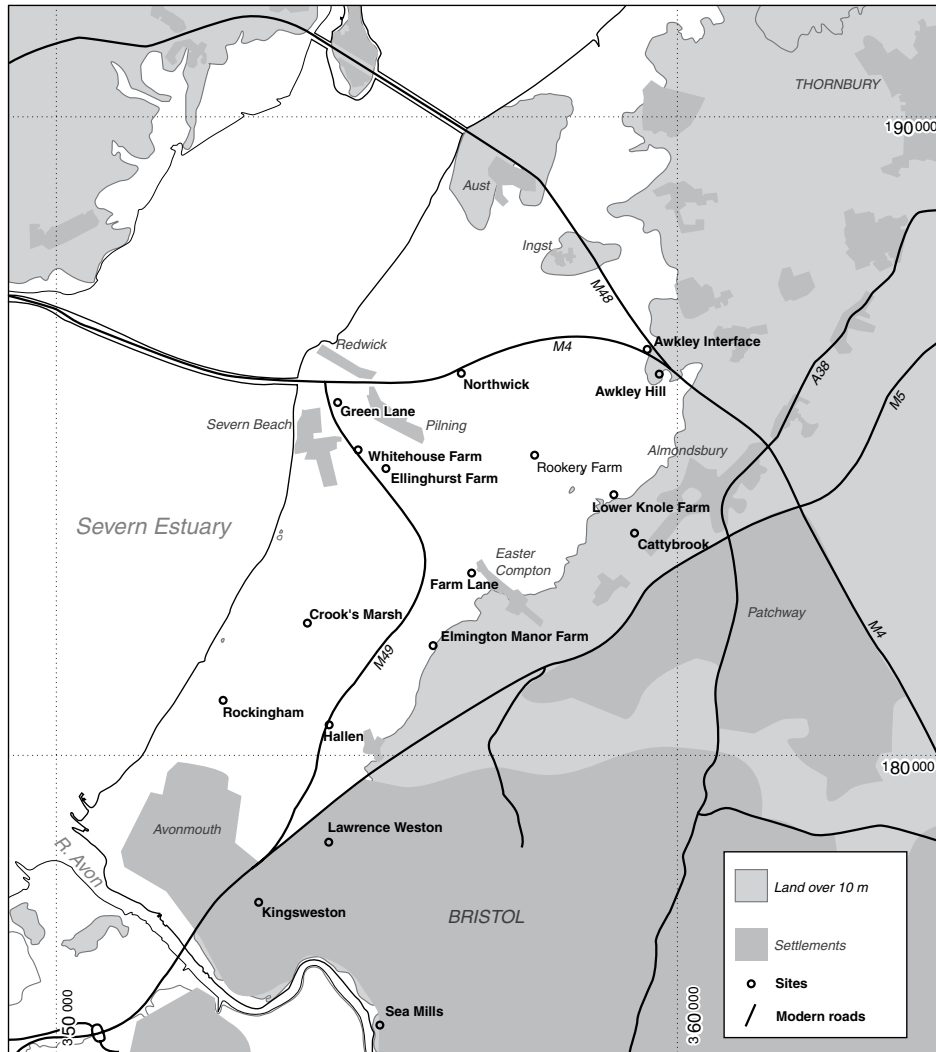


Fig. 9. Locations of Iron-Age and Romano-British sites on the Avonmouth Levels.

The value of wetland resources to early populations was considerable, and it is debatable whether such areas should be considered marginal. Rippon (2000b, 146) classifies the use of wetlands into three possible strategies. *Exploitation* is characterised by the opportunistic use of natural resources, taking advantage of the abundance of wild game, materials such as reeds and withies, and possibilities for salt production, for instance; grazing and even cultivation of some crops are also possible on high salt-marshes. *Modification* denotes measures taken to exclude the worst effects of flooding, with drainage ditches and low flood banks, though at a local scale and with no intention of totally excluding floodwaters. *Transformation* is reclamation proper, aiming at the creation of a permanently dry, freshwater landscape and the total exclusion of marine influence, even if this is rarely achieved in practice.

Iron-Age activity on the Avonmouth Levels appears to correspond most closely to exploitation in Rippon's terminology. At Hallen, the most significant and informative site for this period, roundhouses and associated settlement features with a date range of 390–110 B.C. were established on two low islands of relatively dry land within the marsh (Barnes 1993; Gardiner *et al.* 2002). This site is interpreted as a relatively short-lived, possibly seasonal settlement used for grazing livestock on the marshes; there was no evidence for cereal cultivation and only the simplest utilitarian pottery types were present.

