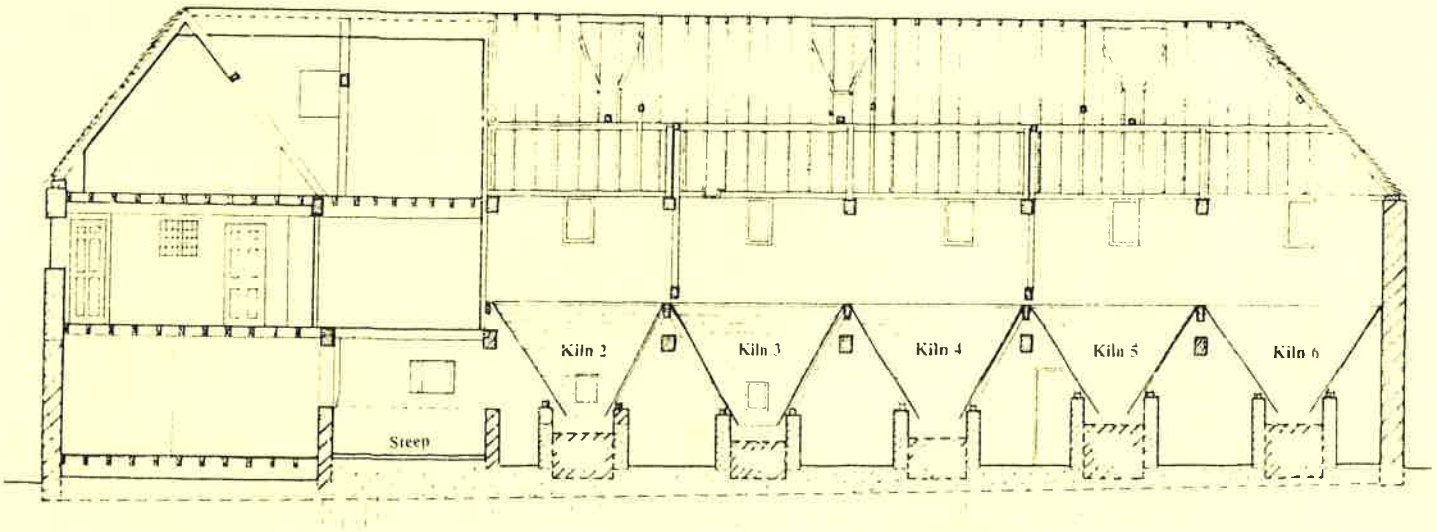
Underriver Projects Limited

The Malthouse and Malthouse Cottage, Boxley, Kent

HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL WATCHING BRIEF



OXFORD ARCHAEOLOGICAL UNIT
JANUARY 1999

Underriver Projects Limited

Malthouse and Malthouse Cottage, Boxley, Kent

HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL WATCHING BRIEF

Oxford Archaeological Unit
January 1999

THE MALTHOUSE AND MALTHOUSE COTTAGE, BOXLEY, KENT

HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL WATCHING BRIEF

LIST OF CONTENTS

THE MALTHOUSE AND MALTHOUSE COTTAGE, BOXLEY, KENT

HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL WATCHING BRIEF

LIST OF FIGURES

LIST OF PLATES

Acknowledgements

During the course of the project various people with particular knowledge of maltings and oasthouses visited the site and provided valuable thoughts and opinions as to the interpretation of the structure. The author wishes to thank Amber Patrick, David Eve Gwen Jones and Robin Walton whose thoughts have been incorporated into this report. Thanks are also due to Robin and Helen Watson for granting access to the site and for funding the archaeological recording.

