4 and 5 Peas Hill Cambridge

Building Recording
and Archaeological Observations

Carpenter's mark

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Building Survey and Archaeological Observations

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Introduction

The Cambridge Archaeological Unit was commissioned to carry out recording of the ground floor timber frames within 4 and 5 Peas Hill by Lawrence King Architecture and Design on behalf of the Cambridge Arts Theatre (Figure 1). This was in response to a request by the Cambridge City Council Buildings Conservation Office for further detail about the timber frames to enable decision-making during design for redevelopment of the ground floor. The field survey was carried out between 29th October and 1st November 2007.

Historical background

Peas Hill lies within what is thought to be an area of early medieval settlement in Cambridge. Ridges of higher gravel run through the area and it is thought that this dryer ground was settled first. This area became the civic and commercial heart of the town from early on and there are numerous finds of pottery and other material. At the north end of Peas Hill investigations on the site of the (now) HSBC bank revealed medieval walls and several Saxon and medieval pits (Addyman and Biddle 1965: 89-90). Immediately to the west extensive evidence of medieval and later activity was revealed at excavations for the redevelopment of the Arts Theatre, behind the Bath Hotel and on St. Edward's Passage in 1995 (Edwards 1996, 1997; Miller 1994; Mortimer 1995).

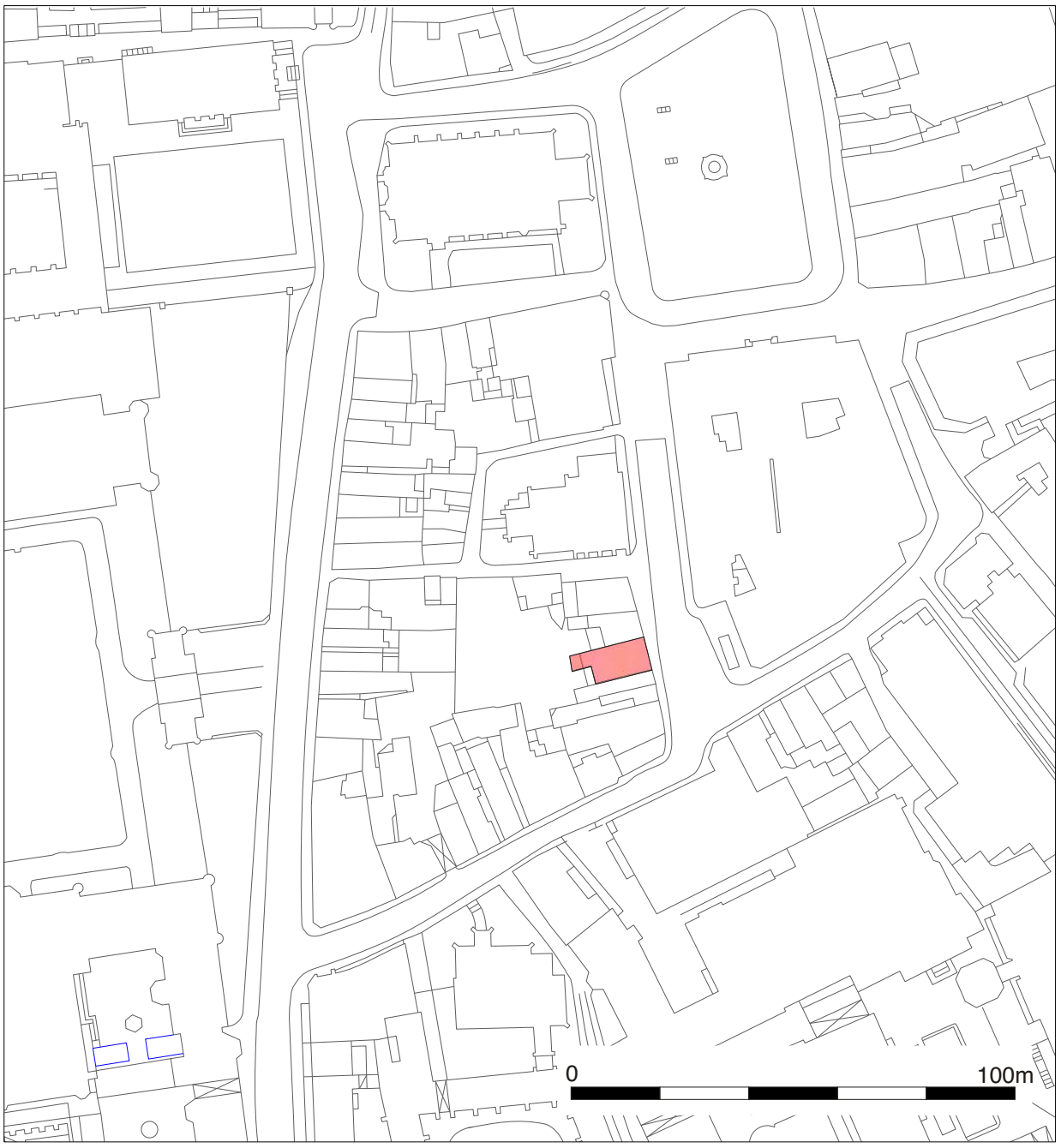
4 and 5 Peas Hill are of two storeys with cellars and attics with walls of plastered timber framing and brick with a tiled roof. The Royal Commission (RCHM(E) 1959: 326-327) considers that for the most part these are 18th century remodelling of 16th/17th century builds. The ground floors have been opened through as one to form a wider shop area; the upper floors are part of a hostel for King's College, formed in the mid-1930s. Access was not available above ground floor at the time of this survey. Both buildings are listed Grade II.

The survey

The survey consisted of three elements: photographic record; detailed notes and measurements; hand-drawn and electronic measured survey using a Leica TPS (TCRP 1205). Only the ground floor and cellars were available for survey so no conclusions can be drawn about evidence from the upper floors.

Numbering system

The timbers of the two frames were numbered depending on whether they were vertical (**V3 - V64**) or horizontal (**H1 - H96**). The frames have also been divided along build or orientation lines giving two sections to No. 4, front and rear and three sections to No. 5, front, middle and rear.



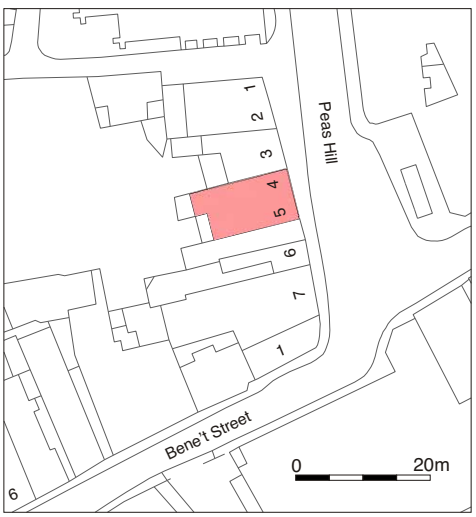


Figure 1: 4-5 Peas Hill Location

Description

No. 5 Peas Hill
(Figures 2-8, 17-20)

Front

The boundary between numbers 5 and 4 is marked at this point by a transverse steep chamfered stepped stop beam (**H1**). The beam has a set of stops and a square mortice slot for a Samson post at or near its centre. Being at the side of the building it only has a chamfer on one side, the north side being plain and waney. It seems that this is not a girder beam as it has no mortice slots for stud tenons on its underside. That it is half width and has a central square mortice evidences the existence of a wall to the north, no longer extant, that it formerly butted up to. It seems that at the front the buildings may at one time have shared a party wall belonging to No. 4, and in the wing shared a party wall belonging to No. 5 (see below).

The front of the frame ended in a jetty protruding towards the street, **H1** extending to form its northern element, the jetty overhanging by about 0.50m. The original jetty plate is missing but there is a single lap dovetail housing in the soffit of **H1** suggesting that it connected here. Outside this joint was a mortice for a bracket onto the missing end wall post of the building. A replacement jetty plate (**H3**), set 110mm from the front of the jetty, has been cut down in length and now only exists as a pillow resting on **V38**. The joint between the beam (**H3**) and the post (**V38**) has the remains of a mason's mitre with a hollow chamfer on its south side, most of which has been chiselled away. The jetty is now supported by an RSJ on a hollow steel column, the soffits of the jetty joists having been trenched to accommodate the steel beam. **H1** and the jetty joists (**H5**, **H7**, **H9**, **H11** and **H13**) all have similar rounded ends with a plain upper surface on which rests a bressumer (**H4**). Other than the trench for the RSJ only **H7**, where a mortice for a bracket was observed, has evidence of other joints. This presumably housed a jetty bracket connecting to a post, now missing, below the original jetty plate. It can be assumed that further jetty joists exist south of **H13**, but these are obscured by plasterboard.

Number	Width (mm)	Depth (mm)	Spacing (centre to centre)	Joints
H1	110	210		Single lap dovetail, bracket mortice
H5	120	150	350	
H7	150	150	350	Bracket mortice
H9	150	150	350	
H11	160	150	370	
H13	130	150	350	

Table 1: No. 5 Jetty joist dimensions

Set between the jetty joists, and later than the jetty itself, are a set of horizontal timbers (**H2**, **H6**, **H8**, **H10**, **H12** and **H14**). These support the oriel window at the front of the building and the overhang that extends streetwards.

The north wall of this section is largely absent represented only by vertical timbers **V37** at the east (street) end and **V35** to the west. Beam **H16**, marking the rear of this

