

Dragon Hall, Norwich (449N): Ceramic Building Material

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Introduction

A total of 2879 fragments of ceramic building material (CBM) weighing 407.051 kg was collected during the evaluation and excavation. This was only a sample of the large quantity of material found on the site. Table 1 lists the count and weight quantification of the CBM by category.

Category	No.	Wt/g
Roof tile	1412	83722
Pantile	107	10455
Chimney	2	245
Brick	20	1738
Early brick	741	142683
Late brick	317	62946
Moulded brick	4	6775
Wall tile	6	62
Floor brick/tile	196	78122
Drain	6	15115
Malting tile	3	201
Roman	15	2246
Unidentified	50	2741
Total	2879	407051

Table 1. Quantification by category.

In addition there were 351 fragments of fired clay, weighing 2676g.

Methodology and retention policy

The assemblage was quantified (count and weight) by fabric and form. Fabrics were identified on the basis of macroscopic appearance and main inclusions. The width, length and thickness of bricks and floor tiles were measured, but roof tile thicknesses were only measured when another dimension was available. Forms were identified from previous work in Norwich (Drury 1993), based on measurements. Other form terminology follows Brunskill's glossary (1990).

The retention policy for this assemblage was to keep samples of all fabrics, representative complete or near-complete pieces of most forms, unusual objects, pieces showing animal or human footprints, and all material identified as Roman or possibly Roman. A small amount of material was kept as a basis for a Norfolk CBM fabric series.

Fabrics

Three Roman and 22 post-Roman fabrics were identified as follows:

Roman

- R1** Fine sandy brown to red fabric with occasional coarse rounded clay pellets and ferrous fragments.
- R2** Medium sandy red fabric with few other inclusions.
- R3** Medium sandy, poorly mixed buff fabric containing moderate coarse white grog.

Estuarine (medieval)

These fabrics are extremely variable in colour, density and degree of firing/hardness. Fabrics 1, 3 and 2 respectively can be regarded as a loose continuum of poor- to well-made bricks with varying degrees of temper.

- 1** Coarse estuarine fabric in varying colours (pink, purple, yellow, often within a single brick), tempered with coarse organic (voids), ferrous and calcareous inclusions. Bricks.
- 2** Dense estuarine fabric (colours as 1) with coarse ferrous and occasional grog inclusions. Bricks.
- 3** Medium density estuarine (colours as 1), some voids, common clay pellets and occasional grog. Bricks.
- 15** Coarse to very coarse sand-tempered estuarine clays, varying from yellow with a purple-grey core to orange with a grey core. Roof tiles, often glazed.

Red sandy (medieval to post-medieval)

These fabrics generally have a similar range of coarse local inclusions (ferrous oxide, flint, chalk) and have been divided on the basis of quartz sand grain size or abundance. Fabrics 6 and 11 ('medium' and 'coarse') were generally allocated unless pieces showed some clear difference in size or abundance of other inclusions.

- 5** Fine sandy red fabric with few coarse inclusions. Includes floor and roof tile, some brick. Similar to R2, and some fragments may be Roman.
- 6/6a** Medium sandy with occasional small red ferrous inclusions, coarse flint, coarse chalk. Tiles often have a grey core in

earlier examples. Fabric 6a is a variant which is slightly overfired and has a sparkly appearance in section. Roof tile (often glazed), floor tile and late brick. Medieval, late medieval and post-medieval.

- 7 Fine sandy red fabric with ferrous inclusions and voids. Mainly roof tiles. Medieval?
- 10 Fine-medium sandy with fine to very coarse ferrous fragments, chalk and flint. Drainpipes.
- 11 Coarse sandy orange-red fabric with common medium sand and moderate coarse quartz, occasional coarse flint, chalk and ferrous fragments. Roof tile and late brick. Medieval-late medieval (some later?).
- 13 Fine sandy soft pale orange-red fabric with mica and soft ferrous fragments. Mainly roof tile, often with diagonal strike marks. Late or post-medieval?
- 18 Medium sandy red fabric with moderate to common medium ferrous and chalk fragments up to 4mm in diameter. Roof tile only. Post-medieval.
- 19 Coarse sandy red fabric with common rounded buff or grey clay pellets and ferrous fragments. Roof tile only. Medieval or late medieval.

Red sandy with grog (medieval to post-medieval)

- 8 Fine sandy red fabric, occasional grog. Roof tile, some brick and floor tile. Post-medieval.
- 12 Medium sandy red fabric with common grog. Roof tile, brick and floor tile. Late medieval and later?
- 20 Medium sandy dark red fabric with common coarse grog and ferrous fragments. Roof and floor tile. Post-medieval.

White fabrics (late to post-medieval)

- 4 Medium sandy cream-white fabric with coarse white and some red grog. Brick and floor tile. Medieval and later.
- 9 Poorly mixed red and white medium-coarse sandy clays, with coarse red and white grog and small-medium ferrous inclusions. Brick, roof tile and floor tile. Probably post-medieval, but some may be early (easily confused with estuarine clays if small).
- 14 Medium-coarse sandy yellow-cream with moderate to common ferrous inclusions and some grog (often large rectangular fragments in section). Bricks and flooring. Post-medieval?
- TGE Medium sandy cream-white fabric with tin-glazed decoration. Wall tiles. Post-medieval.

Machine-made (modern)

- 16 Press-moulded fine dark red fabric with common medium-coarse ferrous fragments. Pantile and floor tile. Post-medieval/modern.
- 17 Fine sandy buff fabric with small soft white and red inclusions, machine pressed. Pantile and brick. Post-medieval.
- 21 Machine-pressed shale. Modern.

Forms

Roof tiles and furniture

Plain tiles

A total of 1412 plain roof tile fragments (83722g) was collected. These included peg tiles, nibbed tiles and possibly pieces of ridge tile. Table 2 shows the quantities of roof tile by fabric.

Fabric	No.	Wt/g
5	13	500
6	773	43479
6a	82	5646
7	12	660
8	114	8664
9	9	150
11	101	5482
12	67	7015
13	44	2912
15	157	6243
18	24	2083
19	8	417
20	8	471

Table 2. Flat roof tile by fabric.