THE MALTHOUSE AND MALTHOUSE COTTAGE, BOXLEY, KENT

HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL WATCHING BRIEF

Summary

Planning permission was granted in 1998 for the conversion of the malthouse and malthouse cottage at Boxley in Kent to accommodation. Prior to the start of the works an archaeological building survey was undertaken to record and interpret the building and an archaeological watching brief was undertaken during lifting of the ground floor. The brick and clunch stone malthouse at Boxley in Kent was probably constructed in the later eighteenth century and retains one primary malt kiln. A row of five smaller hop (?) kilns were added, probably in the early/mid-nineteenth century, alongside the two growing floors of the malthouse and then in the mid/late-nineteenth century a larger kiln was added to the west of the malthouse, which was converted to a cottage later in the century. It appears that the five smaller kilns did not operate efficiently and a flue was added to the rear of one (or maybe two) of the kilns, housed in a lean-to structure, to improve its operation. During a recent enhancement of Kent County Council's SMR the Malthouse was found to have more surviving remains than any other malting in Kent. These included the primary malt kiln, including the base, the plenum chamber and the drying floor, the base and plenum chamber of each of the five smaller secondary kilns, the steep, the two growing floors, two storage lofts, shutters to the growing floor openings and various hatches, holes and shutes. The survey also uncovered evidence of three former small cowls above the five kilns to allow the release of heat and smoke generated below. The excavation of the ground floor provided information regarding the floor construction but did not uncover deposits pre-dating the malthouse.

1 INTRODUCTION

1.1.1 The Oxford Archaeological Unit (OAU) has been commissioned by Underriver Projects Limited, to undertake a programme of industrial archaeological building recording at the malthouse and adjoining cottage, Boxley, Kent (NGR: TQ 7730 5890). This results from the granting of planning permission (application MA/97/1258) and listed building consent by Kent County Council for a programme of building works to convert the maltings into a private residence.

1.1.2 Due to the historic and architectural significance of the building (listed Grade II) permission was granted with the condition that a programme of archaeological recording be undertaken in line with planning guidance (PPG15) and a specification was issued by Kent County Council's Strategic Planning Department.

1.1.3 The initial planning application and County Council specification for recording work only covered the maltings and anticipated only brief recording of the adjoining cottage and how it relates to the maltings. Due to the possibility of a forthcoming application to restore the cottage it was agreed to extend the recording to the cottage as well to pre-empt any future recording work required. Also included in the recording programme has been an archaeological watching brief, undertaken during the lowering of the ground floor. The results of this are also included in this report.

1.1.4 Included in the development to convert the maltings are proposals to

- remove four of the six kilns
- to lower the ground floor structures to increase the floor to ceiling height

1.1.5 The two most complete kilns (Nos 1 and 2) are to retained in the development, possibly being visible behind glazed screens.

2 AIMS AND OBJECTIVES

2.1.1 The programme of recording aims to preserve by record evidence of the construction, development and operation of the buildings prior to the commencement of construction works. Recording work was particularly targeted at features to be removed as part of the development although features to be retained were also photographed, recorded and interpreted to gain an overall understanding of the structure.

2.1.2 Interpretation of the main building was felt to be of particular importance due to several unusual features which it had not previously been able to conclusively explain. The interpretation is complicated by the building's use as both a maltings and an oast house, resulting in evidence relating to two different processes and by the fact that the building is not particularly typical for either process.

2.1.3 Thus the recording project aimed to answer several specific questions, principally:

- What was the purpose of the five smaller kilns?
- How did the structure operate as a maltings?
- How did the structure operate as an oast house?

3 METHODOLOGY

3.1.1 The recording consisted of photographic and drawn surveys. The photographic survey, consisting of black and white prints and colour transparencies, included internal and external shots of both a general and specific nature to illustrate details of construction, evidence of phasing and other features of interest.

3.1.2 The drawn archaeological survey consisted of two floor plans, two sections through the maltings and two sections through the cottage. The overall measurements were based, where possible, on a previous measured survey. The photographic and drawn surveys were both supplemented by field notes and by the annotation of existing survey drawings. The main field work was undertaken on 15, 20, 21, 22, 23, 27 July, 3 August, while the watching brief was undertaken on 4 August 1998.

3.1.3 This study was based almost entirely on physical evidence, little documentary research on the site has been undertaken although this could in future provide useful clues as to the development of the site.

3.1.4 When the recording of the malthouse was initially commenced there was a large amount of accumulated detritus in the main ground floor area (G1). This was largely rubble from the partially collapsed first floor structure but there were also *c* 30 long, tapered ladders used most recently for cherry picking, and fragments of the cowl, discovered adjacent to the large kiln (No 1) at the south of the maltings. Photographs were taken and brief notes made on the detritus before it was cleared to allow the recording of the lower growing floor and the kilns.