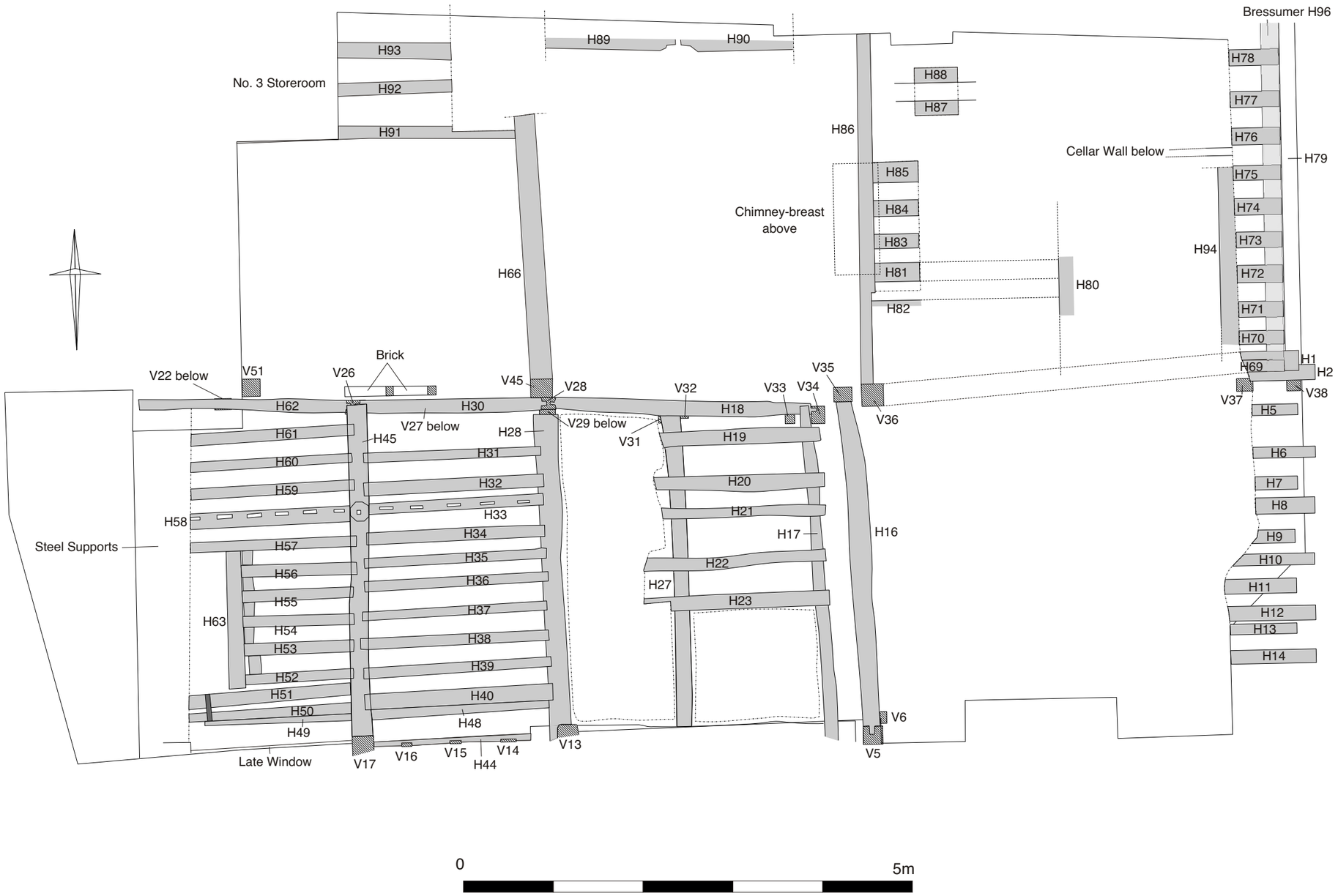


Figure 2: 4-5 Peas Hill, Plan of ground floor ceiling and vertical timbers (scale 1:50)

Figure 3: 4-5 Peas Hill, Plan of cellars in relation to ground floor (scale 1:50)

section, joined to **V35** at its north end. The ends of the front ceiling joists are visible sitting on **H16** (they may be lapped in but this could not be determined), but appear to have been sawn off at that point. Inaccessibility meant any detailed recording of this ceiling structure was not possible at this stage. At its south end **H16** tenons into **V5**. A central axial ceiling beam with chamfers (not numbered) was only visible at its north end where it was joined to **H1** by a single dovetail joint over the samson post joint.

Other than **V5** no timbers are visible in the south wall as it is fully plastered and painted. In the centre of the wall is a covered over chimney-breast 1.69m wide.

Middle: Ground Floor

The ceiling structure of the middle section is supported by three beams, **H17**, **H27** and **H28**. The last of these is actually two beams set side-by-side. The detailed structure of the ceiling in this area is difficult to understand as both transverse beams have been replaced with newer beams fitted in below the floor joists (**H17** and **H28**). Subsequently the joints between joists and beams have been lost. Five joists were observed between **H17** and **H28**, at least a further two can be inferred to the south but this area was obscured. The visible joists (**H19**, **H20**, **H21**, **H22** and **H23**) rested on **H17** at their east end and **H28** at their west end, with **H27** providing central support. The joists were irregular in both sizing and spacing. Joist **H22** has a set of horizontal mortices in the south side from which the tenons had been broken. **H23** to the south was a newer joist suggesting that a section of the floor had previously had joists running north – south, the change in direction possibly associated with access to the first floor. A saw cut on the north side of **H22** cut through the length of an auger hole indicating the timber was reused.

At its north end **H17** rests on **H18**, the south end was not visible. **H27** rests on **H18** at the north end, the south end was supported by an iron hoop-bracket but it was not possible to determine to what the bracket was fixed. The north end of **H28** rests on **V29**, a wooden bracket fixed to **V28**, the south end is supported on two steel angle-brackets fixed to **H13**.

The south wall between **V7** and **V13** is largely constructed from bricks measuring 4½ x 2¼ x 9¼ inches. The coursing is uneven with no clear bond pattern. At the west end an older boxed heart post (**V7**) now with all sapwood eaten away survives. It rests upon a short replacement sill beam **H15**. Both are mostly hidden behind more recent timbers including post **V8** and other timbers of a 19th or early 20th century shop fitting structure. Although **V7** has three tenons on the north side it is unclear whether it relates to the rear of the front or the gable end wall of the wing. **H15** is supported on a much later brick plinth, approximately 1m high, constructed from well-made bricks measuring 4¼ x 2⅜ x 8½ inches.

H25 is a reused vertical stud set horizontally as a lintel above a crude panel frame formed from **H25**, **H26**, **H24**, **V9**, **V10**, **V11** and probably **V12**. There is a vertical break in the brickwork 1.60m from **V7** and the panel extends at least 1.30m from that edge. The crudity of the work and the thinness of the vertical timbers make it unlikely that this was ever intended as a window opening. As seen it is either filled or backed with quite rough brickwork. The main brickwork of the wall ends in a straight

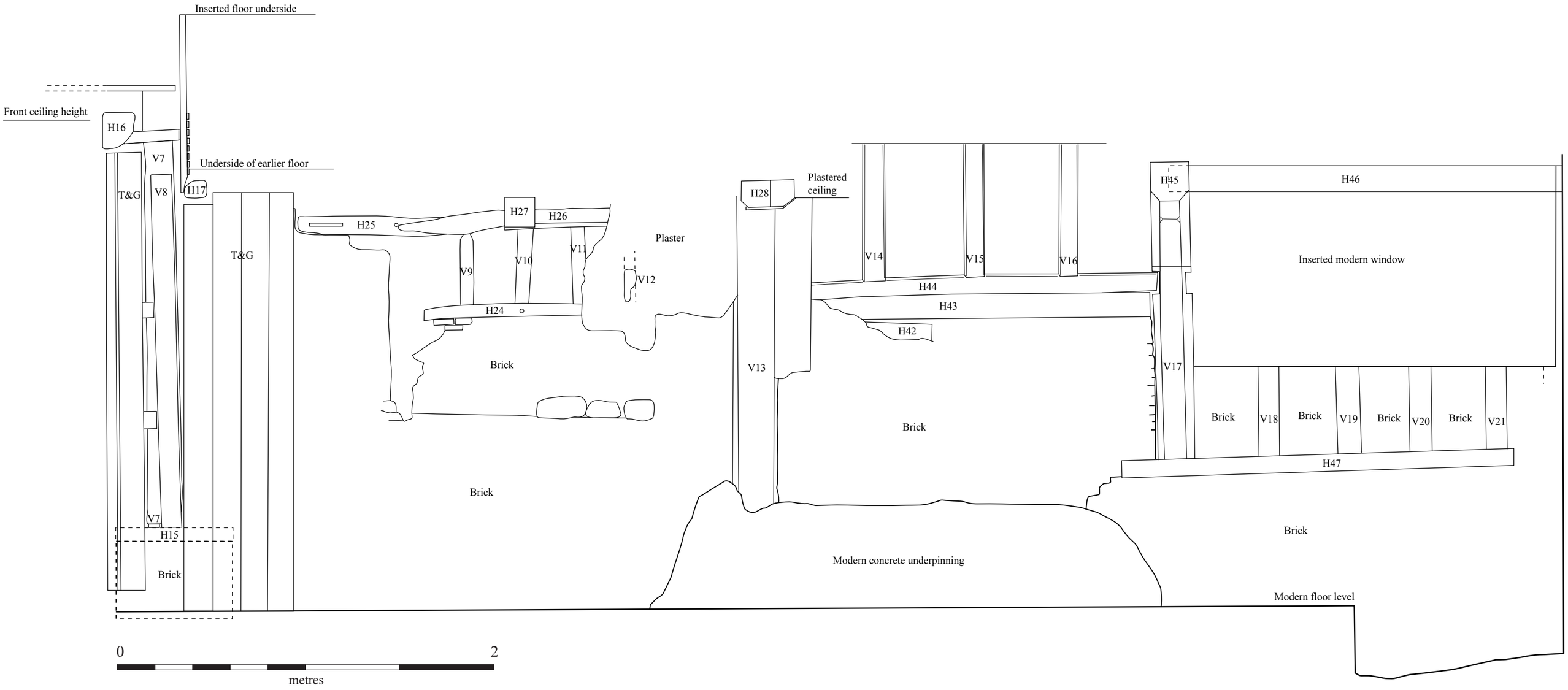


Figure 4: No. 5 Peas Hill, North facing elevation.

edge against which **V13** has been inserted. The bottom of the east end of the wall has been underpinned with modern concrete.

For details of the north wall see below.

Middle: Above Ground Floor

Although direct access was not feasible, it was possible to view the arrangement of timbers etc. between the ceiling/old first floor level and the later inserted floor above at the front of the middle section of No. 5. The lower part of a stud wall could be seen rising up above the line of **H27**. This has no surviving infill, but has nail holes and marks where lath and plaster has been fixed to the east side. To the north are the remains of and older stud wall above **H18**, the studs are more substantial and have sections of surviving wattle and daub between. To the south little detail can be seen, the wall is mostly plastered and painted. Beyond this small exposures of brickwork suggest that this the outer face of the brick build of No. 6 to the south.

Rear

In this part of the building the complete ceiling structure was visible, extending between **H28** at the east to replacement modern steel work at the west. In the centre the joists are tenoned in either side of a steep chamfered transverse beam (**H45**). At its north end **H45** is tenoned into post **V26**, at the south end it rests on a jowl at the top of **V17**, into which it is tenoned. **H45** has a set of stopped steps 1m from the north end forming a boss with a central mortice to hold a samson post. East and west of the boss are joists **H33** (east) and **H58** (west) which are heavier than the other joists with sets of evenly spaced mortices near the north side of the soffits. These mortices were 150mm wide and at 400mm centres on the east side of the beam and 300mm centres on the west side. Each had a single 19mm peg hole. These two timbers and the plain joists (**H31**, **H32**, **H34**, **H35**, **H36**, **H37**, **H38**, **H39** and **H40** to the east; **H50**, **H51**, **H52**, **H53**, **H54**, **H55**, **H56**, **H57**, **H59**, **H60** and **H61** to the west) were jointed into **H45** using a barefaced soffit tenon with diminished haunch. The tenons were 30mm deep except those on **H33** and **H58,** which were 50mm deep. **H40** (west) and **H50** (east) each have heavily hewn timbers set immediately adjacent to them to the south (**H48** and **H49** respectively). The timbers were in contact with the adjacent joists along their entire length, but the purpose is not immediately clear. Between **H50** and **H52 H51** has been inserted. It is bound to **H50** by a sturdy iron hasp and may have been intended to provide additional support around the chimney. The mortices in **H33** and **H58** indicate the presence of a muntin and plank screen forming a corridor down the northern side of the structure. Over the corridor at least one joist (**H31**) was pine. The joists had plain sawn boards up to 0.4m wide of oak or elm nailed to them. None of these boards had unexplained nail holes. The joist (unnumbered) between **H31** and the north wall was missing with nails were still in position sticking out of the underside of the floorboards. Some of the timbers in this area, **V17**, **H45**, **V22** and **V26** had at some point been painted red. There are some slight traces of a plaster ceiling adhering to the west side of **H45**.