This shows that the medium sandy red fabric of high medieval to post-medieval date was the most common to be collected. Medieval estuarine fabrics and medieval or late medieval coarse sandy and grog-tempered red fabrics were also relatively frequent. Overall, however, the assemblage was clearly dominated by red sandy tiles.

Peg tiles and nibbed tiles could only be positively identified if the upper end of the tile, with either holes or a nib, was present. On this basis, the minimum number of peg tiles was 126, and the minimum number of nibbed tiles was two. The fragmentary nature of the material made the recording of numbers of holes per tile difficult. However, of the nineteen tiles for which this was possible, only one had a single central hole. The group was dominated by circular rather than square holes, the latter only occurring in five tiles. The nib on both nibbed tile examples was pulled upwards towards the struck face, so the tiles would have been used 'bottom (sanded) side up' on the roof.

Tile dimensions were recorded where possible, although thicknesses of every fragment were not recorded. This is due in part to the high chance of recording the same tile several times, and also to the great variation in thickness of some examples. In general, most tiles fell in the range 10 to 15mm, with a few thinner tiles down to 7mm and some thicker ones up to 20mm. This is the standard range for tiles in Norwich and elsewhere in East Anglia. Lengths and widths were not commonly available in this assemblage. Three near complete tiles were collected; these measured 250 × 160mm (Fabric 6), 250 × 164mm (Fabric 12) and 261 × 169mm (Fabric 13). The latter is unusually long — the maximum length recorded by Drury was c.250mm. Three tiles could be measured in length only and were all 250-251mm long. Seventeen widths could be measured, ranging from 150 to 182mm. Five were between 150-159mm, seven were between 160-169mm, five were between 170-179mm, and two were 180mm or more. Wider tiles appear to have been more common in the late and post-medieval fabrics at this site, although the sample is small and may not be representative. Some of the medieval tiles described by Drury were c.175mm and 190mm wide.

A total of 262 fragments showed signs of glazing. In most cases this was on the lower half or third of the tile. Some pieces with thick, well-applied glaze which reached to the edge of the tile may have been fragments of ridge tile, particularly as many of these pieces were thicker than the average peg tile. Colours varied from uncoloured ('clear'), through yellow, green, and dark green to brown. These varied with the colour of the tile, with the darker colours found more frequently on reduced grey tiles.

Only two impressions were noted in this assemblage. A dog paw print was found on a tile in 11026, and finger impressions were noted on a tile in 10726.

Many roof tiles showed evidence for re-use in the form of mortar on all or some surfaces, and often on broken edges. Whilst some broken fragments may have been built into walls without ever having been used as roofing material, it is clear that some pieces had been used for their intended purpose. Several tiles were spalled on one surface through weathering, and many were sooted or burnt, suggesting proximity to a chimney or smoke-hole. Some of the latter could also have been used in hearths. Mortar or plaster was sometimes applied to the underside of tiles to aid in weatherproofing.

Pantiles

Pantiles were considerably less common in the assemblage than other roof tiles. A total of 107 fragments weighing 10455g was identified. Table 3 shows the quantities of pantile by fabric. In addition, there was one fragment of a corrugated tile (203g) in Fabric 8.

Fabric	No.	Wt/g
5	1	9
6	22	2874
7	2	64
8	39	2783
11	1	356
13	37	3763
16	2	329
17	1	12
20	1	62

Table 3. Pantiles by fabric.

Fabrics 6, 8 and 13 were the most commonly used in this group of pantiles. A small proportion of these were grey in colour and may have been intentionally reduced. Two pantile fragments were black-glazed and two had black slipped or painted surfaces.

There was a degree of variety in manufacturing techniques, even within single fabrics. Three corner fragments had straight, diagonal cut-offs and four were rounded. One of the latter was an upper right corner, the rest were probably all lower left corners. The rounded type seems to have appeared slightly earlier than the cut-off type (Phase 7), although both occur in Phases 8 and 9. Four nibs were present, and one of these was stamped with an 'H'. Several examples of this type of stamp were present on tiles from the Millennium Library site, perhaps indicating a local supplier.

Like the peg tile, there was evidence for use of fragments in walling. A few fragments were sooted externally or underneath, and two were sooted on both surfaces. The piece with sooting on the underside may be evidence for an open fire in a building which was open to the roof, although this would be unusual in a domestic dwelling of the period.

Chimneys

Two fragments of chimney pots were identified. A louvred fragment in Fabric 5 was collected from floor make-up 10049 (G49), and is probably of 19th-20th century date (Fig. **.1). A rim fragment with knife trimming and sooting on the inner surface (Fabric 8) was found in post-hole fill 10544 (G245), also probably of 19th century or later date.

Bricks

Early Bricks

A total of 741 fragments weighing 142683g were identified as early bricks. The majority were in estuarine fabrics 1-3, as shown in Table 4. However, several brick fragments in other fabrics were also thought to be of possible early date.

Fabric	No.	Wt/g
1	189	46266
2	65	11193
3	455	80616
4	5	1805
6	2	33
7	1	530
9	11	1160
11	2	49
12	10	948
14	1	83

Table 4. Early bricks by fabric.

The key characteristics of early bricks have been described by Drury, and the estuarine clay bricks from this site exhibited the same range of forms and manufacturing techniques. Many of these bricks were overfired, partially vitrified, cracked and poorly formed. Form numbers were assigned to measurable bricks whenever possible, and the results of this are shown in Table 5.

Group A (sanded base)		Group B (strawed base)	
Form	No. of bricks	Form	No. of bricks
EB1	8	EB6	13
EB1?	2	EB6?	1
EB2	14	EB7	21
EB2?	8	EB7?	7
EB2/3	1	EB7/8	1
EB2/4	1	EB7/9	1
EB2/8	1	EB8	6
EB3	6	EB8?	1
EB4	8	EB8/9	4
EB4?	2	EB9	9
EB4/7	2	EB9?	3
Total	53		67

Table 5. Early brick forms.

Group A bricks are broadly dated to the late 13th to 14th centuries, Group B to the 14th-15th centuries by Drury. However, one Group B brick with a strawed base was found in a Period 3 context at Dragon Hall, along with several other 'EB' fragments of unidentified form. This may place the use of these bricks earlier in the 13th century, unless the fragments were intrusive.

