

**Channel Tunnel Rail Link
London and Continental Railways
Oxford Wessex Archaeology Joint Venture**

**Building Material from Northumberland Bottom,
Gravesend, Kent**
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**CTRL Specialist Report Series
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1 INTRODUCTION

1.1 The site

As part of an extensive programme of archaeological investigations carried out in advance of the construction of the Channel Tunnel Rail Link (CTRL), the Museum of London Archaeology Service was commissioned to undertake archaeological recording to the west of Northumberland Bottom, Southfleet, in Kent. The excavation areas lie c.1.5 km to the south-east of the Roman 'small town' at Springhead. The site lies alongside the A2 (Watling Street) between Hazells Farm and Wrotham Road, and is 1.75 km long (OS NGR 562536 171753 to 564123 171006). The investigations were carried out between June 1998 and May 2000, under the project management of Rail Link Engineering, on behalf of Union Railways (South) Limited (a subsidiary of London and Continental Railways Limited).

The earliest evidence for settlement occupation occurs in the earlier middle Iron Age and was concentrated near Hazells Farm. Evidence comprised a scattered group of five pits, a cooking pit, a water hole, a metalworking area consisting of bowl furnace bases and an area of possible animal pens.

Evidence for later middle to late Iron Age activity extended over a much wider area, although indications of settlement activity in this period remain concentrated in the western half of the site. In the late Iron Age or early Roman period an enclosed site of uncertain function was established c.300 m to the east of Downs Road. The enclosure developed alongside a minor track, and appears to have been abandoned before *c* AD 70. Associated features include a number of pits, several ovens or kilns, a hearth, a horse burial, a possible ritual pit deposit containing unburnt human bone, a well or deep quarry, and a cremation burial.

There were two foci of agricultural activity during the Roman period. The earliest, on the high ground to the west of the Wrotham Road dry valley, consisted of a group of adjoining rectangular enclosures bounded by banks and ditches. Activity at this location was mainly in the 1st century AD, extending into the 2nd century, and included evidence for cereal processing and domestic activity, including an oven. There were also two pits containing neo-natal burials.

The second, later focus of Roman activity was located near the junction of Hazells Road and Downs Road. Features included the masonry foundations of a twin-chambered 'corn dryer' and elements of a field system, lying alongside a metalled track (probably a Roman precursor of Downs Road). The coin and ceramic assemblages from this site comprise the only exclusively late Roman (late 3rd to 4th century) site assemblages from the CTRL Section 1 project.

Two medieval sites, found on either side of Downs Road, were dated by ceramic evidence to the 12th/ 13th century. They perhaps form part of a medieval precursor of Hazells Farm. They comprised at least one large rectangular timber post-built building, located c. 200m east of the present farm, and traces of two circular domed clay ovens, lying alongside Hazells Road.

Some 600 m to the east, on the higher ground between Downs Road and Wrotham Road, was a sequence of enclosures, with some indication of structures, ovens and rubbish pits, also dating from the 12th or early 13th century.

Evidence for more recent land-use includes a brick clamp dating from c 1450-1700, located c 100m north of Hazells Farm. A Second World War army camp and anti aircraft battery were recorded just to the west of Wrotham Road.

1.2 Assemblage summary

A total of 72.67 kg of material was examined, comprising Roman, medieval, and post-medieval ceramic building material, mortar, mud brick, keyed clay, daub/fired clay, and stone. It should be noted that the material in the last two categories is not necessarily all building material. Quantities are shown in Table 1. Thanks are due to Susan Pringle, who originally recorded and assessed the material.

Table 1: Building material by weight

Material	Weight (kg)	%
Roman cbm	11.56	15.9
Medieval/Post-medieval cbm	3.60	5.0
Uncertain cbm	0.44	0.6
Mortar	0.05	0.1
Mud brick	1.27	1.7
Keyed clay	0.04	0.1
Daub/fired clay*	54.55	75.1
Stone*	1.16	1.6
Total	72.67	

* Not all necessarily building material

2 CERAMIC BUILDING MATERIAL

2.1 Roman ceramic building material

Roman ceramic building material was present at all component sites but in quite small quantities, totalling 11.56 kg or 15.9% of the assemblage by weight. It accounts for 76.3% of the ceramic building material by weight and 78.4% by count. All is fragmentary and some of it abraded.