4 BACKGROUND

4.1 The site

4.1.1 The malthouse is located on the west side of The Street, in the centre of the village of Boxley to the north of Maidstone in Kent.

4.2 Historical background

4.2.1 As documentary research was not included in the requirements for the study this section is based on information contained in the project brief issued by Kent County Council. It is believed that the maltings was constructed in the later eighteenth century and was then extended in the nineteenth. Two maltsters were active in Boxley in 1839, Thomas Filmer and Matthew Clements, and it seems likely that one of these operated the maltings that is the subject of this study. The Atkins family were active maltsters from at least 1847 until the 1880s when CF Foster became the only known maltster in Boxley, presumably operating from the malthouse on the street. The building was subsequently converted for use as an oast house, possibly in the early twentieth century and from the 1950s it was used as an agricultural store.

4.3 Summary of the floor malting process

4.3.1 An appreciation of the floor malting process and its impact on the building is of vital importance in understanding the malthouse and a short summary is therefore included here (from Patrick, 1996).

- After harvesting barley was stored in the malthouse (or separate building nearby).
- The next stage was the cleaning of the barley and (in some malthouses from mid ninteenth century) the gentle drying of barley either on the main kiln or a separate barley kiln.
- The barley was then soaked in a tank called a steep, to allow it to absorb moisture. This often took between 60-72 hours, during which time the water was normally changed.
- The soaked barley was then measured in a couch frame (couching) for tax purposes. Generally, this part of the process ceased to be carried out after the repeal of the malt tax in 1880 but it continued in some malthouses because of the beneficial effect of heaping the grain and assisting the start of germination.
- The grain is then spread out on the growing floor, between 4-8 inches deep and allowed to begin the process of germination. The time allowed for this varied but could be up to 14 days (in nineteenth century). At this point the two main methods of floor malting, the piece method and the strip method diverge. In the piece method (probably used at Boxley) the barley was regularly turned to allow a more consistent rate of germination, and was gradually transferred along the growing floor, away from the steep, before being hoisted to the upper growing floor and then again gradually moved back towards the kiln. In the strip method the barley was laid out on the floor in one go, and not moved, so that it is at the same point of germination throughout the floor.
- The germinated barley (green malt) was then transferred to the malt kiln, being spread on the kiln floor of either perforated ceramic, cast iron tiles or wedge wire. The heating process kilned the barley and stopped it germinating further.
- The malt was then removed and cleaned again and stored, for at least a month, usually in the malthouse due to freshly kilned malt being unsuitable for beer making.

4.4 Summary of the hop drying process

4.4.1 An understanding of the process of drying hops is similarly important although as the building was originally constructed as a maltings it is more likely that when used as an oast house the process was fitted around the building rather than vice-versa (from Walton, 1998 and Filmer, 1998).

- The first stage of the process was the receiving and storing of the green hops, often largely in a barn adjacent to the oast ready to be moved to an area adjacent to the kiln for loading.
- The hops were then spread on the kiln floor (usually of wire mesh) *c* 60 cm deep and heated from below.
- The hops were spread on the adjacent cooling floor to redistribute moisture.
- The dried hops were then pressed down into pockets suspended below, either mechanically or manually.
- The sacks were then stored on the ground floor ready for transporting.

4.4.2 It is important to appreciate the difference in the malting and oasting seasons and the impact that has on the building. Barley is harvested in the summer and then stored for up to eight months, allowing the malting process to be undertaken for much of the year. Thus a large amount of space was needed for the storage of barley, prior to kilning, either within the malthouse or in buildings nearby. Additionally significant storage space was needed for the malt after kilning, as it was usually stored for about a month prior to dispatch. It was essential that the areas for the two stages of storage were kept separate, due to the differences in moisture content between the barley and malt.

4.4.3 In contrast the drying of hops was undertaken over a much shorter period, about a month, around September when the hops were freshly picked. Again, large amounts of space were needed for the storage of hops, both during the receiving stage and the pre-dispatch stage.