Four bricks had cut-off corners at 45°. Three examples were cut at one end, but one was cut at both ends. These closer bricks were often used to complete the bonding pattern around a window or door opening, or near a corner. However, examples with cut-offs at both ends were used to form vaulting ribs and extant examples can be seen in the crypt or cellar at St. Andrew's and Blackfriars Hall.

One small brick did not fit into the above form series. It measured 168 × 80 × 40mm and may be a 'Dutch brick', similar to some identified in London (Richenda Goffin, pers. comm.).

Over 90% of these bricks were found in contexts belonging to Period 6 and later. Whilst some could be contemporary with the features in Period 6, it appears that the majority of this assemblage was re-used. The presence of mortar, in some cases two different types, on many of the broken edges of these fragments confirms this.

Late Bricks

Late brick fragments were less common than early bricks: 317 fragments weighing 62946g. Table 6 shows the quantities by fabric.

Fabric	No.	Wt/g
5	8	5577
6	186	26958
8	2	268
9	11	2160
11	59	8257
12	43	13724
13	2	1527
14	2	2208
17	1	2265
21	3	2

Table 6. Late brick quantities.

The majority of late bricks were in medium and coarse sandy red fabrics, as would be expected. A few white fabric bricks were present, but most of these can be classified as floor bricks and are discussed below. A few red bricks were worn and had been used in flooring.

Forty-five late bricks were classified using Drury's form series. These are shown in Table 7.

Form	No. of bricks
LB1	11
LB1/2	8
LB3	1
LB3/6	1
LB3?	1
LB4	3
LB4/5	3
LB4?	2
LB5	5
LB6	9
LB9	1

Table 7. Late brick forms.

Five bricks classified as 'late' were less than 40mm thick and do not fit into the current form series. These may be Roman tiles, rather than post-medieval bricks.

Most of these bricks can probably be dated to the 16th-18th centuries. In particular, several Fabric 6 bricks had flared or vitrified headers and may have been intended for use in Tudor diaper work. Nearly all were probably pallet-moulded, most by hand but some possibly by machine (the 'soft-mud' process). A few later machine-pressed bricks were identified (Fabrics 16, 17 and 21). Machine-pressed shale bricks of 20th century date were represented by only three small fragments from a single context. No bricks with frogs were found.

One brick was stamped, which would indicate a mid-19th century or later date. This was an LB6 brick in Fabric 6, with a deep 'C' stamped in one surface (10540).

Layers of plaster were noted on headers or stretchers of three bricks, suggesting that they were from internal wall faces. Sooting was noted on two bricks (10318, 10350) suggesting that they may have been parts of chimneys or fireplaces. Several bricks also showed signs of burning, perhaps from use in association with fires, or possibly indicating a burnt-out building in the vicinity.

Again, there were signs of re-use in this group, several fragments having mortar on every surface and/or on broken edges. Several bricks had two types of mortar, one a buff sandy type and the other, over the top, a white lime mortar with large charcoal inclusions.

Moulded Bricks

A near-complete large half-round brick (Fig. **.2) was recovered from wall repair 11134 (G192). It was covered in mortar and had clearly been re-used. It was in Fabric 12 and measured 163mm wide at the maximum width, 77mm thick and probably c.300mm long. Its original function would probably have been a wall capping brick (Brunskill 1990, 94-5).

A fragment of a Fabric 9 brick with a moulded header end (Fig. **.3) and white slip or whitewash on the moulded face was found in a 19th century rubble deposit (10847) but was almost certainly earlier post-medieval. A similar type was used to form panelling in a late 16th century chimney stack at Newport, Essex (Brunskill 1990, plate 44), for example.

Two bricks in Fabric 14, both with moulded front edges, were found in association with an unidentified tile (Figs. **.4-5) in tile floor 10277 (G192). All were partially covered in pitch or tar, possibly for waterproofing. The bricks were similar in size and fabric to 18th-19th century floor bricks (118mm wide, 37-39mm thick). The tile had one shaped edge with tongue-shaped cut-outs, and was flanged on two edges (one flange broken off). It was probably a decorative feature, although the original function is uncertain. It measured 300mm long, over 280mm wide, and was 20mm thick.

Flooring

A total of 196 fragments (78122g) was assigned to the floor brick/tile category. Table 8 shows the quantities of floor brick and tile by fabric.

Fabric	Floor brick		Floor brick/tile		Floor tile	
	No.	Wt/g	No.	Wt/g	No.	Wt/g
4	1	72				
5					9	760
6					4	922
8	3	378			2	331
9	15	9305	1	252	34	8775
12					18	8864
14	47	29252	3	1079	56	13791
16					1	990
17	1	2570				
20					1	781

Table 8. Floor brick/tile quantities.

Fabrics 9 and 14 were the most common types of ceramic flooring. They were used for producing both bricks and large square tiles of similar thicknesses, so some fragments without edges were difficult to identify. Generally, the tiles in these fabrics had some knife trimming or full chamfering to the sides, whilst the bricks were untrimmed. This type of flooring was common in the 17th-19th centuries, and most fragments occur in features of Periods 7 to 9. A few occur in earlier periods and may be mis-identified early bricks.

Thirty-five white floor bricks provided measurements of thickness, but as most were worn to some degree their original thicknesses are unknown. They varied from 24mm to 64mm. Twenty-two width measurements were recorded, ranging from 103mm to 137mm, but with a peak between 110-117mm (around 4½ inches). Eight lengths were measured, varying from 213-236mm (8½-9¼ inches). The majority fall into Drury's FT26 category, although a few are shorter and narrower. Several were stained black around the edges of the worn area, and many were unevenly worn.

Tile sizes varied considerably. Again most were worn, so thickness measurements could only provide a minimum. Twenty-one tiles varied from 13mm to 46mm. Three tiles had width measurements between 115-120mm, one was 137mm wide, and five were between 221 and 240mm (FT23/24). The smaller examples may have been tin-glazed earthenware tiles, and it was one of these which showed the only evidence of glazing on a white tile, based on a small drip of clear glaze on the side. However, all were found in 19th century or later contexts. The medium-sized tile, which had extremely chamfered edges, was in a Period 7 context and may be of 16th century date. It had two partial redware pot kiln scars on the bottom surface (the pot rims were 80mm in diameter and had been glazed with green or brown iron glaze), indicating that it had been fired in the same kiln as glazed red earthenwares. It could be of Dutch origin.