Fabrics

In recording the Roman ceramic building material Museum of London (MoL) fabric types were used wherever possible; sometimes those found at the site are variants, probably representing local manufacture rather than production at the centres mentioned below for some of the MoL fabrics. (Fabric samples and descriptions are kept by Museum of London Specialist Services.) A further five fabrics were noted; they are referred to as fabrics HRD1, 2, 3, and 4, and WNB1. Quantities are shown in Table 2.

Table 2: Roman ceramic building material fabrics

Fabric	Weight (g)	%
2815	5360	46.4
3023	20	0.2
3028	5	+
3060	710	6.1
3069	140	1.2
3226	1730	15.0
3227	80	0.7
3255	1420	12.3
HRD1	1385	12.0
HRD2	80	0.7
HRD3	90	0.8
HRD4	515	4.5
WNB1	20	0.2
Total	11555	

Some 46.4% by weight (74 fragments) is in fabrics belonging to the MoL fabric group 2815. Materials in these fabrics were manufactured at Brockley Hill and neighbouring kiln sites along Watling Street north of London, with a date range of *c* 50-160, although some may be Kent variants, not necessarily with the same date range. Other fabrics are present only in

small quantities, ranging from one fragment to eighteen fragments. Materials in fabrics 3060 and 3023 usually come from the Radlett area of Hertfordshire and belong to the period 50-120; materials in fabric 3069 perhaps come from somewhere in Hertfordshire or Buckinghamshire and date from the period 70-100. The place of manufacture of materials in other MoL fabrics (3028, 3226, 3227, and 3255) is not known; all date from the later 1st century with some extending into the early 2nd century.

The non-MoL fabrics are:

HRD1: red or orange, slightly micaceous, with moderate medium to coarse quartz and large rounded or blocky yellowish silty clay inclusions, sometimes with a white calcareous speckle and with common fine black iron-oxide specks;

HRD2: light brown to orange with abundant fine to medium angular quartz, sparse coarse quartz, and sparse coarse rounded dark red iron-rich inclusions;

HRD3: fine red with coarse quartz, iron-rich clays and sparse pale cream silty streaks; HRD4: light orange with abundant fine quartz and common fine black iron oxide specks and frequent rounded cream and dark red clay/silt inclusions;

WNB1: orange with white speckles, fine black iron oxides, sparse coarse rose quartz, and coarse pale cream clay and ferruginous sandstone inclusions.

The date range and place of manufacture of these five fabrics are not known, although they may well be fairly local.

Forms

Apart from a single tessera cut from building material in fabric 3023, the forms present are bricks, roofing tiles (both tegulae and imbrices), box-flue tiles, and voussoir tiles. All the material, however, is very fragmentary and often it is not possible to be certain which form is represented. The definite forms (90 pieces) comprise: 25 bricks (27.8%), 18 tegulae (20.0%), 14 imbrices (15.6%), 10 box-flue tiles (11.1%), and 23 voussoir tiles (25.6%).

Of particular interest are the last two forms. The box-flue tiles (*tubuli*) must derive from a building with a hypocaust heating system: they were used to form conduits in the walls (Brodribb 1987, 70-79). Two opposite faces were provided with some form of mortar keying: all those from this site with evidence of such keying are combed; in one case it is clear that a seven-tooth comb was employed. The voussoir tiles (*tubuli cuneati*) might also be used in vaulted roofs, as conduits in connection with a hypocaust heating system, although they were also used to create lightweight vaults even in the absence of a heating system (ibid, 79-83).

Mortar keying on the fragments from the site is again exclusively combed, one piece clearly with a six-tooth comb. One piece preserves part of a circular side-vent. Two of the box-flue tile fragments and no fewer than 22 of the voussoir tile fragments (plus a further seven possible voussoir tile fragments) come from structural debris: the box-flue tiles from structural debris 153, the voussoir tiles from 102, and the possible voussoir tiles from 178 and 191. Some of the other ceramic building materials (8 bricks, 1 tegula and 1 imbrex) also come from structural debris.