Between joists **H57** and **H51**, west of beam **H45**, is **H63**, a transverse joist forming a trimmer to joists **H52**, **H53**, **H54**, **H55** and **H56**. The space thus formed was filled by

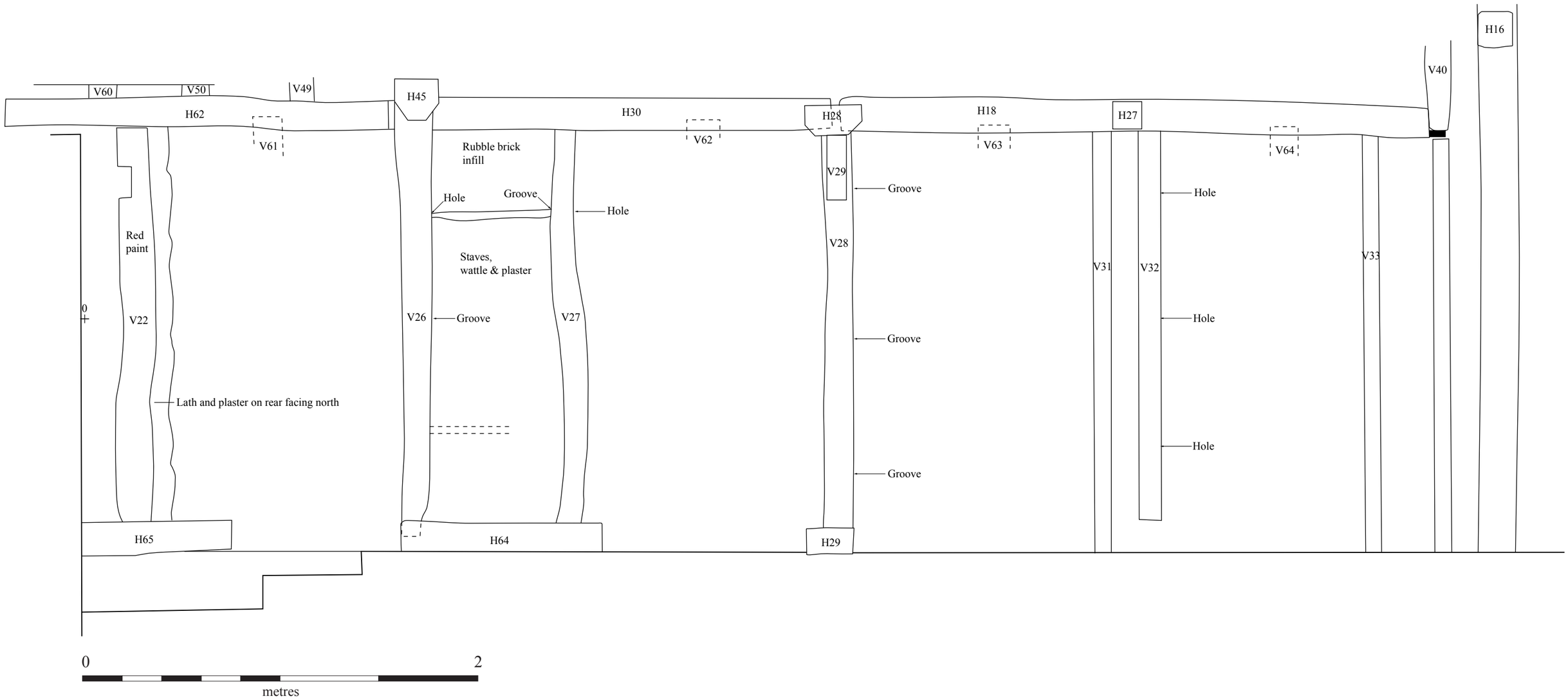


Figure 5: No. 5 Peas Hill, South facing elevation (scale 1:20)

the brick structure of a chimneybreast, now visible only where supported on modern steels at first floor level.

The south wall between **V13** and **V17** is largely constructed from bricks measuring 4½ x 1⅞ x 9 inches. These are better made bricks than in the wall of the middle section, but have been laid from the south i.e. outside, leaving mortar squeezed out between them. The courses are slightly uneven and no particular bond is evident. Adjacent to **V13** the end of the brickwork is neat and regular with a small gap between it and the timber, suggesting again that the timber is a later replacement set into existing brickwork. Adjacent to **H17**, however, the brickwork comes right to the timber, with a slightly undulating edge, suggesting that this timber was *in situ* when the brickwork was constructed. The upper part of the wall between **V13** and **V17** has a section of panelling, similar to that in the middle section, but much better constructed. Here horizontal timbers (**H42**, **H43** and **H44**) support three vertical studs (**V14**, **V15** and **V16**). The verticals are fitted into **H44** and it is unclear what role **H43** and **H42** play. The areas between **V14** and **V15**, **V15** and **V16**, **V16** and **V17** are infilled with plaster which does not extend out over the timber elements. **V44** sits in a socket cut into **V17**. The fit is crude and seems unlikely to be an original fitting. A matching socket on the west side of V17 was unfilled. The wooden frame is of painted pine with a simple beading detail on the edges of the boards.

From **V17** west to the modern steels the build changes to bricks measuring 4 x 2¾ x 8⅝ inches. Again the courses aren't entirely level and no particular bond is evident, however in this brickwork the mortar joints have been neatly finished on the inside face. The brick build changes towards the base of the wall just east of **V17**, however the lower portion of **V17** is missing and the timber is supported on **H47,** which is set into the brickwork and is apparently contemporary with it. **H47** supports four vertical timbers (**V18**, **V19**, **V20** and **V21**) between which brick nogging is inserted. These bricks measure 4½ x 1⅞ x 8⅝ inches, making them slightly different to both the other types in this section of the structure. Inserted above these timbers is a modern window (1950s or later) with the glass still extant. To the south modern brick blocks any view or light the window would have had (this is where the modern foyer of the theatre next door starts to wrap round No. 5). Above the window **H46** has been inserted, with **H17** eased to accommodate. It is not clear if this possible lintel is contemporary with the late window or a little earlier. The westernmost 0.30m or so of the wall has been rebuilt in modern brick, presumably at the time that the steels were inserted to carry the chimney structure above.

The north side of No. 5 consists of a close spaced stud wall, with storey high panels of wattle and daub infill, extending from near the back of the shops to the steel chimney supports at the back of the rear part of the building. Although broadly similar along its length there are differences in the structure east of **V28** to that west of **V28** reflecting the distinctions observed in the ceiling and in the south wall. Both sides of the wall are described in this section with the east and west differences highlighted as appropriate.

The structure consists of a fast grown sill beam or beams recorded as **H29**, **H64** and **H65**. Tenoned into this are posts **V26 V28** and **V40**, extant studs **V22**, **V27** and **V32**, and missing studs **V61**, **V62**, **V63** and **V64**. The lower part of **V40** has been replaced with an inserted post **V34**. Above the studs, at a height of 1.92m above the sill beam,

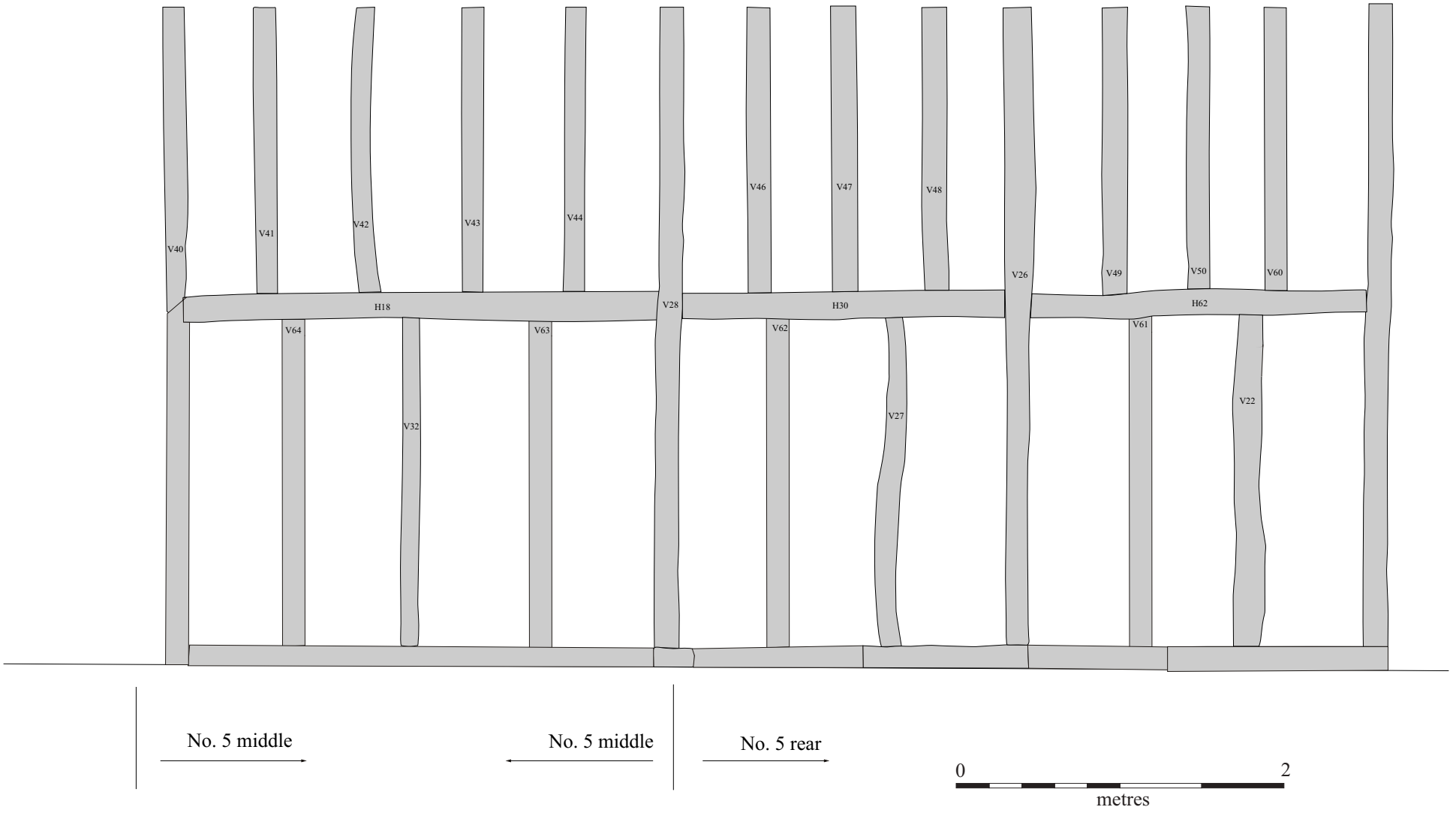


Figure 6: No. 5 Peas Hill, North facing elevation of north wall reconstruction (not to scale)

are girder beams **H62**, **H18** and **H30**. **V31** and **V33** are later inserted studs providing additional support to **H18**. The girder beams are tenoned into the sides of the posts (**V26 V28** and **V40**) creating two bays of >2m and 2m west of **V28** and one bay of 3.05m west of **V28**. These timbers are more or less all that is visible of the frame from the 'inside' of No. 5, however part of the external face was visible from the north side. From this view it is clear that posts **V26**, **V28** and **V40** rise through the height of at least the ground and first floor. Between these, tenoned into the girder beams, is an upper set of studs, offset from the ones below (**V41**, **V42**, **V43**, **V44** and **V46** to the west, **V47**, **V48**, **V49**, **V50** and **V60** to the east). The original length of these is unclear as they are either truncated by the modern floor at the front of the wing, or hidden from view in the back of the building (where they had plasterboard fixed to their south side). One obvious distinction between the frames west and east of **V28** is that the two bays to the west have two studs between the posts on the ground floor and three on the first floor, whereas to the east there are three studs between the posts at ground floor and four at first floor. There is also a distinction in the size and finish of the studs used. East of **V28** they were all small trees with flats on their faces but waney corners. West of **V28** the studs were small trees squared up so that they had square corners. On the ground floor the loss of sapwood and replacement of studs hides this distinction. As well as being better finished the studs west of **V28** are slightly larger straighter and closer set than those east of **V28**.