5 BOXLEY MALTHOUSE

5.1 Introduction

5.1.1 Boxley Malthouse is a floor maltings of two main phases. Phase 1 is a two-storey (plus storage loft) L-shaped structure with square plan kiln (No 1) in the south-east angle. The six bays of growing floors lie to the north and a small projection containing stairs lies to the west. The main body is 23 m long x 10 m wide with a 2.6 m projection. The walls to the three main facades (east, west and south) are of brick (Flemish bond) to first floor level, below clunch (chalk) block above (Plates 1 + 19). The northern elevation, which is largely obscured by vegetation is entirely of brick. The roof is double hipped, timber framed and plain tile covered.

5.1.2 A second kiln was added to the west, enveloping the small projection and creating a more pronounced L-shaped Phase 2 structure (Plate 1). This extension is entirely of brick, with decorative Flemish bond at first floor (red stretchers, yellow headers) above plain red Flemish bond at ground floor. There is also a decorative parapet top to the front (south) wall with dentil course. The pyramid-shaped roof is again plain tile covered. This second kiln was later converted into a cottage, possibly in the late nineteenth century.

5.1.3 The use of 'clunch stone', a hard chalk suitable for use as a building material, in the construction of the malthouse is one of the building's unusual and relatively rare features. It is interesting to note, however that another oast house in Boxley, a nineteenth century

structure at Street Farm, also incorporates chalk as a structural material in its external walls (Walton, 1998). Only a single wall of this later structure is of chalk (the rest is of brick) and again it is above a base formed of another material, this time ragstone and flint. A site inspection of this structure has not been made as part of this project and it seems likely that the chalk wall is incorporated from an older building and that there was a small scale, local tradition of using chalk. The use of chalk in Boxley is also commented upon by Pevsner, stating that its use is common in Berkshire but not often in Kent. Financial considerations seems a possible reason for the use of chalk at first floor level, as the structure was probably built between 1784 and 1850, the period in which the brick tax subdued the use of brick. This does not, of course, explain why the use of chalk caught on particularly around Boxley although the clunch here appears of a particularly durable nature.

5.1.4 The use of chalk only above ground level demonstrates that the builders were aware of chalk's porous nature and unsuitability as a foundation material. Appreciating that, it is also interesting to note that chalk has been used in each of the kiln bases, suggesting possibly that the kilns were seen as ephemeral structures.

5.1.5 Among the other curiosities is the brick northern wall, contrasting with the other, partially chalk walls. This would appear to either suggest that the building formerly extended further to the north and that it was truncated with a later brick wall, or that the building was formerly open at first floor level to incorporate a loading bay. Either arrangement would have necessitated an alteration in the property boundary because the wall forms the northern boundary, adjoining land belonging to the Hermitage.

5.1.6 Either possibility is supported by the existence of a series of small structures apparently within the Hermitage grounds, adjoining the northern boundary of the malthouse. These structures are perpendicular to the malthouse and form a courtyard to the rear of the maltings. Their easternmost edge, however, is located at the north-western corner of the malthouse, suggesting that the malthouse formerly continued north or that the area had to remain open to accommodate a loading bay. This is supported by some evidence at the northern end of the roof space suggesting that this hipped end has been rebuilt. There is a ridge-piece at this point contrasting with no ridge-piece in the rest of the roof structure.

5.1.7 Unfortunately it has not been possible to thoroughly inspect either the perpendicular structures or the northern wall of the maltings, due to boundary walls and heavy ivy growth. Thus interpretation of this area remains limited and inconclusive.