The infrequent white Fabric 4 was generally heavily abraded and could belong to either the early brick or the floor brick category as it occurred in Periods 4, 8 and 9.

Red floor tiles and bricks were less common in this group, although a few 'late bricks' showed signs of wear and had probably been used for this purpose. Three fragments in Fabric 8, two with spalled surfaces, were identified as possible floor bricks. A complete red brick in Fabric 17 (10280) was worn on the sanded side, and had a shallow frog formed by two large square stamps, both indicating the place of manufacture: SKIERS/ SPRING/ NR/ BARNSELEY. There was a brickworks at Skiers Spring, Hoyland Nether, which is just south of Barnsley. Documentary and map evidence suggests that this works was certainly in operation between 1855 and 1881, and possibly later (D. Cuffley, pers. comm.). A late 19th century date is therefore likely for this brick and the others with which it was laid.

Fifteen red tiles or tile fragments were glazed (8 yellow with white slip, 7 green/brown glazed), and all were Flemish types. Very few were complete, but the fragments probably represented six small tiles (115-120mm each side, c.25-27mm thick) and nine large tiles (c. 260mm each side, c.28-50mm thick). Corners showed the typical nail marks in the upper surface, which were derived from the forms on which this type of tile was made. Edges were generally chamfered or partially knife-trimmed. Five were recorded as Fabric 5, three as Fabric 6, and seven as Fabric 12.

Six other red floor tiles were identified (Fabrics 5, 8, 12, 20), most of which were probably Flemish types but could not be positively identified as such. All were worn, some were covered in mortar and one was burnt. The large tile in Fabric 20 (40mm thick, no other full dimensions) was probably post-medieval or modern and had signs of pitch on the surface (10707). Six possible tiles were also found in Fabrics 5, 9 and 16.

Drains

Three near-complete drainpipes were sampled from post-medieval drain 10161 (G151). All were in the same fabric (Fabric 10) and of the same form (Fig. **.6). The narrow end was c.115mm in diameter, the wide end 141-145mm.

Both pipes with complete lengths were 526mm long. The pipe wall thicknesses were measured at the ends (9-12mm) and in the middle of one broken example (22mm). Limescale was visible on the lower half of the internal surface of one pipe. The drain was associated with soils containing 18th century pottery.

Miscellaneous

Wall tiles

Six fragments of tin-glazed earthenware wall tiles were found, all in association with 18th century pottery (10102, 10202, 10668). All fragments were thin, c.7-8mm, and small. Designs were not easily identified, although one piece showed a building in a roundel painted with purple manganese paint (Fig. **.7). The other fragments were either plain white or blue-painted (Figs. **.8-9).

Malting tiles

Fragments of three malting tiles were collected. The largest fragment was from pit fill 10707 (G373). It was covered in mortar but was probably in Fabric 14. The holes were cone-shaped in section (Fig. **.10). Two smaller fragments were found in floor make-up 10049 (G49), both in Fabric 17. One fragment was a corner with part of a large hole close to the edges, and the other was a fragment without edges but with part of a smaller hole. All were probably of 19th century date and related to maltings somewhere in the vicinity. However, the large fragment at least had clearly been re-used in walling and the pieces may have reached the site as hardcore.

Unidentified

A few small fragments were too abraded or burnt for identification, and some may have been pieces of fired clay or daub.

Roman tiles

Fifteen fragments of Roman tile could be positively identified, although it is possible that there were at least five more pieces of this date (see 'Late bricks' above). Table 9 shows the quantities of Roman tile by fabric.

Fabric	No	Wt/g
R1	6	1030
R2	6	881
R3	3	335
Total	15	2246

Table 9. Roman tile quantities by fabric.

Only four tiles could be identified to type. There were three flanged tegulae and one imbrex. All three flanges were rectilinear in section, and there were signs of knife-trimming at the edges. One cut-away was present. The flanged tegulae ranged in thickness from 21 to 24mm, with flange heights of 37-44mm and flange widths of 19-27mm. The imbrex was 16mm thick. Eight other tiles could be measured, and their thicknesses ranged from 18 to 34mm.

Several tiles had traces of medieval or post-medieval mortar, although one still had traces of the pink mortar associated with the Roman period. The presence of these tiles on the site can be explained by the re-use of Roman tiles in late Saxon and medieval flint walling.

Daub and other fired clay

A total of 351 fragments of fired clay were collected, but many of these were small fragments from bulk sample residue. These were divided into four basic fabric groups, as shown in Table 10.

Fabric	Description	No.	Wt/g
1	Sandy matrix tempered with medium, coarse and very coarse chalk, occasional flint and occasional organic material (voids and straw impressions). Probably daub.	78	1024
2	Fine matrix with some voids and moderate sand. Possibly early brick, but may be daub.	9	180
3	Coarse organic tempered, very light with abundant voids.	212	125
4	Medium sandy matrix, with the appearance of poorly-made late brick, tempered with coarse and very coarse flints. Caulking, render, or hearth lining.	45	1342

Table 10. Fabric descriptions and quantities of fired clay.

In addition, there were six fragments (2g) which were unidentified, and a small piece of vitrified hearth lining (3g).

Only five pieces had wattle impressions, all rounded and all in Fabric 1. No impressions were complete enough for diameter measurements to be recorded. Thirty pieces had flat or slightly undulating smoothed surfaces, some with the remains of whitewash adhering. Most surfaces were found on pieces in Fabrics 1 and 4.

It seems likely that the chalk-tempered pieces (Fabric 1) were the remains of daub from wattle-and-daub structures. Fabric 2 was similar to, but less well-fired than, some early bricks and may be brick rather than daub. The use of Fabric 3, the majority of which consisted of very fragmented pieces, is uncertain. Fabric 4 could have been used for caulking or render on clay lump buildings and this would explain the possible whitewash found on its surfaces. However, this whitewash was vitrified in places. Clearly the material had to have been burnt in order to survive as fired clay, and this may have resulted in the vitrification seen on these surfaces, but another possible explanation would be that these pieces were hearth or oven lining fragments.