Part	No	Length (mm)	Width (mm)	Thickness (mm)	Diameter of trunk (mm)	Spacing (centres) (mm)
Stud	V22	1980	160	110	190	
Stud	V61	Missing				680
Post	**V26**	**3005+**	**196**	**100**	**250**	**760**
Stud	V27	1980	150	90	150	700
Stud	V62	Missing				710
Post	**V28**	**3750+**	**150**	**140**	**210**	**700**
Stud	V63	Missing				760
Stud	V32	1920	150	100	200	800
Stud	V64	Missing				700
Post	**V40**	**Part missing**				**760**

Table 2: Dimensions of posts and studs at ground floor from west to east (lengths excluding tenons).

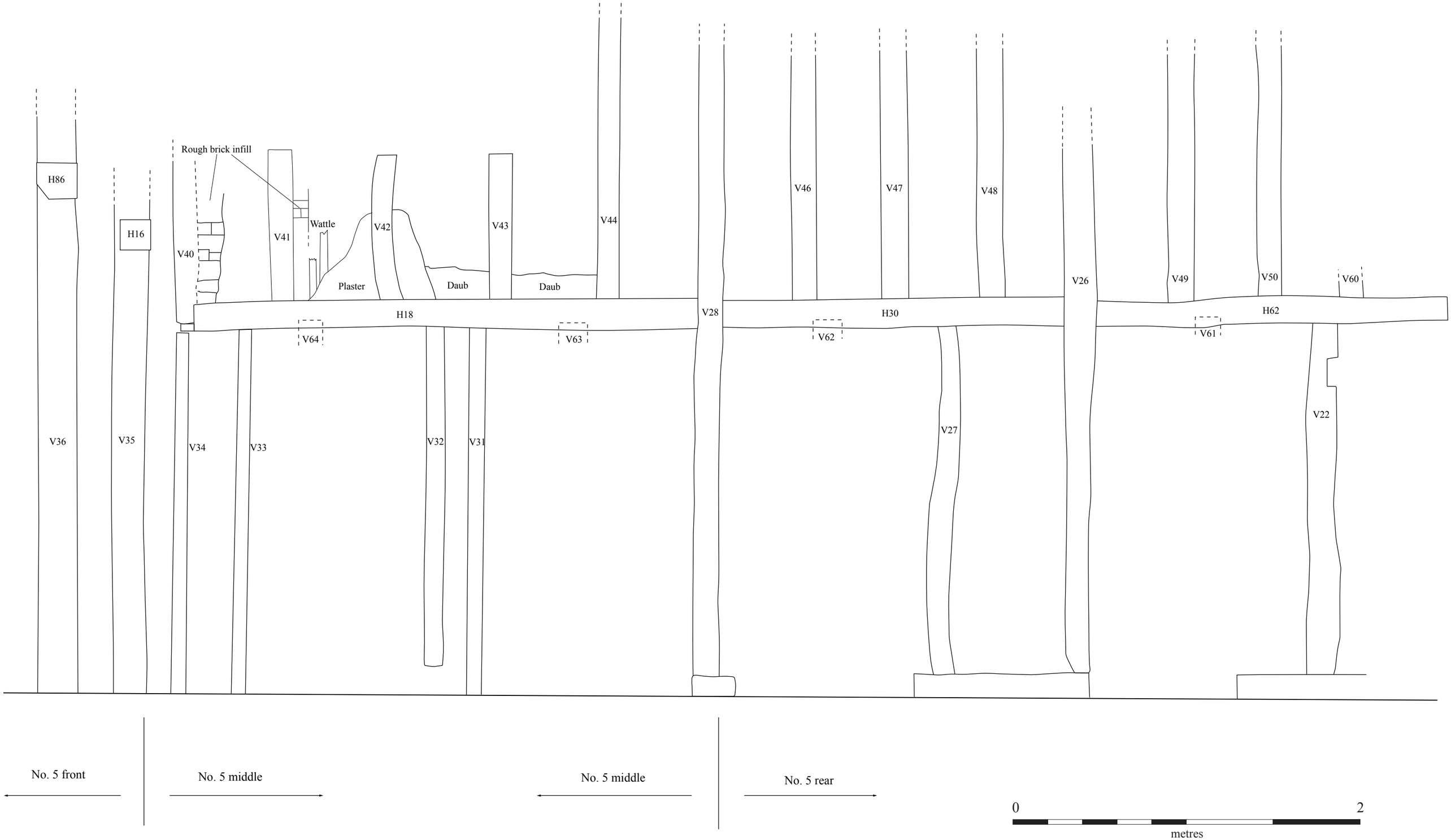


Figure 7: No. 5 Peas Hill, North facing elevation of north wall (scale 1:20)

Part	No	Length (mm)	Width (mm)	Thickness (mm)	Diameter of trunk (mm)	Spacing (centres) (mm)
Stud	V60	1400+		100		
Stud	V50	1400+	150			500
Stud	V49	1400+	150	100		500
Post	**V26**	**3005+**	**196**	**100**		**600**
Stud	V48	1400+	150	100		500
Stud	V47	1400+	160	100		560
Stud	V46	1400+	130	120		540
Post	**V28**	**3750+**	**150**	**140**		**540**
Stud	V44	1400+	130	100		600
Stud	V43	1400+	120	90		620
Stud	V42	1400+	130			620
Stud	V41	1400+	140	100		620
Post	**V40**	**Part missing**				**560**

Table 3: Dimensions of posts and studs at first floor from west to east (lengths excluding tenons).

The soffits of the girder beams had an axe cut groove along the length intended to hold the chisel shaped ends of the vertical wattle rods. This groove ran into the mortice holes but stopped 30mm from the tenons at each end of the beams, which indicates that the lengths of these beams have not been altered. Internally only one of these wattle and daub panels survived between **V26** and **V27**. Each set of vertical rods is held in position by three horizontal staves and is lashed to the top stave. The daub had slumped revealing these upper horizontal staves and the tops of the chisel-ended rods still set in the continuous groove in the soffit of the girder beam **H30**. The small poles (or heavy rods) were all ash and between 40mm and 48mm in diameter. Some were split in half and one into quarters. They had the typical growth pattern of coppice poles with little taper and no developed side branches. The top stave was the central section of a 48mm diameter pole with flat areas hewn on both sides. The middle stave was not visible, the bottom stave was half round. The staves were pointed at one end and chisel ended at the other. The pointed end fitting in an auger drilled hole 25mm diameter or 19mm diameter expanded with a chisel. The chisel end was fitted in an axe cut groove 0.25m long with its lower end cut flat across and level with the matching hole. The bottom and top staves were fitted near the north face of the studs and the middle stave towards the south face. This would mean that the staves were tight when hammered into position and the middle stave would have tensioned the heavy rods. There was a slight angle on the slot so that the central stave increased the tension on the rods as it was hammered home. Having staves on both sides of the vertical rods means the string only served the function of holding them in place until the central stave was fitted. Although no other panels are present the posts and studs at ground level have a combination of grooves and auger holes on each side. To the west of, and including the west side of, **V28** all the auger holes are cut with a 25mm auger. East of **V28**, and on the east side of that post, the sides either had three slots or three holes that were made with a 19mm auger and then widened with a chisel. On the first floor the evidence was less visible, but the holes above the east end were cut with a 25mm auger. A small section of lath and plaster is visible *behind*

South wall, north facing elevation

North wall, south facing elevation

Figure 8: No5 Peas Hill, composite elevations

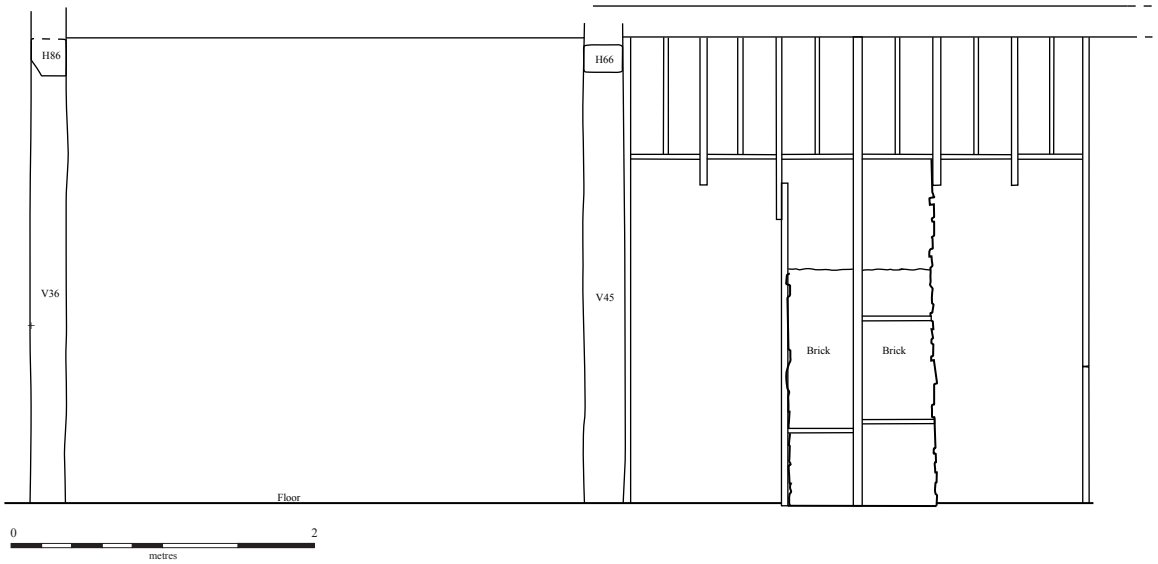
V22, i.e. facing towards the north. This was entirely obscured from the north by the later wall extending west from No. 4.

On the north face at first floor level some wattle and daub remains at the east end of the section east of **V28**, between **V44** and **V43**, **V43** and **V42**, **V42** and **V41**. The last two also had remnants of plaster. All survive to a maximum height of 0.40m above **H18**. Between **V41** and **V40**, and just immediately west of **V41** is some very rough brick nogging infill. It was not possible to make a detailed record of the bricks, but most appeared broken.