First/Second-Century A.D. Sites on and beside the Levels

Evidence of early Roman activity includes sites on the margins of the Levels or on the adjacent dry land, and others further out on the alluvial floodplain. Farmsteads and settlements in the vicinity of Kingsweston villa (Boon 1950), on the ridge bordering the Levels, were occupied from the 1st century A.D. At Lawrence Weston (Parker 1984) late 1st-century features associated with an enclosed farmstead were associated with cattle and sheep bones, with evidence of crop processing waste from spelt wheat, as well as barley and oats. A farmstead of late 1st- to early 3rd-century date at Cattybrook (Bennett 1980) and finds of late Iron Age/early Roman pottery possibly associated with a number of linear features at Awkley Hill (Barnes 1993, 23) occupy similar topographic situations overlooking the Levels. The foot of the slope bordering the Levels also appears to have been a favoured location. In an auger hole and test pit at Elmington Manor Farm, below Spaniorum Hill, Juggins (1982) identified a buried land surface associated with 1st–2nd-century sherds and buried beneath 0.7 m of colluvial deposits. The abraded nature of the animal bone and pottery is indicative of manuring of arable land and Juggins postulates that the lower slopes of Spaniorum Hill were being cultivated at this time. Less than 400 m to the south of Juggins's test pit, Young (1992, 30–2) recorded a buried soil horizon, a possible cobbled surface and two deep ditches, all containing 1st–2nd-century pottery, in a construction trench at O.S. Nat. Grid ST 55878130. An evaluation in a similar topographic situation, at 7.38 m above O.D. at the foot of Awkley Hill, revealed a buried soil containing Romano-British occupation deposits and sealing features that included a recut ditch, a pit and a posthole, sealed by 0.7 m of colluvium (Barnes 1993, 25–6).

The mid 2nd-century features at Farm Lane can be understood against this background of settlement at the ecotone between the dry land and the Levels. The site occupies a low-lying location on the margin of the Levels: boreholes along the pipeline route indicated the presence of a buried ridge of Mercia Mudstone, reaching a maximum elevation of around 5.0 m above O.D. in the vicinity of the recorded features and dropping away to the west beyond Trench 136B (Fig. 2). Environmental indicators provide evidence of a marine influence, suggesting that the ditches were connected to an active salt-marsh. Despite this connection to tidal waters, there is no evidence that the site was subject to severe or prolonged flooding during or after the period of occupation, as features from both phases were visible 0.5 m below the modern ground surface, and Roman sherds were present in the topsoil. The landward extent of the settlement is unknown, but it is probable that the features discovered form part of a larger site, the core of which lay on higher ground while fields defined by ditches extended onto lower-lying areas that may have been more vulnerable to flooding. As there is tentative evidence for a mixed agricultural economy, cereal crops could have been cultivated at the foot of the hill and on the adjacent slopes, with cattle and sheep grazing on the marsh beyond. The pottery assemblage, composed largely of coarse wares with very few imports, is characteristic of a rural settlement with no special distinctions of status.

The features at Lower Knole Farm are also in a similar landscape setting, at 5.3 m above O.D. on the edge of the alluvial floodplain. The one ditch identified during the project was buried

beneath deposits which are interpreted as interdigitated colluvium and alluvium, as at Elmington Manor Farm and Awkley Hill. At first glance, this might appear to be a smaller and more short-lived settlement than that at Farm Lane, but the trenches excavated may have located only its peripheral areas.

The Second Severn Crossing archaeological programme, in particular, produced evidence for early Roman occupation in several locations further out on the alluvium, but only one such site has been extensively investigated. A short-lived settlement dated to the 1st century A.D. was excavated at Northwick, in a floodplain setting at 6.5 m above O.D. (Barnes 1993, 13–9; Gardiner *et al.* 2002). This was thought to be a seasonal pastoral site, similar in function to the Iron-Age site at Hallen, as charred plant remains were limited to single examples of weeds of disturbed ground, but no cereals were found. The presence of substantial ditches with evidence for repeated recutting, however, indicates a concern with drainage that might be thought more consistent with occupation of a more permanent nature. Concentrations of domestic refuse in their primary fills were overlain by deposits of clean alluvial clay, suggesting that occupation was punctuated by episodes of flooding. This flooding may not have been catastrophic or severe enough to cause the abandonment of the site, as no great depth of alluvium had accumulated over the Roman ground surface: features were visible 0.45 m below the modern ground surface, and material of Roman date was present in the topsoil.