Because of the fragmentary nature of the material no full dimensions are preserved. One brick fragment has an angle of some 63° and is probably part of a triangular brick, more or less equilateral. Such bricks were used as facings to walls with a rubble or concrete core (Brodrigg 1987, 47-9). Another brick has wavy lines made with a finger in its upper bedface. It is possible that these were intended as mortar keying, but this is not common on Roman bricks and was indeed hardly necessary with Roman building techniques; the lines may, therefore, be no more than a doodle made in an idle moment at the brickyard. One tegula shows part of a 'signature mark' (Brodrigg 1987, 99-105). Some of the materials have grey (reduced) cores or surfaces, a consequence of insufficient oxygen during firing.

2.2 Medieval and post-medieval ceramic building material

Medieval and post-medieval ceramic building material was recovered in even smaller quantities (totalling 3.60 kg or 5.0% of the assemblage by weight) and again all is fragmentary. It accounts for 23.7% of the ceramic building material by weight and 21.6% by count. It comes exclusively from ARC-330 98. Nearly all is from pits or ditches and none is associated with buildings. Some of the brick fragments, however, are associated with a brick clamp.

Fabrics

As with the Roman materials, MoL fabric codes were used during recording. The similarity of these fabrics should not, however, be taken to imply a London provenance for the materials: more probably they were made fairly locally using superficial Thames Valley geological deposits similar to those used in the London area itself. Some brick fragments are so overfired and vitrified that their fabric is not ascertainable. All others are in MoL fabric 3033, which in London dates from the late Middle Ages down to c 1700. Peg tiles and curved tiles are in MoL fabrics 2271, 2276, 3090, 3094, 3201 and 3234. All are in some shade of red, the single fragment in fabric 3234 being pinkish although this fabric sometimes fires yellow. Fabric 2276, distinguished by its fine moulding sand, is usually of post-medieval date. The other fabrics have a wide date range from the late 12th century onwards.

Forms

A small flake in fabric 2271 is probably from roofing tile but is too small for its form to be certain. The definite forms comprise: 17 bricks (38.6%), 24 peg tiles (54.5%), and 3 curved (ridge, hip, or valley) tiles (6.8%).

Bricks

The bricks are all fragmentary and no full dimensions are present. One, however, has a breadth of 110 mm and a thickness of 55 mm and another a breadth of 108 mm and a thickness of 50-55 mm. These thicknesses – of approximately 2-2½ in – suggest an early date, probably in the Tudor but perhaps in the Stuart period. Compared with, say, Essex, Kent was tardy in adopting brick, with the first major use of the material in its own right occurring at Wickham Court, West Wickham only in 1469 (Rigold 1973, 188; Smith 1990, 171-4). One brick has faint sunken margins. These result from the particular method of manufacture (Betts 1996, 6-10; Smith forthcoming); they are unusual in the London area (and probably also in Kent) after *c* 1700. Of particular interest are the bricks from 183 and 345, which are associated with a brick clamp. Those from 183 are overfired and vitrified fragments and must be wasters from clamp-firing. Their fabrics are therefore not ascertainable, although it is likely that they are similar to the other fragments and thus in fabric 3033. One fragment from 345 has a vitrified upper bedface, but is not for that reason a waster (though it may have been broken during dismantling of the fired clamp). Although permanent kilns were sometimes used for firing bricks in medieval and Tudor times, clamp-firing was far more common. (Both terms, ‘kiln’ and ‘clamp’, were used interchangeably down to quite recent times, a fact which has sometimes misled writers on the topic.) Clamp-firing had its advantages: no permanent plant (and hence little capital) were required, clamps could be set up wherever there was suitable raw material and often close to where the bricks were needed, the number of bricks fired at any one time could be varied considerably, and there was no need for the frequent maintenance required by a permanent kiln. These considerations were enough to counter the disadvantages: there was greater wastage with a clamp, it took longer to fire the bricks, and clamp-firing was more susceptible to the vagaries of the weather (Smith forthcoming). Clamp-firing remained the norm in north Kent yards down to the 20th century.