5.2 Ground floor (Figure 2)

5.2.1 Lobby (G0)

5.2.1.1 The ground floor is entered through a lobby at the south of the building, sandwiched between the main, Phase 1 kiln (No1) to the east and the storage area to the west. The external door has a brick segmental arch over matching the ground floor windows, showing that the door is primary (Plate 1). The first floor is reached by an open-tread timber staircase (Plate 13) within the lobby, leading to the south-west corner of the upper growing floor. This staircase can be seen to be secondary partly by a small ledge table beneath it, next to the doorway to the ground floor, which is virtually unusable with the staircase in-situ, and which no doubt would have been used for keeping notes on quantities of malt or hops produced and production progress. More conclusive proof that the staircase opening is also secondary is shown by the joist holes either side of the opening above, showing that the first floor structure formerly continued, expanding the room previously formed by F3 and F4. It is not possible to be certain of the location of the primary staircase but it is possible that they were at the western end of the small Phase 1 projection, at the location of the secondary staircase serving the cottage/kiln (G3).

5.2.2 Lower growing floor (G1)

5.2.2.1 The lower growing floor, (17.75 m x 5.75 m) where soaked barley would be spread to begin germination, filled the eastern half of the ground floor of the main Phase 1 structure, to the north of the main kiln (No 1) and adjacent to the five later kilns (Plate 10). The floor surface is a cement screed, as is typical of growing floors, and slopes gently down (by *c* 4 cm) towards the line of kilns. The exact outline of the cement floor at this point is unclear, it having largely cracked and come away, beneath the gentle slope and in front of the kiln bases.

5.2.2.2 As part of the development the ground floor was lowered to allow a greater floor to ceiling height and a watching brief was undertaken during the removal of the floor construction, thus revealing the foundation and ground floor construction (see Appendix A for details).

5.2.2.3 There is a slight but clear concave ramp (16 cm wide, rising *c* 3 cm) spanning the growing floor (east-west) (see Figure 2). This possibly relates to the movement of germinating barley along the floor from the steep and the desire to keep different pieces separate while still being able to easily move it along the floor.

5.2.2.4 There are five main timber beams, 19 cm wide (underside of beam 1.9 m above ground floor) spanning the building east-west and supporting the first floor (Plates 7, 10, 20). The beams are supported by an intermediate row of five, primary timber posts (15 cm x 15 cm), each one with small chamfers and a wide (2.33 m) load-spreading head, rising gently to either side of the post, immediately beneath the main beam.

5.2.2.5 Several secondary posts were added, probably in an attempt to prop up a weak first floor, prior to its partial collapse. A post exists below the second beam from the north, between the row of main posts and the east wall, resting directly on the floor fixed by a small lead shoe. There was clearly another secondary post, beneath the third beam from the north, evidenced by a similar shoe, and there remains, adjacent to this one, another post at the edge of the collapsed area.

5.2.2.6 Lead 'socks' remain in-situ around each of the existing posts on the ground floor to prevent the wet grain from rotting the base of the posts (Plate 10 and 11). These socks, however, differ considerably in height. The one furthest to the south is 43 cm tall but the one furthest north is only 16 cm tall.

5.2.2.7 The posts and beams also contain a significant amount of graffiti and dates of interest. Oct 1891 is scrawled on the northern side of northern most beam, towards the east wall, while Sept 1870 is written on the northern side of the angled load-spreading head supporting the same beam. New Tons 1940 is written on the south side of the same beam again

5.2.2.8 Three non-glazed windows exist to the road elevation (east) beneath brick segmental arches. Each is timber framed with five vertical iron bars and horizontally hung, internal timber shutters. Shutters such as these are typical features of maltings growing floors, allowing control of ventilation and sunlight to ensure an even spread of germination within the barley.

5.2.3 Steep (Plate 11)

5.2.3.1 The steep (inner dimensions: 2.7 x 2.1 x 0.9 m tall), in which barley would be soaked prior to spreading over the growing floor, is a brick line tank, with cement rendered surfaces, which remains in-situ towards the south-west corner of the lower growing floor (Plate 11). It now contains a small amount of water and is fed with rain from the central roof gulley, via a gutter and down pipe. It has not been possible to locate the drain but must still operate (inefficiently) due to the small amount of water constantly present. Two hatches in the side

walls above the steep exist allowing access. The first is 1.15 m wide x 1 m tall (with its base directly on the wall of the steep) within the timber stud partition adjoining G2 and G3 to the south (formerly a single room). The second hatch, which is now blocked, is in the western wall, and would formerly have linked the steep with the room which became the kitchen (G7) in the cottage. This may suggest that the kitchen was formerly used as storage for barley, prior to transfer to the steep through this hatch, but the opening has a brick segmental arch to match the other primary openings within the building and it is clear that it was originally simply a external window increasing ventilation within the lower growing floor. Three small openings (D, E, F) are visible in the floor above the steep to allow for shutes to fill the steep with barley from the first floor storage area (See Room F2, Fig 3).