Elsewhere, evaluations and watching briefs have established a late 1st–2nd-century presence, with the recognition of Romano-British pottery and cut features at a number of locations. At Ellinghurst Farm, Redwick, midden deposits containing domestic waste, with well-preserved animal bone and pottery dating from the late 1st/2nd to the late 3rd century A.D., occurred in a ditch that was visible at 5.5 m above O.D., 0.7 m below the modern ground surface (GGAT 1991, sections 3.4.8 and 5.3.2). A watching brief at Rookery Farm identified two ditches and a pit of 1st–2nd-century A.D. date, and a spread of contemporary material which appeared only 0.2 m below the modern ground surface (Young 1992, 18–20). Romano-British pottery was also found within a buried soil layer at Green Lane, Redwick (Wessex Archaeology 1999, 8). At Rockingham Farm, 2nd-century A.D. metalwork was recovered in a residual context on an excavation of mainly medieval features, and undated ditches were thought to be Roman on the basis of their stratigraphic position (Locock and Lawler 2000). It may be possible to see the discovery of 1st-century A.D. sherds at Crook's Marsh as part of this horizon of early Roman exploitation of the alluvial floodplain, although the pottery occurred in a later feature and the circumstances of its deposition are not understood.

While the Avonmouth Levels in the early Roman period were probably fringed with permanent farming settlements, in locations like Farm Lane on the edge of the alluvium, whether similar settlements existed further out on the Levels is debatable. The distinction between the early Roman period and the late Iron Age on the Levels may be an artificial one in many respects: of the sites mentioned above, Northwick, Green Lane, Rookery Farm and Elmington Manor Farm also produced more limited evidence for late Iron-Age activity, suggesting a pre-conquest origin for these developments. The economic basis of the early Roman activity on these sites remains unclear, as the scale of the investigations has been insufficient to determine whether existing patterns of exploitation were maintained, or if the 1st century A.D. saw the establishment of more permanent settlements; however, the presence of substantial cut features and quantities of cultural material at most of these sites hints at permanent occupation. On the available evidence, late Iron-Age/Early Roman land use on the Avonmouth Levels may have been more settled than Gardiner *et al.* (2002) allow, and the evidence they cite for sites on the alluvium being abandoned in the later 2nd century due to increasingly severe flooding is by no means universal. Although the features at Ellinghurst Farm were buried beneath a substantial alluvial deposit, and phases of alluvial deposition may also

be present at Lower Knole Farm, this does not appear to be the case at Rookery Farm, Northwick or Farm Lane, where deposits of Roman date were shallow enough to be disturbed by modern ploughing. The occupation and abandonment of Romano-British sites on the Levels may have been governed more by localised events of flooding and sediment deposition within a continually shifting pattern of drainage, not to mention social and political factors, than by gross fluctuations in relative sea level.

Late Roman Agriculture at Crook's Marsh: modification or transformation?

The dryland edges of the Avonmouth Levels continued to be a settled agricultural landscape well into the 4th century, a pattern of land use probably brought to an end only – if at all – by the final collapse of Romano-British civil society and the villa economy. The type of land use attested by the mid 3rd/early 4th-century phase at Farm Lane appears little different from the 2nd-century, with similar environmental evidence for a mixed agricultural economy, and finds characteristic of a rural settlement of ordinary status. Fragments of fired clay, interpreted as walling from buildings of wattle and daub construction, were present but there was no tile or other evidence of more sophisticated building techniques (Crowley, in McGill 2001 vol. 3, 57–60). Although there is no evidence for occupation at Farm Lane continuing after the mid 4th century, only a small area was investigated here and the apparent abandonment of the site at this time may be no more than a minor shift or reorganisation of the pattern of settlement.

Elsewhere on the edge of the Levels, an impressive villa was established at Kingsweston in the later 3rd century (Boon 1950), and a near-continuous ribbon of settlements extended along the ridge overlooking the Levels in its vicinity. Lawrence Weston (Parker 1984) is the most notable example of this group of sites: here, a later phase of settlement, represented by a cobbled yard, continued into the later 4th century. Many more Romano-British sites undoubtedly await discovery along the edge of the Levels, buried beneath colluvial deposits or lying undetected under pasture.