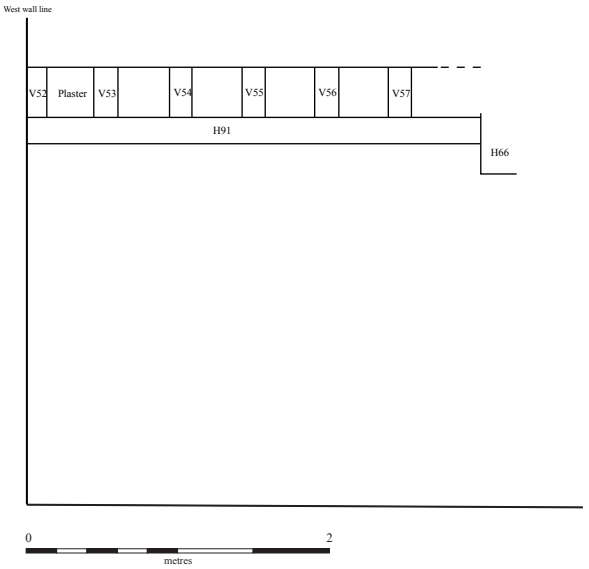
No. 4 Peas Hill
(Figures 9, 10, 21, 22)

Front

The front part of No. 4 has a jetty front with surviving jetty plate **H94**, supported on a badly cut up post **V37**. This post had a long mortice slot on its north side that originally held a brace. There is, however, no corresponding slot on the underside of the jetty pate **H94**, indicating that these timbers are not contemporary. The jetty consists of jetty plate **H94**, jetty joists **H69**, **H70**, **H71**, **H72**, **H73**, **H74**, **H75**, **H76**, **H77** and **H78** and bressumer **H96**. Between the southernmost joist **H69** and post **V37** is jetty bracket **H68**, the joint between bracket and post being rather poorly made, the bracket of clean cream coloured oak, the post of brown oak. All the jetty timbers are of the cream coloured oak and are very clean in appearance. Other than for some insect damage to the top of the jetty plate and that the west side was dirty, the timbers could have been erected yesterday. The clean state indicates that they were protected in a clean void since they were fitted as exposure to the elements would have changed the colour of the wood within a month. The clean surfaces of the wood were hewn and sawn but not finished, suggesting that they were never intended to be visible. The jetty joists were sawn sections of large trees rather than boxed heart. There was a mortice hole in the jetty plate **H94** below joist **H73** with a sawn off tenon *in situ*. This tenon was broken and not simply a packing piece being used to fill an unused or redundant mortice hole. The tenon was the same cream colour as the other pieces of this structure. The purpose is unknown. Rising from the bressumer two studs (unnumbered) form the timber-framed front of the building. This part of the structure was visible only with difficulty and no measurements were possible. Photographs taken through a small gap revealed a lath and plaster wall in front of, but separate from, the timber frame. A later timber, **H79**, runs in front of **H96**. Touches the nose of **H76** butt ends c. 120mm in front of the nose of **H69**. This is part of the later shop conversion.



North facing elevation of south wall



South facing elevation of north side.

Figure 9: Peas Hill No. 4 Elevations (scale 1:50)

Number	Width (mm)	Depth (mm)	Spacing (centre to centre)	Joints
H69	235	200	175	Bracket mortice
H70	160	120	145	
H71	165	120	220	
H72	180	120	210	
H73	160		190	
H74	180		200	
H75	170		180	
H76			190	
H77	Inaccessible			
H78	Inaccessible			

Table 4: No. 4 Jetty joist dimensions

In the central part of the space a hole in the ceiling plaster revealed an axial beam (**H80**) and it is possible that this supported the western end of the jetty joists. Extending westwards from H80 were a series of floor joists (**H81**, **H82**, **H83**, **H84**, **H85**, **H87** and **H88**). Others were present but not visible. The western ends of the floor joists run to a large beam **H86** and appear to rest upon it. Behind and above **H86** rises a chimney with modern steels supporting the remainder on the floors above.

Rear

Far less survives of the rear frame of No. 4, and in part it has clearly been significantly altered by the insertion of a set of three large posts (**V36**, **V45** and **V51**) on the south boundary carrying oversize transverse beams **H86** and **H66** that support the present floor structures. The posts only survive on the south side with the northern ends of the beams resting on a 20th century concrete beam that was cast *in situ*. It is likely that the oldest (only?) surviving piece of the earlier structure on the ground floor of No. 4 is **V30**, a very decayed vertical hanging from above, less than 80mm thick and with no surviving surfaces.

What survives of the south wall of No. 4 has vertical pine studs 40mm – 60mm wide, seven were located between **V45** and **V51** of which only four still run full length. Only the westernmost of these was given a number, **V24** with replacement base **V25**. Between these long studs were brick nogging infill of which only the two central blocks remain. The lower 1.46m of this brickwork is constructed mostly from yellow bricks measuring 8½ x 2⅜ x 4¼ inches. The courses are level and even, but no particular bond has been used. Above this point the build changes to mostly older red bricks, but almost no whole bricks have been used. These measure 7⅞ x 2 x 4¾ inches. Above the top of the brickwork the spaces between the longer studs are filled with short ones 30mm wide. Again between **H45** and **H51** only, lath and occasional plaster survive. Below the brickwork level the long studs have no nail holes indicating that they had never been covered with laths. There are studs with lath and plaster marks to the east of **H45** but these are all much later. Immediately below the lath and plaster section east of **V51** is clear evidence that the No. 5 frame was exposed at the time at which this wall for No. 4 was constructed. Short braces for one of the long studs have been nailed through into **H62**.

South wall, north facing elevation

Figure 10: No 4 Peas Hill, composite elevation

On the north side of No. 4 the picture is quite complicated. In the northwest corner a small part of No. 3 (the Tearoom storeroom) intrudes in to the space that is ostensibly that of No. 4. In line with this, and extending eastwards towards the basement stairway, are a set of three axial joists (**H91**, **H92** and **H93**) are either tenoned or fixed to **H66** (the exact connection was obscured by the ceiling). The southernmost joist, **H91**, has a set of 50mm thick studs tenoned into it (**V52**, **V53**, **V54**, **V55**, **V56** and **V57**) with plastered panels between.

Part	No	Length (mm)	Width (mm)	Thickness (mm)	Diameter of trunk	Spacing between
Joist	H91	3210	170	120	250	350
Joist	H92	3210	160	120	250 halved	220
Joist	H93	3200				

Table 5: Axial joists to north side of No. 4

Part	No	Length (mm)	Width (mm)	Thickness (mm)	Spacing between
Stud	V52	>330	100		320
Stud	V53	>330	150	35	330
Stud	V54	>330	150	45	330
Stud	V55	>330	150	45	330
Stud	V56	>330	150	50	330
Stud	V57	>330	150	35	330
Beam	H66				460

Table 6: Spacing of studs tenoned into H91

Immediately above the basement stairway (and subsequently inaccessible) are two girder beams **H89** and **H90**. They have vertical tenons facing each other where a post had been removed. The length of the tenons suggests that the post was over 0.25m wide. The intrusion of No. 3 and the gap between the cellar wall of No. 4 and the wall of No. 3 (see below) suggests there was formerly a passage between the two structures.

Carpenter's Marks

Although the buildings were both framed, no sets of carpenters marks were seen that would aid assembly. The only mark was carpenter's signature mark gouge or race knife cut on the south side of **V36**. This does not number the timber but indicates who did the job. Given its location it would have been hidden from within the completed building.

Undercrofts
(Figures 11-13, 23)

There was evidence below both buildings for stone built undercrofts predating the material in the frames above. That below No. 5 was observed in three locations (see

figures). To the front (east) was 0.70m of clunch built masonry in rough irregular courses set in a hard orange yellow gritty sandy mortar. The base is on natural gravel. Above 0.70m the build changes to roughly coursed red brick and clunch. To the southeast a roughly coursed clunch wall was observed and in the southwest 0.70m of roughly coursed clunch changing above to red bricks. Below No. 4 broken clunch was observed in a hole through the later brick wall, but not in courses. Against the north wall, and seemingly bonded into it, was a stone column standing six blocks high, 1.20m above modern floor level. To the west of this a hole 0.80m above the floor revealed four irregular courses of rough clunch blocks set in a well-concreted yellow sandy mortar. To the east no masonry was revealed. The face of the wall into which the column is bonded is a mixture of rough stone with occasional bricks, the whole thinly mortar faced and whitewashed. The column has been heightened/repaired by the addition of five courses of bricks measuring 4½ x 2½ x 9¼ inches. The location of the cellar walls in relation to the first floor of the present structure is worth noting. On the south side both coincide suggesting that the location of the south wall has been established for a considerable time. To the north, however the cellar wall lies some 0.89m in front of the first floor wall at the front and 1.25m in front towards the top of the staircase. This provides further evidence for a passage between No. 4 and No. 3 in the past (see discussion below).

In the rear part of the No. 4 cellar was a curious brick built structure, arching forwards (southwards) into the room. The southern edge was lost in the modern brick cellar wall, but the original structure would have been approximately 0.70m wide based on the angle of the arch. The arched part of the structure was constructed from red brick measuring 2⅛ x 4½ x 2⅛ inches. The west end was blocked with a section of dusky pink bricks measuring 4¾ x 1⅞ x 9¼ inches. Initially though to perhaps be an oven there is no trace of burning on the bricks, at present the purpose is not known.

Potential for Dendrochronological Dating

Several, although not many, timbers have a potential for dendrochronological dating:

1. Jowl story post **V17** may have sufficient rings at the jowel to provide a date. As potentially the oldest timber this would be desirable.
2. Jetty plate **H94** has sapwood on its top and may date this problematic jetty.
3. **V36**, with the carpenter's mark, is a large timber and would not only indicate a date for the work of this individual (and therefore any other timbers elsewhere encountered with the same mark) but also the point at which these large post were inserted to carry the upper floors of No. 4. Ideally this timber would be sampled as a set with **V45**, **V51**, **H66** and **H86**.
4. For completeness any sampling programme should include samples from the first floor and roof areas that are more likely to have large sections of timbers, or more complete sapwoods.

Archaeological Observations
(Figures 11-15, 23)

During the course of the building recording it was possible to investigate a number of test holes that had been cut in the walls and floors of the cellar area. These were intended to provided information fro the structural engineer, but also allowed an opportunity to explore the below ground evidence. Four holes approximately 0.60m square were dug in the cellar floors (Pits A-D), and ten were cut through walls (I-VIII, elevation IV shows three holes in the north wall of No. 4).

Results

Test Pit A

Located in the floor of the western extension of No. 5 cellar. Breaking through the floor comes immediately onto gravel natural below the modern concrete floor.

Test Pit B

In the south face 0.70m of clunch in rough irregular courses set in a hard mid yellowish sandy mortar. A construction cut is not visible and so assumed to be tight to the foundation. At 0.70m the build changes to red/pink squared bricks – none were whole so dimensions unknown. This may represent either a reuse of the older clunch footing or a change of materials in a contemporary build. The change in build coincides closely with the height of a make-up layer observed in the east face of the pit, which truncates a dense white clay surface. This would tend to support the former interpretation.

Test Pit C

In the east face 0.70m of surviving clunch masonry in rough irregular courses set in a hard orange yellow gritty sandy mortar. In the north face a construction cut with vertical sides was visible 0.26m out from the clunch face. Resting on natural gravel at the base was a block of blue grey clay 0.20m square. It is possible this was intended as a sill for a timber construction, but too little was exposed to allow this to be determined. From the banded layers sealing this and the construction cut several pieces of 16th century Babylon tyg were recovered together with undiagnostic clay pipe fragments and oyster shell. At this same height in the east face, above 0.70m, the wall build changed to roughly coursed brick and clunch.

Test Pit D

This had evidence of a possible clay floor in the west section, possibly with trample horizons or relaid. This was cut by a steep-sided robber trench to the north, which in the east and west sections was significantly undercut due to the presence of very loose natural gravels. The cut was backfilled with broken and crushed clunch fragments in a matrix of brown sandy silt, presumably relating to removal of a clunch construction in the vicinity.