5.2.3.2 Until the repeal of the Malt Tax in 1880 the process following the steeping of barley was couching. The couch frame would be located adjacent to the steep and would generally consist of four corner posts supporting three fixed boarded sides and a fourth side of removable slats. When the tax man had visited and measured the barley in the couch frame the fourth side was removed and the grain spread over the growing floor. There is no surviving evidence of the couch frame at Boxley but it would clearly have either been to the north of the steep at the present location of Kiln 2 or, as is more likely, to the east of the steep adjacent to the entrance to the lower growing floor.

5.2.4 Stowage to west of Kiln 1 (G2/3)

5.2.4.1 The original maltings contained a room (6.2 m x 4.3) for the storage of barley to the west of Kiln 1, partially contained within the small projection perpendicular to the main body of the building. The original room has now been divided by a modern stud partition so that half the original floor area, and both windows, are now within a room (G3) in the cottage. The section which remains as a part of the maltings (G3) has boarded walls and the hatch through which barley would have been shovelled to be soaked in the steep. Small traces of gauze were noted against the south wall in G3 sealing the gaps between timber boards covering the brick end wall. It is only present up to a height of *c* 50 cm, and apparently confirms that the room (G2 and G3) was used for the storage of grain.

5.2.4.2 The hatch linking the room with the steep apparently confirms that this area was for storage of barley but it is also significant that there is a circular iron lined 10 cm diameter hole and cloth shute above (and another former hole: G, H) allowing the transfer of materials from the first floor F3, which logically could be for the unloading of malt from the kiln. The holes and shute are likely to be secondary, inserted either when it was decided to unload all the kilned malt to the storage loft and use F3 for barley or when the kiln was used to dry hops and the shute used to fill sacks beneath (discussed in greater detail at 5.3.12).

5.2.4.3 The floor within G2/3 is boarded and is raised by 38 cm above the ground to the level of the rest of the ground floor, by three beams orientated north-south supporting joists. This is the only section of the ground floor with a suspended floor and may be a clue confirming its function. It was possibly felt to be important to achieve a level of air flow beneath the stored grain to reduce the risk of it prematurely beginning germination. The floor is in a substantially worse condition than the first floor timbers, being largely rotten and unable to support any significant weight. It is most likely that this is due to air bricks having become blocked.

5.3 First floor (Figure 3)

5.3.1 Upper growing floor (F1)

5.3.1.1 The main first floor area, directly above the lower growing floor, is occupied by the upper growing floor (Plate 4). A section of the upper growing floor has collapsed, measuring 5.7 m x 3.2 m, towards the centre of the floor and against the east wall. This has allowed a

clear view of the first floor construction, consisting of layers of clay tiles, bonded together with a cement mortar, below a cement screed surface and above a timber boarded ceiling (Plate 7). Such a floor construction is typical for a maltings growing floor, being proof against rot, non-combustible, strong, requiring substantial strength and being ideal for conducting and radiating the heat generated by the germinating barley. The collapsed section has also allowed a view from below of the housings in the main beams where the joists formerly supporting the first floor have collapsed. The housings consist of a recessed mouth and pairs of adjacent mortice holes, on the central line of the housing, extending through the main beam, to allow joists with two tenons to slot in.

5.3.1.2 Similarly to the ground floor arrangement, there are five main timber posts along the spine of the building with two secondary posts to the east of the spine, either side of the third bay from the north. One of the secondary posts is in-situ while the other one was formerly above the area of collapsed floor and is suggested by a post head on the beam above. It is perhaps unlikely that the posts were added simply when the first floor began to bow and look weak because then they would probably only have been added at ground floor level. The two pairs of extra posts, may therefore suggest that some machinery was inserted requiring extra support, possibly such as a hop press.