Crook's Marsh remains, however, the only known late Roman site on the alluvium of the Avonmouth Levels where occupation has been shown to continue into the late 4th century. The evidence from Crook's Marsh points unambiguously to a settled farming community, with features associated with field systems occurring over an area at least 700 m from south-east to north-west, evidence of crop processing, and a material culture typical of contemporary dryland settlements, though with no indications of any special status. The existence of ditched field systems led Juggins to conclude that the Levels must have been fully reclaimed land during the late Roman period, with a system of sea banks and floodgates to exclude all marine influence (Juggins 1982, 37–42). The molluscan assemblages that he studied supported this conclusion, as they indicated dry conditions with some standing fresh water in the ditches. Allen and Fulford (1986, 116), who studied molluscan assemblages from the features recorded by the Evertons, similarly concluded that the local environment would have been dry or damp grassland rather than salt-marsh.

The draining and reclamation of the Avonmouth Levels would have been well within the capabilities of late Roman society. The Wentlooge Level, on the opposite side of the estuary, appears to have been a fully reclaimed landscape, on the evidence from Rumney Great Wharf presented by Fulford *et al.* (1994). Ditches exposed at that site, on the eroding foreshore beyond the existing seabank, proved to be late Roman and aligned with the extant drainage rhines within the area protected by the seabank, indicating that the rectangular fields covering the central part of the Wentlooge Level were of Roman origin. Post-Roman partial inundation of this landscape had been dealt with by setting back the seabank to its current position. Pollen and waterlogged seeds from Roman features on the foreshore at Rumney Great Wharf indicated an open, non-saline pasture, but with no evidence of arable cultivation in the immediate vicinity. Crook's Marsh,

in common with most of the Avonmouth Levels, lies at around 6 metres above O.D. With relative sea levels calculated to have been around a metre lower than today (Rippon 1997, 107–12), the Levels would have been predominantly a high salt-marsh, flooded only at the highest astronomical tides. Reclamation may have been assisted by a slowdown in the rate of sea level rise that appears to have set in from the mid 3rd century A.D. (Allen and Fulford 1990, 316–17), and which is apparent in the relative heights of the reclamations in the inner Severn estuary undertaken from the early Roman period onwards, corresponding to the level of the highest tides at their respective dates. Banks no more than 1–2 m high would have been sufficient to exclude the tides from the Avonmouth Levels in normal conditions, and constructing the 15 km of sea wall calculated by Rippon as sufficient to protect the entire area would not have been an impossible undertaking.

The evidence from the Pucklechurch to Seabank pipeline confirms the existence of a mixed agricultural economy at Crook's Marsh, but also casts doubt on the existence of such a comprehensive system of flood defences. Diatom and foraminifera samples indicated at least occasional incursions of estuarine water into the ditches. Since cultural material, including chaff from crop processing and numerous sherds of pottery, occurred in the same deposit and from all the layers overlying it, the marine influence cannot be attributed to flooding following the failure of flood defences and consequent abandonment of the site. Rather a situation must be envisaged in which the activities of the community continued through at least occasional episodes of marine flooding, which may be recognised as the layers of alluvial clay interleaved with organic stabilisation deposits observed within and over ditch [19]. The flooding may, of course, have affected only part of the field system surrounding the settlement: the ditches recorded in the watching brief are nearer the coast than those sampled by Juggins, and may represent an outlying area which was regularly inundated while the core of the settlement remained dry. We should also be cautious about assuming that all the features at Crook's Marsh were contemporary: the settlement may have shifted, expanded, contracted or have been periodically abandoned in response to changing conditions. Nevertheless, at some point in the site's history occasional incursions of salt water appear to have occurred without occasioning the abandonment of farming. At a similar or perhaps somewhat earlier date, as far inland as Farm Lane, evidence of crop processing occurred in mid 3rd–early 4th-century ditches which also had a direct connection to the sea.