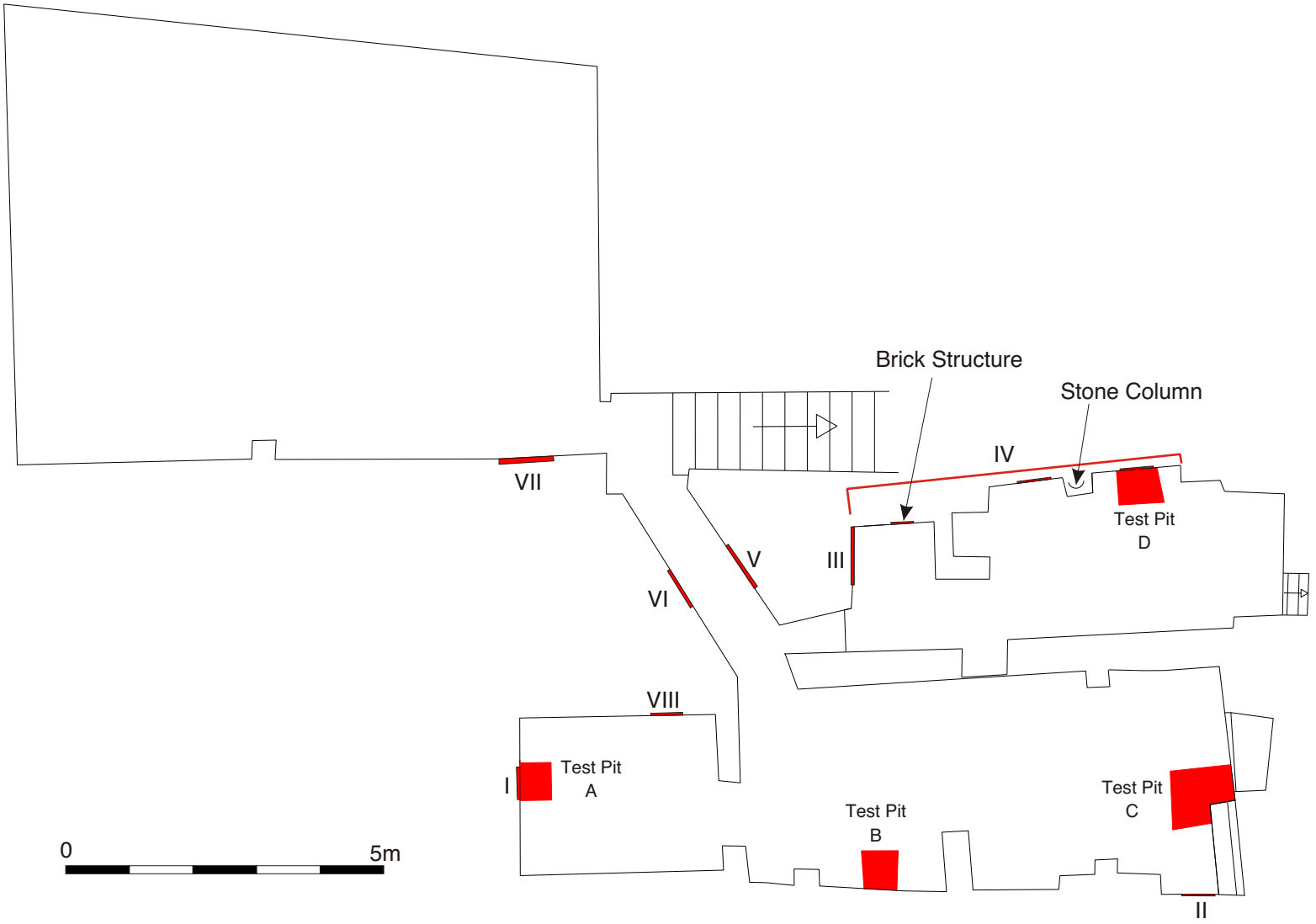


Figure 11: Location of Archaeological Observations in Basement Area

Wall Hole I

0.50m S-N, 0.70m high. Base 1.14m from modern cellar floor level.

Backfilled with rubble, base of brick fireplace structure above. May obscure archaeological deposits further back.

Wall Hole II

0.50m S-N, 0.50m high. Base 1m from modern cellar floor level.

Clunch and mortar wall visible behind modern brick skin.

Wall Hole III

0.50m S-N, 0.60m high. Base 1.10m from modern cellar floor level.

Loose fill, rubble and timber. May obscure archaeological deposits further back.

Elevation IV

Masonry, column and brickwork as described above.

Wall Hole V

0.50m NW-SE, 0.80m high. Base 1m from modern cellar floor level.

Side of a pit cut through stratified archaeological levels. A copper alloy coin or jetton recovered from the pit awaits identification. If a jetton it is likely to be 16th century in date.

Wall Hole VI

0.60m SE-NW, 0.46m high. Base 1.14m from modern cellar floor level.

A sequence of archaeological layers apparently sloping SE to NW, perhaps tip lines in a larger pit cut into gravel. A smaller cut within contained grey silt and crushed clunch.

Wall Hole VII

0.50m S-N, 0.50m high. Base 1.10m from modern cellar floor level.

Demolition/construction material in construction trench is all that is visible. May obscure archaeological deposits further back.

Figure 12: Archaeology and wall observations beneath No. 4

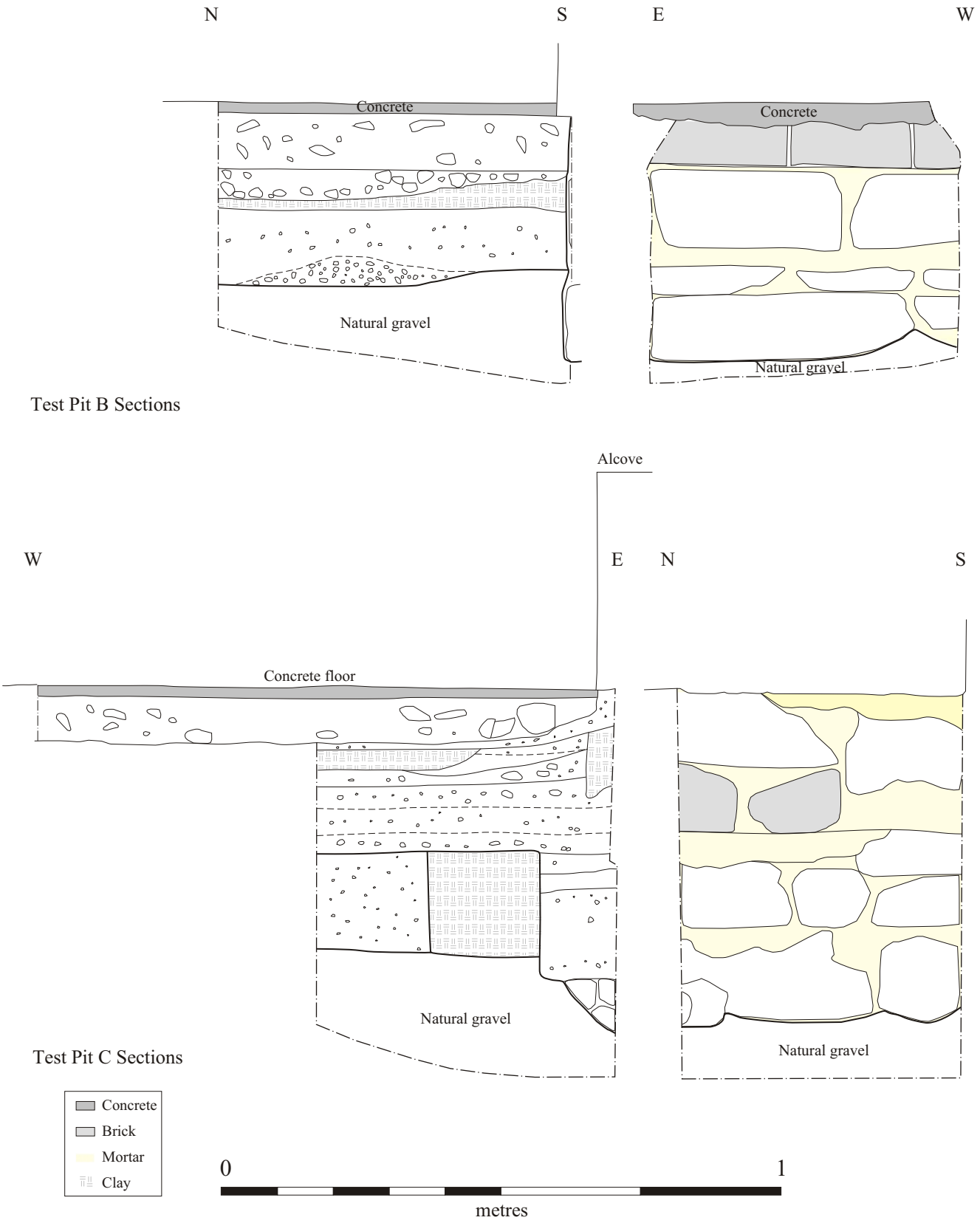
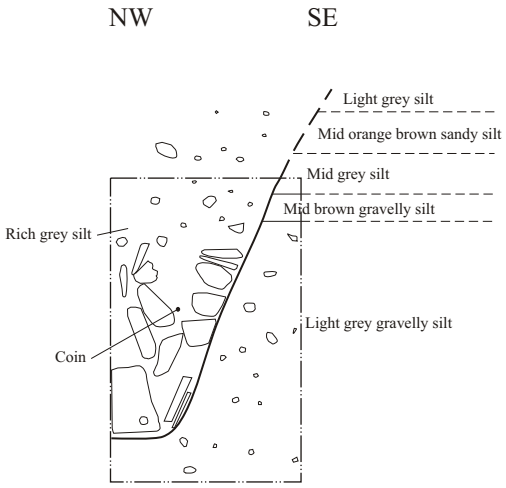
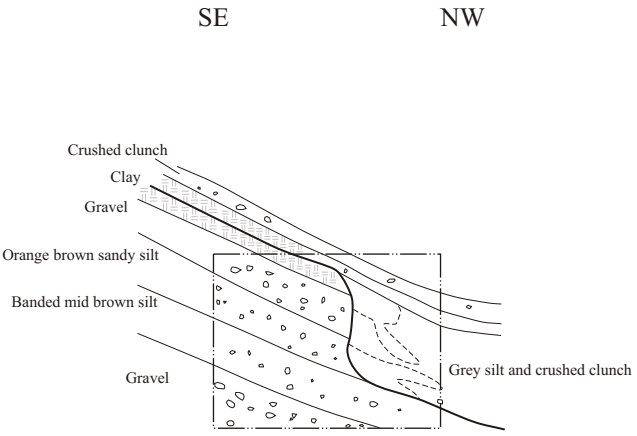
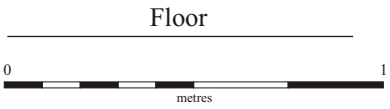


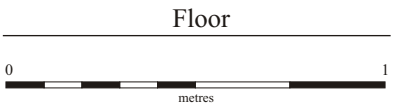
Figure 13: Archaeology and wall observations beneath No. 5



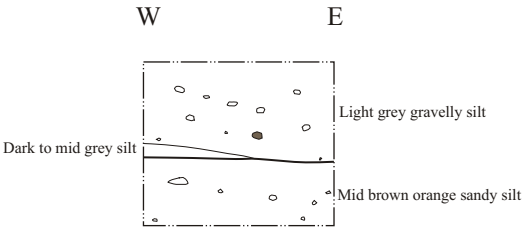


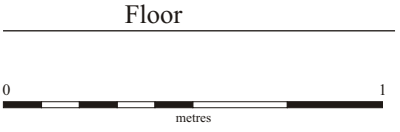


Wall investigation hole V



Wall investigation hole VI





Wall investigation hole VIII

Figure 14: Wall investigation holes

Wall Hole VIII

0.50m W-E, 0.40m high. Base 1.14m from modern cellar floor level.