5.3.1.3 A hop press is a commonly found feature in oast houses, normally located towards the kiln, which would consist of a frame, above a floor hatch with pocket suspended below. The frame would support a winch mechanism used to force down a press into the sack to compact the dried hops. Earlier oast houses, and less advanced later ones, did not have a hop press and the sacks were filled and compacted manually by means of a man standing within the sack. If, as is thought, the row of five kilns to the west were for hops, a central hop press inserted here (within the collapsed floor section) would be logical. However, the maltings operation would clearly have had to have been permanently abandoned to accommodate the hop press within the growing floor and it is thought possible that with so many kilns in the building both malting and oasting continued simultaneously or perhaps alternated seasonally.

5.3.1.4 Alternatively it may well be that hop sacks were filled manually through primary hatches relating to the maltings. The only existing hatch within the upper growing floor (B) allowing vertical access to the lower growing floor is located at the northern end of the building and is directly below a further hatch (C) in the loft floor above. The double hatch would clearly allow the easy transfer of stored materials, possibly both kilned malt and dried hops at different periods in the building's history, from the storage loft to the ground floor. When the site was visited a large board had been placed over hatch B between ground and first floors with a ladder standing on the board utilising the opening (C) above. Each hatch probably had a variety of uses, one of which was to allow the raising of partially germinated barley (the piece) which had been turned and gradually moved along the lower growing floor from the steep and which would then slowly return along the upper growing floor towards the Kiln 1. Alternatively the piece may have been hoisted from the ground floor by a former hoist mechanism at the current location of Kiln 6. A possible hoist here is tentatively suggested by features within the storage loft (see below).

5.3.1.5 The only evidence of other hatches is also towards the northern end of the building where there is some trimming (A) within the floor structure, visible from below, apparently of a former square opening. As has been mentioned above it is also possible that there was a further hatch within the collapsed floor area, possibly accommodating a hop press or other machinery.

5.3.1.6 A timber loading door, split horizontally, is located towards Kiln 1 (door 1.35 m wide, 0.6 m from the kiln) opening to the street elevation at first floor level (Plate 19). The main timber loading beam is located on the floor of the storage loft, protruding from the building

at eaves level and attached to the joists by means of two iron straps, visible from below. There is no gable or dormer projection above the beam and thus there is no access to the loft from the pulley.

5.3.1.7 That the pulley and loading beam do not provide access to the storage loft, despite the fact that it is the only surviving loading bay, suggests that this may be a secondary feature. There appears to be enough evidence to accept that the storage loft was primary (see 5.4) and if this was the primary loading bay it would be logical and relatively easy to have incorporated a dormer in the roof to allow access to the loft. It appears most likely that there was originally access to the roof space through a loading bay towards the northern end of the building (discussed in 5.4 below) and that the loading beam adjacent to the kiln was inserted when this primary loading bay ceased to be used. Being inserted into an existing building it was much easier simply to lay the loading beam flat on the loft floor rather than insert a loading dormer into the roof structure. The aesthetics of the east elevation also suggests that this loading door is secondary. The three ground and three first floor openings are staggered to create a stepped 'rhythm' in the elevation which is awkwardly broken by the door directly above (and very close to) the ground floor opening furthest to the south.

5.3.1.8 Another pulley mechanism is attached to the wall, immediately below the line of the joists, to the north of the door opening. Two north - south joists, parallel with the wall on which the pulley is fixed, have been cut, in line with the pulley, as if to accommodate a rope and possibly another pulley. The first cut is within the joist adjacent to the pulley and the second cut is in a joist 3.55 m away. There is no clear evidence of a second pulley adjacent to the second cut.

5.3.1.9 The window openings are again typical of those of maltings growing floor, consisting of three timber framed and timber barred windows (non-glazed) in the east wall, again with horizontally hung shutters, in bays alternating with those to the lower growing floor. The west elevation has five smaller windows, with two timber verticals, set diagonally, at first floor level. Another feature which in many maltings is important in identifying the former growing floors is the low floor-to-ceiling height, especially of the upper growing floors. At Boxley the first floor to joist height is 2.03 m, which is not as low as in some maltings although it is necessary to stoop beneath the main beams. This height is being increased as part of the current development.