The situation on the Avonmouth Levels during the late Roman period was perhaps more akin to modification of the wetland landscape than transformation (*sensu* Rippon). The existence of a seabank enclosing the whole of the Levels should not be assumed, as a more local and piecemeal strategy might have been pursued instead. Drainage ditches, in combination with low, localised flood banks, may have sufficed to control flooding in most conditions and prevent damage to the crops. Experiments have been carried out in the Netherlands following the discovery of remains of crop plants from settlement sites in former salt-marsh areas (Korber-Gröhne 1981; van Zeist 1974). They tested the viability of growing crops on soils susceptible to flooding from brackish waters and tests showed that crops planted in the salt-marsh grew well, until the plots were flooded by summer storm floods causing considerable damage, although barley seemed to be less susceptible. Some protection against such events would probably have been necessary, although a ditched system around small field plots controlling water flow may have sufficed and could have been easily maintained. A similar situation may have prevailed on the Oldbury Levels to the north-east, where Roman settlement developed alongside a tidal channel next to the coast (Allen and Rippon 1997). Whereas the medieval and post-medieval seabank enclosed the whole of the Oldbury Levels, the Roman sea defences seem to have respected smaller channels.

If the provision of flood defences was indeed partial and localised, this may at least partly explain the lack of evidence for late Roman occupation elsewhere on the Avonmouth Levels. Former watercourses, levees and areas of relatively high ground that were apparent in the 3rd and 4th

centuries may not be obvious today, due to the combined effects of the constantly shifting pattern of natural drainage in a floodplain environment, and the modification and regulation of that drainage regime since the medieval period. Crook's Marsh may have been somewhat higher and better drained than much of the surrounding floodplain, and this may also be more generally true of parts of the Avonmouth Levels nearest the sea, where tidal sedimentation would have been heaviest, leading to the buildup of a coastal levee. More low-lying areas further inland would probably have been more inhospitable, with heavy clay soils and peat fens developing, as floodwaters would have taken longer to drain away and would have been compounded by the effects of runoff from the surrounding land. Some support for the existence of a coastal levee is provided by the borehole readings (Carter *et al.* 2003), which show the present-day ground surface reaching 6.5 m above O.D. at Seabank, and continuing at around 6.1 m from the area of the features recorded in 1997 to the sharp angle made by the pipeline route at its southernmost point (Fig. 1). Between this angle and the buried ridge at Farm Lane, where the pipeline route runs parallel to the edge of the Levels, the ground surface dips below 5.5 m above O.D. in places, reflecting the presence here of more compressible fine-grained sediments and peat.

A major episode of reclamation and colonisation in the late Roman period is apparent in other areas of former wetlands along the Severn estuary. As well as the evidence from Oldbury discussed above, large areas of the Somerset Levels were drained at this time (Rippon 2000a) and many smaller areas of tidal alluvial deposits in the inner estuary were also enclosed by flood banks (Allen and Fulford 1990). While environmental factors such as decelerating sea level rise may have made these developments possible, it is probably no coincidence that they occur at approximately the same time as the remarkable florescence of villas apparent in the Gloucestershire area (Branigan 1977), the social and political causes of which have been the subject of some debate. The extensive and wealthy villa at Kingsweston is a part of this development, and it is not unreasonable to suppose that at least part of the Avonmouth Levels might have been included in its estate, even if links between villas and their dependent settlements are notoriously difficult to prove. A link between wetland reclamations and the villa economy has been suggested by Allen and Fulford (1990), who contrast the extensive late Roman reclamations on the left bank of the inner estuary, where the adjacent high ground appears to have been relatively densely settled, with the situation on the right bank, where most of the reclamations appear to be medieval or post-medieval. Comparison with the levels on the Welsh side of the outer estuary is also instructive. The embanking of the Wentlooge Level is thought to be an earlier development connected with the need for grazing land to supply the fort at Caerleon (Allen and Fulford 1986, 115–16). Further east at Nash on the Gwent Levels, 1st–3rd-century activity is thought to reflect seasonal use of a salt-marsh for grazing, again with the suggestion that supplying the nearby fort was a relevant factor (Meddens and Beasley 2001). Diatoms and foraminifera from drainage ditches dating to the 2nd century A.D. at Nash indicated a brackish environment that was not effectively reclaimed, and the plant macrofossils included salt-marsh species with no evidence for arable in the immediate vicinity.

The strategies pursued in utilising the wetlands of the Severn estuary in the Roman period seem to have varied from place to place, in response to the opportunities offered by a changing environment and, no doubt, to varying social and economic demands. At Crook's Marsh, we can perhaps see the development of a dependent farmstead linked to a villa estate, responding to a growing market economy by making the most of the farming potential of an area of high salt-marsh, but without any strategy for large-scale reclamation.

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