Three layers were evident, but a possible cut may mean the upper two are within a larger feature extending beyond the observable area. A piece of Thetford Ware pottery from above the possible cut is 12th or 13th century in date.

Discussion of test pit findings

Although limited in extent the test pits and wall investigations do indicate that there is evidence of earlier activity surviving. Some of this directly relates to the story of the buildings themselves, some to perhaps earlier activity.

The building remains indicate the presence either of early cellars or undercrofts predating the main phase of the structures as extant above, or of more substantial stone walled buildings on the same location. Based on the roughness of the clunch build it seems likely that the former is the more probable. If the column below No. 4 stands to its original height then the floor level above has been raised by some 0.40 – 0.75m. Further investigation may be able to establish this. The change in build above a certain height, and the association of this with 16th century pottery, is further circumstantial evidence to a significant change in one or both buildings at about that time. This is further discussed below.

The non-building remains, survive intermittently in islands between the cellar walls. Figure 15 is an attempt to model where survival might be expected. The exposures are too small to make any definitive statements other than that there is evidence of activity from at least the 12th to the 16th/17th century.

Discussion

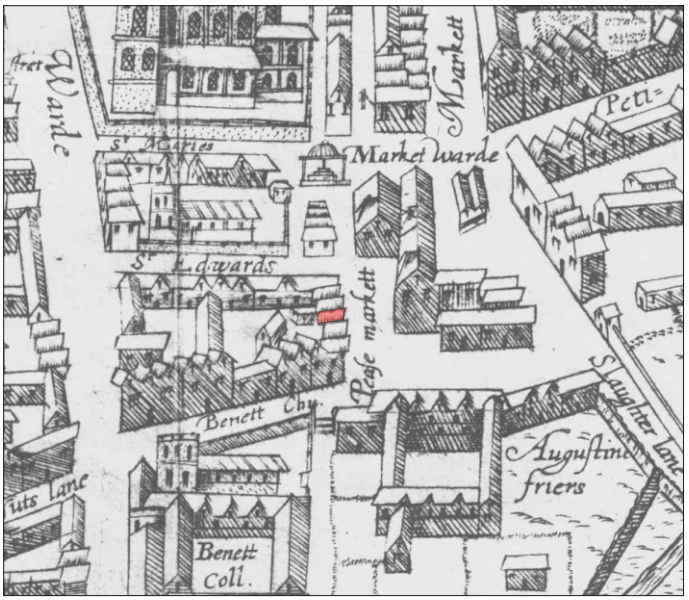
Most of the timber framing that survives in the two buildings dates to the late 16th/17th century or later. There are perhaps, however, some traces of earlier material. In No. 5 rear the jowl post (**V17**) has a carefully filled in mortice hole on its north side which does not relate to anything in the structure as it stands. By the later years of Elizabeth I's reign, jowl posts had begun to revert to a simpler post form. It is therefore possible that this single timber predates the rest of the structure and belongs to the later medieval period rather than the post-medieval. The Royal Commission in its discussion of these buildings suggests it is possible that this portion of No. 5 was the earliest built and originally consisted of a ground-floor hall open to the roof (RCHM(E) 1959: 326). The jowl post indicates that this is possibly a matter that might be resolved by dendrochronological dating. The later arrangement of the room, probably intended as a parlour, seems to be constructed as a whole. The chimneybreast is central to the space only with the plank and muntin screen *in situ*, indicting that the elements are integral. The fireplace would certainly post-date any version of the building as an open hall. The plank and muntin screen may have been quite short lived as the oak ceiling laths nailed to the underside of the joists run continuously over the mortice holes for the tenons at the top of the screen. Only one set of lath ghosts were seen, so despite the lack of chamfers on the joists there was no

Figure 15: 4-5 Peas Hill, predictive model of archaeology

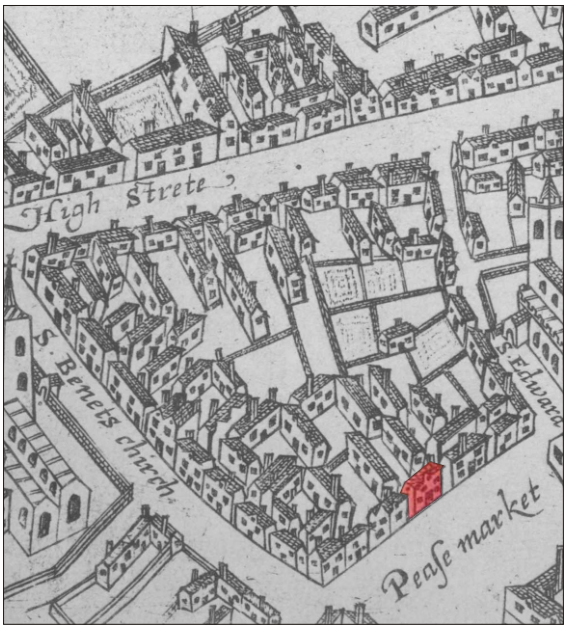
evidence that these joists had been plastered over before the planking screen along the corridor was removed. The lack of ornamentation of these joists points to the unpretentious nature of this structure. Hewett describes a partition from a 17th century London Inn as thin planks let into the grooves in studs rather than the grander plank and muntin and it may be something of this nature that should be envisaged (1980: 244). At some stage jowl post **H17**, beam **H45** and posts **V22** and **V26** were painted red. There was, however, no red paint on the underside of the joists, which were uncoloured, or on the surviving daub panel in the north wall, which appears to have been whitewashed. This colour scheme again seems to post-date removal of the plank & muntin screen. The dating of this plank and muntin scheme, based on the small joists and the stepped stops on **H45**, is likely to date to the late 16th/early 17th century. The lack of chamfers on the joists and the general small size of the timbers, however, suggests this is not a high status room but might also imply it is old fashioned and so may be slightly later in date than would be expected. The use of pine joists, one of which (**H33**) is part of the plank and muntin construction is more likely to be in the 17th century, although earlier examples are known.

In the front of No. 5 the transverse beam **H1** with its steep chamfered sides and stepped curved stops also suggests a date of the late 16th/early 17th century, but the jetty may be earlier as the joists are rather heavy. This ceiling with its central axial steep chamfered beam may be complete above the sawn laths and two layers of plasterboard. Although it is possible that the rear 'parlour' and part of the shop front area are broadly contemporary, both having steep chamfers and stepped stops, there is no evidence to suggest that these structures continue through the middle section, the date of which is uncertain. Externally there are three distinct roofs over the building, which supports an interpretation of three structures.

Far less survives of No. 4, and what does seems to generally be later in date than the main components of No. 5, with significant portion rebuilt later than No. 5. Other than the nature of the material used the main evidence comes from the relationship of the two buildings to the wall between them. At some stage in the life of No. 5 this wall was sufficiently accessible to allow a plaster finish both internally and externally. At the east end of the wall the daub panels were finished on both sides, at the west end the daub was missing so no conclusion can be drawn. There are two possible interpretations for this. One is that at some point in the post-medieval period, presumably around the 17th century, No. 5 was free sanding on its northern side allowing a fine finish to be applied. The problem with this is that beneath both buildings is a substantial undercroft predating this phase of their use. To allow such a scenario that below No. 4 would have to have been backfilled and there is no evidence to support this. An alternative is that for a period the two structures shared a party wall. At a later date No. 4 had a secondary, but non-supporting wall, inserted immediately to the north. That the frame of No. 5 was accessible at this time is supported by the observation that the much slighter studs of the No. 4 wall are nailed to the No. 5 frame via small off-cuts. Whilst the rear and middle parts of the No. 5 frame do appear as separate structures, the inserted wall in No. 4 seems to have been built up against them in one phase. There is a problem with the pure party wall interpretation in that there are no mortices on the north side of the central wall to indicate that it ever provided support for the northern structure. It is clear, however, that both buildings do have a relationship to this central wall. Curiously at the front the way that the main beam **H1** is chamfered on the south side only, in effect a half

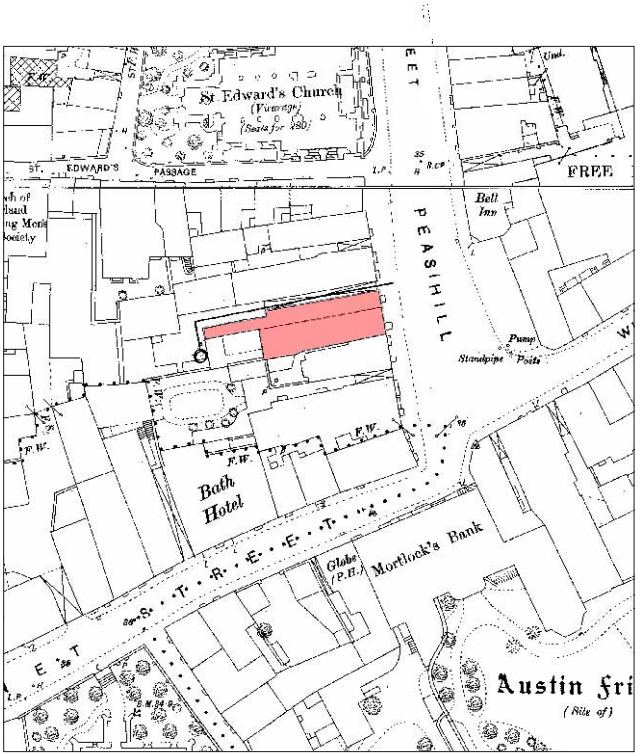


Lyne 1574



Hamond 1592

Loggan 1688



OS 1:500 1885

Figure 16: 4-5 Peas Hill, Historic Maps

beam, is evidence that it was fitted in relation to an existing wall to the north. One possibility is that at the time the rebuild takes place only No. 5 has a contemporary rear wing, with that to No. 4 added later.

The date of the jetty in No. 4 is difficult to define, partly because the wood appears so new looking. An early interpretation was that this might be a 19th century insertion in the manner of William Morris and the philosophy of the Society for the Protection of Ancient Buildings that restoration should accurately replicate what was there originally. The new sawn pine 225mm wide floorboards, however, suggest an earlier date than the Morris period as they had been replaced by 150 to 175mm wide band sawn boards by the late 19th century. The wider sawn floorboards were in common usage in the 18th century but were available much earlier and if the timber could remain without being discoloured for 100 years there is no reason why it should not remain so for 200 or 300 years in a sealed space. Looking at the lath and plaster covering the front of the structure, the studs rising from the bressumer do show signs of weathering in that they are grey in colour. Nail holes indicate that the lath and plaster previously continued down lower and it seems likely that the whole jetty was covered thus protecting it from the elements almost immediately after it was installed. There was no dating evidence on these timbers, but the plate (**H94**) may be large enough to date by dendrochronology, as it has sapwood. This would provide a date for this structure.