Illustrated CBM

1. Louvred chimney fragment, sooted internally. Red, fine sandy fabric. 10049.
2. Half-round brick. Red, medium sand and grog-tempered fabric. 11134.
3. Plinth brick with shaped front edge and pitch on one surface. Cream, medium sandy fabric. 10277.
4. Moulded brick with possible slip on moulded surface. Red and white mixed, medium sandy fabric. 10847.
5. Tile with tongue-shaped cut-outs at one edge, with broken flanges or sides and pitch on one surface. Yellow, coarse sand and ferrous fabric. 10277.
6. Drainpipe. Orange, medium sand and ferrous fabric. 10161.
7. Tin-glazed earthenware wall tile, purple manganese design. 10102.
8. Tin-glazed earthenware wall tile, blue painted. 10102.
9. Tin-glazed earthenware wall tile, blue painted. 10202 (or 10210).
10. Malting tile fragment. Buff, medium sandy fabric. 10707.

CBM by site period

The quantities of CBM and fired clay by period are shown in Table 11. Tables of form and fabric by period are included in the Appendix.

Period	CBM		Fired clay	
	No	Wt/g	No	Wt/g
1	18	455	46	1140
2	22	1254	130	232
3	76	3315	91	91
4	435	29243	40	348
5	102	11926		
6	361	42619	4	208
7	766	130865	10	32
8	510	109012	27	141
9	560	72418		
10	19	261		
Unstrat	10	5683	3	484

Table 11. CBM and fired clay by site period.

CBM was present in all site periods, although some of the material from earlier phases may be intrusive. Fired clay was most common in periods 1-4.

Period 1 – mid 9th–11th century

The eighteen fragments of CBM from this phase included two large pieces of Roman tiles (12258 G105, 12157 G106) and 16 smaller fragments which could all be fired clay or small pieces of Roman tile (12237 G7, 12155 G106, 11405 G212, 11514 G213). All were collected from pit fills.

Fired clay in this period was also from pit fills. The most interesting group was the 16 fragments of Fabric 4 which were found in pit fill 11445 (G397), and smaller pieces from pit fill 11536 (G398). These may be fragments of hearth or oven lining, although they appear to have vitrified limewashed surfaces.

Period 2 – 11th–12th century

Of the 22 fragments from this period, six were certainly or possibly Roman (11943 G14, 12504 G15, 12092 G55, 12412/12413 G57, 12103 G117), and eight were too small for positive identification (11997 G107, 12082 G107, 11906 G109, 11754 G112, 11349 G215, 12144 G320, 3149 G508). The remaining eight consisted of two fragments

of ?late brick in Fabric 5 (11971 G9) which could be Roman tile or floor tile; two fragment of roof tile from posthole fills (11725 G15, 12071 G55) perhaps intrusive; a piece of brick in Fabric 9 (11997 G107) which is probably intrusive (or daub?); and one piece of glazed roof tile and two late brick fragments from an evaluation context (3310, G485) which also contained 16th-17th century pottery. Several fragments had mortared surfaces and had presumably been re-used.

Small fragments of fired clay in Fabric 3 were collected from a sample of layer 11317 (G117) which represents a burnt building destruction layer. A daub fragment with a whitewashed surface and wattle impressions was found in layer 12082 (G107). From G215, deposit 12201 contained a very hard-fired fragment of possible daub with undulating surfaces. Other fired clay from contexts of this period consisted largely of very small pieces which were unremarkable.

Period 3 – 12th–mid 13th century

Roman tile was found in several contexts of this period. In particular, deposit 11195 (G119) produced five fragments, including a flanged tegula, in association with a piece of ?medieval roof tile. Make-up layer 11137 (G120) also produced a flanged tegula, and a small fragment of white ?brick. A Roman tile was collected from surface 12083 (G173), and another from deposit 12408 (296). A possible imbrex fragment (or ridge tile?) was found in layer 12109 (G223) with a small piece of red brick or Roman tile. Three red brick/tile fragments from pit fill 11707 (G61), two of which were burnt, could also be Roman.

Roof tiles, some green glazed, were present in several features, often in association with 13th century pottery. Other sites in Norwich have also produced tiles of this early date. Three green-glazed fragments were recovered from road 11742 (G17) and five fragments from layer 11679 (G19). Two roof tile fragments from construction cut 11743 (G21) may have been wrongly labelled (bag = 11743, label = 10743). The yard surface 11840 (G154) produced one fragment of roof tile with worn surfaces. Roof tile was also found in layer 11898 (G225) and deposit 12314 (G296). Surprisingly, none of these tiles were in early estuarine fabrics, all being medium-coarse sand or sand/grog tempered.

A large fragment of an EB7 brick was found in deposit 11274 (G68). If not intrusive, this would be one of the earliest examples of this form in Norwich. It was associated with 11th-12th century pottery.

Other features in this phase produced a few small fragments of unidentified or uncertain brick/tile.

A few fragments of possible daub, one with wattle impressions, were collected from posthole fills in G60. Other fragments in this period were all small, including further Fabric 3 pieces recovered from make-up layers G119, above building destruction debris G117 in Period 2.

Period 4 – mid 13th–mid 14th century

Features of this phase produced one Roman tile fragment, 370 fragments of plain roof tile, 48 fragments of early brick, seven fragments of floor brick/tile and seven fragments of 'late brick'. The most common fabrics were sandy red types, particularly Fabric 6, but estuarine tile and brick fabrics also made up a significant proportion of the total.

CBM was collected from several road contexts (G20, G159, G511), where it had presumably been deposited as hardcore. Red sandy and estuarine clay roof tiles and early bricks were found in G20, a few fragments of roof tile in G159, and a Roman tile, a small piece of 'late brick' and a roof tile from G511.

Glazed roof tile was also used in several other surfaces or floors, including G179, G180, G264, G300, G306 and G310. The latter also produced several fragments of early and ?late brick. A piece of early brick was found in floor 12260 (G376).

Post holes/pipes and slots in G40, G139, G299, G305, G333, G403 and G404 all produced small quantities of roof tile and/or early brick, most in association with high medieval pottery. Foundation cut G342 produced the largest quantity, including several half-bricks (EB2, EB7, EB8/9) and pieces of Flemish tile. This material, together with some late medieval pottery from the fill, may belong to the backfilling rather than construction phase.