Peg tiles

The peg tile fragments are so small that no lengths or breadths are preserved. It is difficult to date them, although glazed examples (whether using splash-glaze or the more satisfactory cover-glaze) are probably of medieval date in this part of England. Some tiles from ditch 1 are glazed. Few retain the holes used for fixing with pegs or nails. Where they survive they are mostly circular, and indeed the standard Kentish form at all periods had two such holes, not

always symmetrically placed. One fragment from ditch 169 has a diagonal hole: holes of this form usually indicate a post-medieval date. So too, as mentioned above, does the use of fabric 2276, a fragment of which was present in deposit 323. Kent peg tiles 'have been so good for so long' (Burnham 1973, 176) that they are the dominant roofing material on buildings of all types outside metropolitan Kent; indeed they have often crept down onto the walls themselves as tile-hanging, a speciality of the south-eastern counties.

Curved (ridge, hip, or valley) tiles

Three fragments of curved roofing tiles were recovered. They are so fragmentary that it is not clear whether they are from ridge tiles or from hip or valley tiles. All three types were available by the late 13th century (Cherry 1991, 194), and ridge tiles indeed almost certainly earlier. Like peg tiles, they are common in Kent. A fragment from pit 1278 has splash-glaze and is therefore probably of medieval date. Another, from deposit 323, is in fabric 2276 and therefore probably of post-medieval date.

3 NON-CERAMIC BUILDING MATERIAL

3.1 Mud brick

Fragments of mud brick were recovered from pit 1033 at ARC-WNB98. No dimensions are preserved (indeed some of the 20 fragments are so small that they may be daub rather than from mud bricks) but one measures not less than 75 x 75mm with a right-angled corner. One has a small hole, 10 x 6mm and 12 mm deep pushed into it with a stick. It is hard to see any constructional purpose for this and it may be accidental or simply made during an idle moment. The mud bricks are probably of Roman date, when they were used either on their own or as infilling to timber-framing. Mud bricks were, however, sometimes used in medieval and post-medieval times.

3.2 Keyed clay walling

A fragment of keyed clay walling was recovered from Ditch 3102 at ARC-WNB98. It is too small for its pattern, probably formed by combing, to be ascertained. Keyed clay walling was used in the early Roman period (Russell 1994, 47-50).

3.3 Daub

Quite large quantities of fired clay, totalling 54.55 kg or 75.1% of the assemblage by weight, were recovered from all component sites. It is light brown or orange in colour, sometimes with small inclusions of chalk, suggesting, as would be expected, that it was prepared locally.

Many pieces have smoothed faces, either straight or curved. In a very few cases there are finger marks where the clay has been smoothed. The material is not all necessarily daub; some may be from loom weights or other objects whilst other pieces seem to be from kiln lining. Only where there are wattle and/or lath impressions can one be certain that the material is daub. Definite or possible impressions were present in pieces from ARC-33098 pit 150, pit 255, ditch 282, and pit 1280 (possible), from ARC-HRD98 structural debris 3102, ditch 77, structural debris 107, structural debris 152, structural debris 153, and ditch 156, and from ARC-WNB98 pit 791, deposit 1044 (possible), ditch 1110 (possible), ditch 1125, ditch 1130, ditch 1202, pit 1252 (possible), and deposit 2203 (possible). Daub has been used from prehistoric to recent times. It is impossible independently to date the pieces from this site.

3.4 Mortar

Six fragments (totalling only 50 g) of soft light-brown lime mortar were recovered from pit 149 at ARC-33098.

3.5 Stone

Stone types present, all as small fragments, are: Hassock sandstone (from ARC-HRD98) and chalk, ferruginous sandstone, flint, and Kentish Ragstone (all from ARC-WNB98). All these stone types were available within Kent itself. None shows tooling and none is large enough to preserve other features. Some may be from building stone – rubble or worked – but this is by no means certain.

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