Although little physically remains of the pre 16th/17th arrangement, there is circumstantial evidence that points towards an interpretation of what was there earlier. The evidence from the cellar areas of earlier walls or undercrofts points to buildings that at some stage in their life were both substantial and of high status. In some towns a 'standard' house plot, if such a thing can be defined absolutely, was about 3 perches wide (16½ yards, 15.08m), with narrower plots at 1½ perches wide. In Cambridge, although no detailed research has been done in the town centre, work at the Grand Arcade (Dickens and Baggs forthcoming, Cessford forthcoming) suggests that the average plot width was closer to 1.5 perches (8¼ yards, 7.54m). As they currently stand 4 and 5 Peas hill together occupy 7.74m of street frontage, which includes the former passage between No. 4 and No. 3. This gives No. 5 a width of 4.30m and No. 4 only 3.44m *including* the passage. Without this extra ground No. 4 would be closer to 2.50m wide. Based on the location of the cellar walls, however, the true width of the plot is actually c. 7.42m, which gives a width very close to 1½ perches for both buildings together. It is feasible to suggest, therefore, that originally only one property occupied the plot (presumably with a range to the street and a wing to the rear separated from No. 3 by a passage or narrow lane) and that at some stage, probably in the later 16th, earlier 17th century the plot was divided into two more modest structures which, from that point on, have related but slightly different structural histories. The archaeological evidence from the cellar also supports a major change at that time with brick and brick and clunch rebuilds on clunch footings. The historic map sequence (Figure 16) also provides evidence. Hammond's map of 1592 appears to show a frontage of large buildings facing to the street whereas Loggan's 1688 map shows narrower buildings running back from the street. Again this matches well with the physical evidence at the site. The 1885 map shows that in the late 19th century there is still a passage between No. 4 and No. 3. That the jetty timbers of No. 4 extend beyond the southern side of the southern wall of that passage indicates that at least by that time the flying freehold goes with No. 4. The incursion of the Tearoom

storeroom, however, suggests that the arrangement may not have been straightforward.

In conclusion most of what survives at 4 and 5 Peas Hill relates to a complete rebuild and conversion into two properties in the late 16th/early 17th Centuries and subsequent alterations and rebuilds in the 18th, 19th and 20th Centuries. Within and beneath the fabric, however, remains some evidence of the earlier occupation of the site both in surviving build in the cellars and as archaeological stratigraphy in 'islands' between standing walls.

Acknowledgements

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a. Head of jowl post V17

b. Crude fit of H44 in slot in jowl post V17

c. H45 showing stopped steps forming a boss with central mortice to hold a samson post (looking up)

d. Joists fitted to H45 using a barefaced soffit tenon with diminished haunch

e. Joist H33 showing mortice slot for plank and muntin screen

f. Surviving wattle & daub panel in north wall

Figure 17: No. 5 Peas Hill, Details

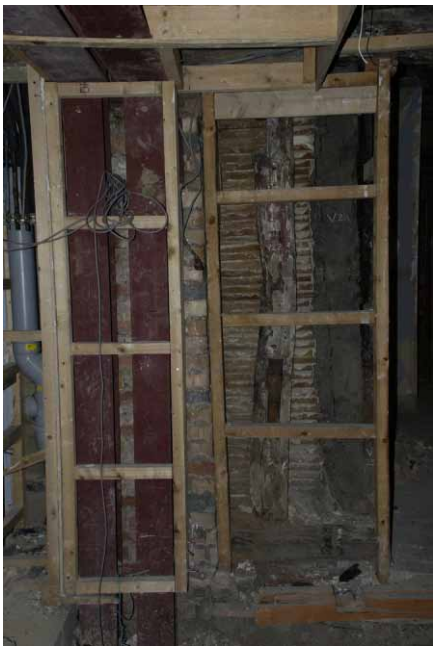
a. Cut-off base of jowl post V17 supported on H47

b. Auger hole in V27

c. Rough panel? framing in south wall

d. Well made panel? framing in south wall

e. South wall showing panel? framing, brickwork and late window

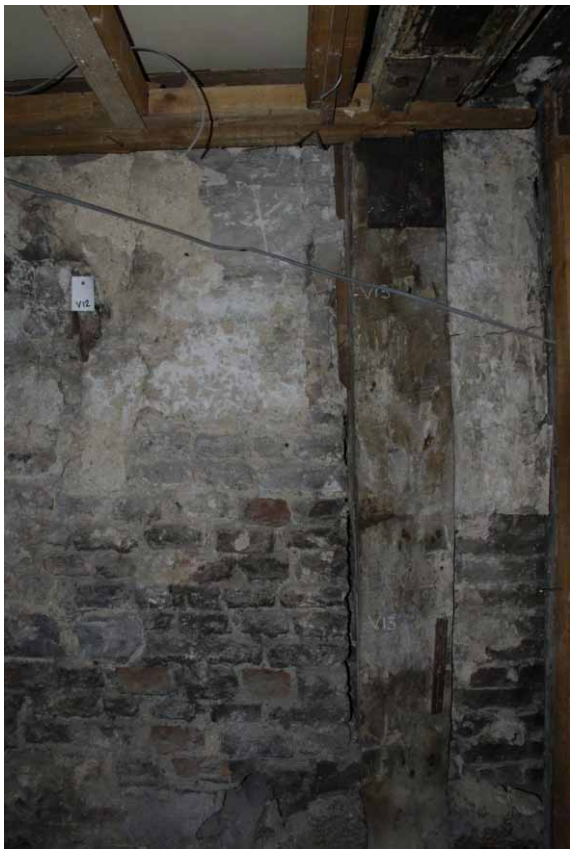


f. Lath and plaster behind V22

Figure 18: No. 5 Peas Hill, Details

a. Chisel slot in V28

b. Moulded bracket V29 supporting H28



c. Replacement post V13

d. Replacement jetty plate H3, jetty joist H5 at top of image, bressumer H4 above

Figure 19: No. 5 Peas Hill, Details

a. Joists H54 and H55 tenoned to trimmer H63 at chimney-breast

b. Wattle & daub panels facing inwards above inserted later ceiling

c. External (north) side of frame east of V28

d. General view middle and rear parts on No. 5

Figure 20: No. 5 Peas Hill, Details

a. Jetty joists H69-H74, bressumer H96 above

b. Bracket H68, jetty plate H94 and jetty joist H69. Note clean state of timber in images a and b

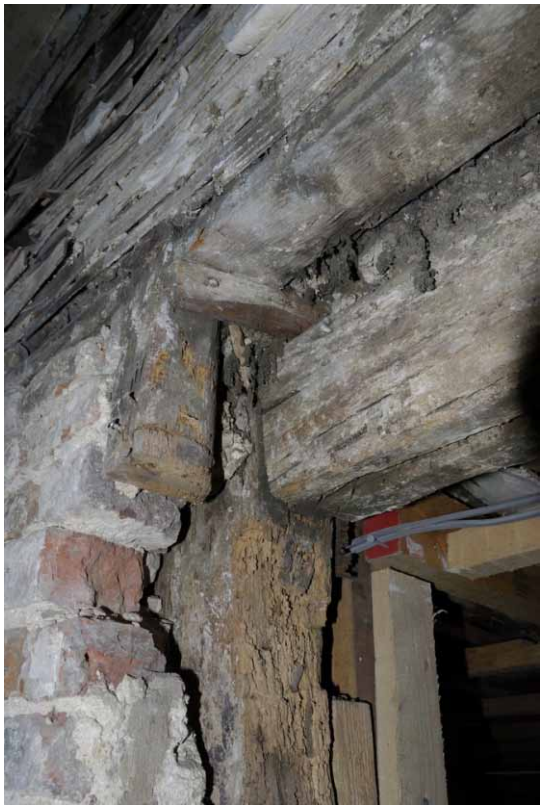
c. Front of No. 4, plaste panelling on studs rising from bressumer H96

d. Post V37

e. Slot for brace on north side of V37

Figure 21: No. 4 Peas Hill, Details

a. Brick infill panels in south wall



b. Relationship between buildings in central wall

c. Lath and plaster on stud frame of No. 4, No. 5 frame behind

d. Framing in NW corner over earlier passage

e. Stud of No. 4 wall nailed to frame of No. 5

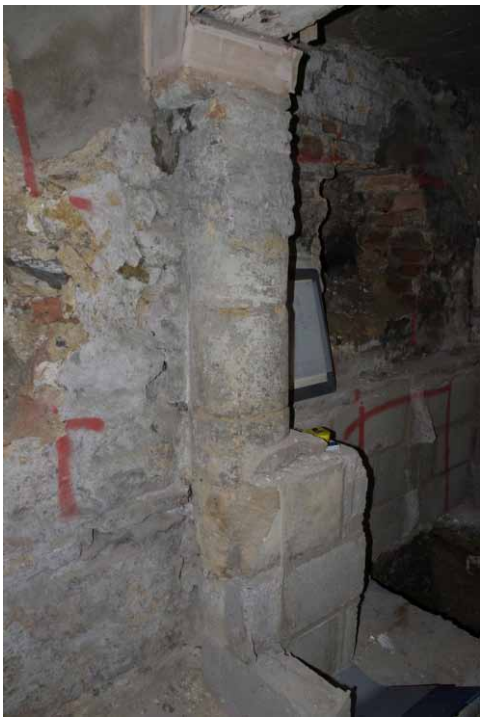
Figure 22: No. 4 Peas Hill, Details

a. Clunch walling in II below No. 5

b. Wall investigation holes below No. 4

c. Brick structure

d. Stone column and walling below No. 4



e. Stone column below No. 4

Figure 23: Cellar details

a. Location between No. 6 (the Arts Theatre) and No. 3 (Tearoom)

b. Modern frontage

c. Roofscape, No. 4 to left, No. 5 to right

d. Roofscape No. 5

Figure 24: No. 4-5 Peas Hill, external views

Appendix 1
Glossary of Terms

BRACE/ANGLE BRACE: An inclined timber used to support and provide rigidity to roofs, partitions etc.

WIND BRACE:. A diagonal or arched member placed across rafters to stiffen and support a roof structure.

BOXED HEART: Technique used by a sawyer as the timber is sawn from the log in that the center of the log is 'boxed' within the timber.

BRESSUMER: A horizontal timber resting on the jetty joists and carrying the upper storey.

COLLAR: A horizontal member connecting rafters at a point between their feet and the apex of the roof.

DIMINISHED HAUNCH: A refinement of the standard mortice and tenon joint where an backwards angled slope is cut on the upper shoulder of a tenon joint allowing part of the timber to be housed into the morticed timber.

GIRDER BEAM: A horizontal beam within a frame lying at storey height and supporting the studs on the adjacent floors.

KING POST: An upright post set on a tiebeam or collar and used to support a ridge piece.

LAP DOVETAIL JOINT: A joint in which the dovetailed member is proud of the receiving member and is not finished flush with it.

LATH: The smallest piece of timber (2-5cms across) used in building, employed on rafters to support the roof covering or in a partition as a base for plaster or external render and wall covering.

MORTICE AND TENON JOINT: The most common form of joint between two timbers meeting at right angles or at an oblique angle, the mortice being a socket cut in one timber to receive the tenon projection of the other.

BLIND MORTICE:. A mortice that does not pass through the timber

PEG: A wooden nail, round or square in section, used to fix a joint.

PLANK AND MUNTIN SCREEN: Alternate thick and thin planks, the latter set in grooves running vertically along the edges of the former.

RACE KNIFE: A cutting tool with a blade that is hooked at the point, for marking outlines and roman numerals on medieval timbers for assembly or to denote ownership

SAMSON POST: A free standing vertical post rising from a floor to carry a beam.

SINGLE DOVETAIL JOINT: The dovetail is cut on one side of the joint only the other side being straight.

SECRET SINGLE LAP DOVETAIL JOINT: A joint in which the single dovetail the lap member is hidden within the receiving member being disguised as a simple halved lap joint.

TRUSS: A combination of timbers to form a frame placed at intervals and carrying the purlins.

WALL PLATE: A longitudinal timber set on top of a timber frame, brick or masonry wall on which roof-trusses or rafters rest.