Small fragments of roof tile, floor tile and brick were collected from pits, linear features, ditches and dump layers. Roof tile fragments, often with signs of glazing and mortar, dominated this group.

Make-up layer 11377 (G127) produced two fragments of daub with smoothed surfaces and wattle impressions, and another piece was recovered from pebble floor 11832 (G306). The channel related to a hearth in G304 produced several small fragments of Fabrics 3 and 4, the latter probably pieces of hearth lining.

Period 5 – mid 14th–early 15th century

Only a small quantity of CBM was collected from this Period. The assemblage consisted of 93 roof tile fragments and nine pieces of early brick. The dominant fabrics were red sandy Fabric 6 and estuarine Fabric 15.

Road and surface/floor groups G25, G142, and G338 produced small quantities of roof tile, much of which was glazed. Dump layer G337 is recorded as producing large quantities of CBM — the small sample collected was also dominated by roof tile, but one small fragment of early brick was also present.

Post holes and slots in G315, G410 and G462 also produced several fragments of roof tile. One of these, from 11398 (G462), appeared to be of post-medieval date and could be intrusive.

Samples of bricks were collected from two walls (G141, G316), both of which were flint and mortar constructions with occasional brick and tile. Bricks from 10694 were an EB2 and an EB4, both dated to the late 13th-14th centuries, one with a cut-off corner. From wall 11148, there were EB7 and EB8 bricks of 14th-15th century date. This dispersal of bricks and half-bricks in a flint wall is typical of high and late medieval brick usage in East Anglia.

Period 6 – early 15th–mid 16th century

In this period, early brick was the dominant CBM type with 212 fragments. There were also 129 roof tile fragments, 16 pieces of floor tile and four of late brick. The fabrics are dominated by estuarine types, although red sandy types were also present.

Several floors contained CBM in this period. Two early bricks (EB7 and EB8) were collected from the G23 cellar floor. Floor 10317 in G131 produced small fragments of early brick and roof tile, and two pieces of yellow-glazed Flemish tile. Four tiles of this type, all large, were collected from floor G359, but two were mortared on the glazed surface and breaks, indicating re-use or perhaps a mortar floor covering. Floor 11982 (G380) brick samples consisted of a complete EB9 and two fragments, plus one roof tile. Masonry floor 11981 (G384) produced half-bricks of EB4 or EB7 size. Fragments of early brick and roof tile were also collected from floor 11132 (G412). Layers forming a yard surface (G255) produced several fragments of late medieval tile and early brick, and some very small pieces of possible late brick.

Cellar infill groups G22 and G24 included several fragments of dumped roof tile and brick, many with traces of mortar. Brick types included EB2 and EB3, presumably from a building of 13th-14th century date subsequently demolished. No samples of the brick step or buttress in G24 were available for study.

Wall 10861 (G176) contained an EB1 brick of 13th-14th century date, presumably re-used. Wall packing layers in G189 produced roof tile and EB6 and EB7 bricks, and roof tile only in G344. The footing in G128 and the construction trench in G262 also contained small quantities of early brick and roof tile.

Samples from the brick drain 10669 (G274) were both EB7 bricks of 14th-15th century date.

Other features in this phase generally produced small pieces of roof tile and early brick. Late brick occurred rarely and small fragments may well have been misidentified. A few fragments of floor tile were also collected.

Fired clay from this period may also have been residual, and included a fire-blackened and mortar covered piece from 11762 (G24) cellar backfilling, and two smaller pieces from robber pit and make-up contexts.

Period 7 – mid 16th–late 17th century

A total of 472 roof tile fragments, seven pieces of pantile, 218 fragments of early brick, 21 floor brick/tile pieces, one wall tile, and 46 late brick fragments were collected from features of this period. Red sandy fabrics were more common than estuarine types in this period, the former making up approximately two-thirds of the group by count.

Several posthole groups produced CBM. 10472 (G29) and 11054 (G36) contained glazed roof tile, 11678 (G33) contained unglazed roof tile and a small piece of late brick, 10833 (G88) produced a near-complete EB1 brick and a roof tile fragment, and 10481 (G93) contained fragments of floor brick/tile and a pantile. Fragments of early and late brick and wall tile were found in association with mid-late 18th century pottery in 10202 (G210). Several postholes in G287 contained roof tile and early and late bricks, including an LB9 brick. Posthole 10950 (G432) contained fragments of EB2/4 and late brick, and 10987 in the same group produced a pantile fragment.

A worn floor tile, a roof tile fragment and a small piece of early brick were collected from floor G38. Floor make-up G348 contained several pieces of roof tile. Floor 11108 (G349) produced two pieces of worn, burnt and sooted early brick. Floor 11325 (G464) produced several small fragments of roof tile, and early and late brick.

G46 contexts included a wall and chimney stack. Samples from these were largely LB1 bricks, although one LB5 and one EB7 were also present. Most fragments had a thick deposit of white charcoal-rich lime mortar. Wall 10355 (G94) samples consisted of three EB9 bricks, and construction cut 10663 contained glazed roof tile and early brick fragments. Wall 10579 (G96) samples were similar (EB8 and EB9, yellow mortar), as were those from wall G186 (EB6, EB8, EB9 and LB5, charcoal-rich mortar). One EB7 brick with a cut-off corner was found in fireplace G366. Wall 10189 (G500) sample was a complete LB1 brick. The brick sample from drain repair G367 was an LB5 with a curved area of mortar on the upper surface.

Other features and layers in this phase generally contained small fragments of roof tile, pantile, floor tile, and early and late bricks. A few more complete pieces were collected, for example a floor brick with wear on both surfaces from pit fill 10335 (G289), several early bricks (EB2, EB3, EB4, EB6-9) from cess pit fill G185, and from layer 10742 in G28 (EB2, EB8/9). A complete roof tile was found in well fill 10790 (G424).

Small fragments of fired clay, all probably residual, were collected from a well (G424), walls (G46) and soils (G37).

Period 8 – late 17th–mid 19th century

Period 8 features contained a minimum of 197 roof tiles, 48 pantiles, 113 early bricks, 56 pieces of floor brick/tile, 71 late bricks, three moulded bricks, five wall tiles, three malting tiles, 6 fragments of drainpipes and one piece of

chimney pot. Red sandy fabrics still form the greatest proportion in this period, but there are now more white bricks and fewer estuarine fabrics.

Features in G49 were related to tenement buildings in Old Barge Yard. Wall 10047 samples consisted of two complete RT4 roof tiles and two LB1 bricks. Floor 10048 produced several white floor bricks of 18th-19th century date, but the make-up layer 10049 below it contained finds which were almost certainly of 19th century or later date mixed with earlier fragments. CBM from 10049 included pieces of pantile, roof tile, floor brick/tile, early brick, late brick, malting tile and a small fragment of a louvred chimney pot. A sample from fireplace 10050 was an LB1 brick, and fireplace fill 10070 contained several pantile fragments. Wall 10054 samples were a floor brick and an EB6 brick. Other layers produced a similar range of material.

Floors in G253 contained small fragments of floor tile, brick, roof tile and pantile.

A sample from wall 10195 (G291) consisted of two floor bricks. The rebuild of the wall included EB4 bricks with two types of mortar on them. Wall 10187 (G401) produced an LB3 brick, and LB6 bricks with two types of mortar were collected from walls in G402.

Posthole 1223 in G254 contained two complete EB7 bricks and a fragment of glazed roof tile, all earlier objects re-used for post-packing. Postholes in G246, G271 and G276 contained more recent fragments, including pantile and wall tile.

Drain 10161 samples consisted of six pieces of three large drainpipes. This was probably of 19th century date, based on the stratigraphic evidence. No comparable drainpipes are published from the city.

G192 fireplace and wall contexts produced several unusual bricks which were not paralleled anywhere on the rest of the site. All were probably reused but, with the exception of a half-round brick may have been a boundary/garden wall coping, their original uses were uncertain. Two were moulded plinth-like white bricks, and there was a large ?flanged tile with one cut-out edge.

Other layers and features in this phase produced small fragments of pantile, roof tile, floor tile, early and late brick and malting tile.

Fired clay fragments were collected from floor make-up 10060 (G49), layer 10084 (G47) and hearth fill 10434 (G90). All were small and abraded.

Period 9 – mid 19th to 20th century

Late brick is now the dominant CBM type with 165 fragments, followed by roof tile with 125 and early brick with 124. There were 52 pantile fragments, one moulded brick, 90 floor bricks/tiles and one chimney pot fragment. Despite the late date of this phase, a quarter of CBM fragments are still in estuarine fabrics, demonstrating the degree of residuality and re-use of these early bricks. However, red sandy fabrics still make up approximately two-thirds of the assemblage, and white fabrics have increased.

Postholes in G50 and G268 contained fragments of roof tile, whilst another in G388 produced black pantile and late brick fragments. Postholes in G245 produced a large quantity of late bricks (LB6), early bricks (EB2/3), floor tiles/bricks, roof tiles, pantiles and a fragment of chimney pot. These were probably used intentionally to backfill the holes which were left when the posts were removed.

A tiled floor (G372) was made up of white floor tiles and bricks, and a red floor brick with a maker's stamp. All were worn and most had mortar on their worn surfaces, suggesting that they were replaced by bedding for a new floor. The bedding layer for the brick floor contained roof tile and pantile in association with 18th century pottery.

Floor make-up G389 contained largely residual material, including some large fragments of early and late brick, floor tile and roof tile. A related brick manhole was made up of complete early bricks (EB1, EB7) which presumably must have been salvaged from a late medieval building in the 19th century.

Unstratified and archive

Three early bricks, two floor bricks, four late bricks and one roof tile were unstratified. Five fragments of roof tile, six of early brick, one of floor tile and seven of late brick were collected from features assigned to the archive.

Discussion

Since material from structural features was only collected as samples, much of this assemblage can be taken to represent secondary use and disposal of CBM, including re-use in walls and intentional burial as hardcore. Clearly it is not representative of the amount of brick originally used on the site, particularly in the post-medieval period.

The presence of Roman tile in Periods 1 and 2 is interesting as it suggests the use of Roman tile in nearby Late Saxon structures. Whilst Roman tiles were plundered for use in Saxon flint and stone buildings, they were also taken for use in hearths and this could be their function on the present site. However, none was found *in situ*. Fragments of fired clay from Period 1 were mostly related to hearths or ovens. The first positively identified example of daub was from Period 2, suggesting that wattle and daub buildings were present on the site by the 12th century.

Period 3 also produced Roman tile, but medieval roof tile dominated the small assemblage. Red sandy glazed examples were the only types present, although still in small quantities. Although fragments of early brick may

have been present in Periods 1 and 2, Period 3 is the first to have a large piece and suggests 13th century use of such brick on this site.

As a whole, the Period 4 CBM assemblage indicates that the use of both red sandy and estuarine clay roofing tiles had now become established on this site, and that glazed roofing tiles were probably favoured over undecorated types. Early brick was present but appears to have been little used, although the fragments which were deposited in dump layers were probably waste from construction which took place in this phase. The only early bricks with mortar on their surfaces were those from the large foundation cut for the Abbot of Woburn's house. Occasional fragments of late brick and roof tile from this phase may be intrusive or wrongly identified. Fired clay included fragments of daub and hearth lining.

As with other artefactual assemblages, very little CBM was found in Period 5. However, the first samples from *in situ* walls were collected, and indicated that bricks were used in 13th-14th and 14th-15th century structures on the site. Typically for the region and the period, they were scattered in predominantly flint walling.

Generally CBM from Period 6 was of 14th-15th century date and may be residual, although in a few features such as the drain and some of the walls, the bricks could be contemporary with construction. They were also used in flooring, along with fragments of roof tile and contemporary floor tile.

In Period 7 there seems to have been opportunistic use of early bricks in later walls, presumably those which could be recovered in complete or near-complete condition from demolished buildings. However, late bricks were starting to appear in greater numbers and were employed in several Period 7 walls. Plain tiles used as hardcore were probably largely residual, although some may have been contemporary with the period, and there were a few pantile fragments which are unlikely to be earlier than the second half of this phase.

By Period 8, pantiles appear to have been more common on the site. Whilst Dragon Hall and many other buildings on King Street today are roofed with pantile, the pitch of their gables suggests that plain tiles were originally used. The fragments from Period 8 could perhaps be contemporary with this re-roofing. Other CBM forms which were not common, or not found, in earlier periods included floor bricks, malting tiles and a chimney pot.

The assemblage for Period 9 was very similar to that from Period 8, with only one new form, the corrugated pantile, appearing.

The CBM forms and fabrics collected from this site are similar to other assemblages from the city, and from rural sites such as the Commandery at Carbrooke (Anderson forthcoming). Assemblages from much of Suffolk also show very similar characteristics. Glazed estuarine roof tiles, for example, have been found in 13th century contexts at monastic and mercantile sites in Bury St. Edmunds, and the post-medieval bricks from Palace House, Newmarket were very similar to those from Norwich. The early use of ceramic building material is probably indicative of medium to high status buildings.

Whilst timber-framed wattle and daub buildings may have been present on the site from Period 2, evidence for this building method is slight. Fired clay was not a common find on the site, but the reason for this is uncertain. It is particularly surprising in view of the construction methods used in Dragon Hall itself; presumably the brick nogging used in the present building superseded wattle and daub infill. The lack of burnt daub may be a result of site clearance after any major fires, or could simply indicate that very few uncontrolled fires occurred.

Based on the collected assemblage, CBM was available and used on this site from the earliest occupation. Although the people of those early phases re-used Roman bricks, perhaps in flint-walled buildings or as hearth linings, the growing demand for ceramic tiles and bricks resulted in a revived brick and tile industry in the region by the 13th century. Material of this early date was rare in contemporary contexts, but as much of it was likely to have remained *in situ* for several decades or even centuries, this is not surprising. Re-used and redeposited material of this date indicates that it was available. Even so, it was probably used sparingly, as the dispersed nature of bricks in flint walling shows. Roof tiles of 13th-14th century date were largely glazed, and there were doubtless buildings in the vicinity with brightly-coloured green and yellow roofs. By the late medieval period, these may have been replaced by plain red tiles, and sandy red bricks may have been more generally available. However, early bricks were still being used in walls, and possibly vaulting, of this date.

Many of the late bricks from the site were collected as samples from *in situ* walling, and samples of floor bricks and tiles show the types of flooring used in 17th-19th century structures. The extensive walling in post-medieval brickwork which survived as cellars and footings, and the pantiled roofs still present on the standing buildings, are not well represented in the sample.

References

- Anderson, S., forthcoming, 'County School, Carbrooke (8814 CBK): the ceramic building material'.
- Brunskill, R.W., 1990, *Brick Building in Britain*. Victor Gollancz Ltd, London.
- Drury, P., 1993, 'Ceramic building materials', in Margeson, S., *Norwich Households*, EAA 58, Norwich Survey, pp.163-8.

Appendix

CBM fabric by period (count)

CBM Fabric	Period:										Un	
	1	2	3	4	5	6	7	8	9	10		
?			40	1								
1				9	3	26	58	33	57	1	2	
2	1			4		6	20	11	13	3		
2?			1			1	5					
3		1	2	24	4	178	125	61	51	2	1	
3?					2		4					
4				2			3	1				
5		2	2	4		2	6	11	5	1		
5?		1										
6	14	8	13	220	62	66	281	181	138	8	5	
6?		2		2		1	1					
6a			1	29		6	39	5	1	1		
7				2		1	4	5	3			
8				1	2	10	22	55	68			
8?			1				1		2			
9		2	1	16		1	13	35	12		2	
9?				1				3				
10								6				
11	1		2	42	3	14	29	16	55			
11?				1								
12		2	2	13	7	31	34	26	21			
12?			1	1			1					
13		1		3		2	9	19	49			
14				1			15	23	76			
14?			1					1	2			
15				58	18	10	66	2			3	
16								1	2			
17								4	2			
18					1		19	4				
19							8					
20						3	2	2	3			
21						3						
R1		1	4	1								
R2	2	1	3									
R3		1	2									
TGE							1	5				

Fired clay fabric by period (count)

Fired clay Fabric	Period:								Un
	1	2	3	4	6	7	8		
?			6						
1	13	15	11	6	2	4	24	3	
2	1					3	3		
2?				2					
3	4	91	73	26					
3?		17	1						
4	27	3			2	3			
4?		4		6					
VHL*	1								

* VHL = vitrified hearth lining

CBM form by period (count)

CBM Form	Period:										Un	
	1	2	3	4	5	6	7	8	9	10		
?		1	41	1				7				
B		1		1			1					
B?	14								3			
CHIM								1	1			
DP								6				
EB	1	1	1	34	3	187	148	89	115	6		
EB?	1	1	2	2		1	6	9	1			
EB1				4		1	2		1			
EB1?							1	1				
EB2				5		1	9	2				
EB2/3									1			
EB2/4							1					
EB2/8							3					
EB2?					1	2	5					
EB3						3	2	1				
EB4					1	1	3	2	1			
EB4/7						2						
EB4?							2					
EB6				1		2	11	1	1			1
EB6?					1							
EB7			1	1		4	7	6	3			1
EB7/8						1						
EB7/9												1
EB7?					2	2	3	1				
EB8					1	1	3		1			
EB8/9				1		1	1	1				
EB8?						1						
EB9							9					
EB9?						2	2					
FB							11	17	25			1
FB/FT												1
FB?		1	1	1			2	5	3			
FLT		1	2									
FT			1	4		16	5	33	56			
FT/FB									3			
FT?				2			3	1	3	1		
IMB			1									
LB		3	2	2		3	11	47	149	7		4
LB?		5	4	4		1	13	5	6			
LB1							7	4				
LB1/2				1			4	4				
LB3								1				
LB3/6								1				
LB3?								1				
LB4								2	1			
LB4/5								4				
LB4?							1		1			
LB5							9					
LB6								2	7			
LB9							1					
MALT								3				
MB								1	1			
MB?								2				
PAN							7	47	51			
PAN?								1				
PANC									1			
RBT	2	2	3	1								
RBT?			3									
RT		3	14	368	93	129	471	197	125	5		1
RT?		3		2			1					
WT							1	5				