5.3.2 Stowage to west of Kiln 1 (F2/3/4)

5.3.2.1 The area above the steep (F2) was clearly for storage of barley, and three in-filled holes (each *c* 15 x 12 cm) are visible in the timber boarded floor indicating the former presence of shutes to transfer the barley into the steep below (See D, E, F). There is also a slotted hatch (I) in the ceiling, directly above one the three holes in the floor, suggesting that barley was also stored in the room above and dropped down either to first floor level or directly to the steep. Also confirming that F2 was for storage of grain is the presence of a series of thin low gauze strips, similar to those found in G2/3, sealing the joints between horizontal boards on the stud partition dividing the room from Kiln 2.

5.3.2.2 The area within the first floor Phase 1 projection, to the west of Kiln 1, is divided into two main rooms: F3 (4.3 m x 3.45 m) and F4 (4.3 m x 3.65 m) by a secondary partition. The partition consists of a 2 m length of timber studding with lath and plaster surface to each face (possibly nineteenth century) adjacent to the south wall. This section also contains a hatch (65 cm tall x 55 cm wide, 1.1 m above floor) too small and awkwardly located for the purpose of transfering grain . Extending the partition to the north, is a 1.4 m length of hardboard, painted white.

5.3.2.3 F3 has been reduced in size through the addition of the enclosed (by timber boarding) staircase rising from the ground floor lobby (probably enclosed to prevent malt/barley

falling down the stair opening). A non-glazed window (boarded) exists within the south wall of F3 with three vertical timber bars, similar in design to those of the growing floor. Two small circular holes (G, H) exist within the boarded floor of F3, each one *c* 10 cm diameter. One of the holes retains an iron lining around it and a cloth shute descending to the ground floor. The other hole is in-filled with timber.

5.3.2.4 The timber joists supporting the storage loft above are exposed. A small area (J) (2.15 x 1.2 m) adjacent to the staircase which has no primary joists, the floor boards above simply being supported by thin inserted timbers (Plate 16). This would suggest a large opening between first and second floor, possibly for the transfer of materials although it may have accommodated a set of stairs. The western edge of this opening is against a north-south timber beam, supported by a narrow timber post. A small hole within the floor indicates the former existence of a second supporting post.

5.3.2.5 F4 has also been reduced in size through the addition of a staircase serving the cottage to the west. This is enclosed by a plastered, stud partition with a window allowing visual access between the room and the staircase. It is a two-light window with timber mullion and 12 small rectangular panes to each light divided by lead strips. The staircase has a domestic nature and strongly appears to have been inserted when the western kiln was converted to a cottage, although as discussed earlier it is thought quite likely that there was a previous staircase here, serving the maltings. The window (which looks of a greater age than the conversion) was presumably only added with the partition when the staircase was reorientated to serve the cottage and it must have been reused from elsewhere.

5.3.2.6 There is also a single window within the south wall of F4 but this one is deeper, timber framed with single mullion (four panes to each side) and is glazed (Plate 1). The window appears to have been inserted, probably in an existing opening. This may have happened when the second main kiln to the west, was converted to a cottage to create a larger living area, a theory which is enhanced by the fact that the ceiling is plastered within F4 (unlike in F3). F4 is also floor boarded (24 cm wide)

5.3.2.7 It is less easy to be certain of the original purpose of these two rooms (F3/4) than of F2 above the steep exept that they have had more than one function. The logical assumption is that when the malthouse was first built, kilned malt was unloaded into F3/4 where it was dressed (removal of rootlets), cleaned and prepared for storage. The malt may then have been transfered up to the storage loft through the possible hatch identified by the area without joist (mentioned above). Within the same general arrangement, the angled hatch in the western face of the kiln hood (see 5.5.6) would alternatively allow for the transfer of malt directly to the storage loft. However, the shute and hole in the floor (presumably secondary) suggest the transfer of materials from F3/4 to G2/3 (where barley is thought to have been stored). It maybe that at some time it was decided to transfer all malt directly to the loft, thus allowing the storage of barley in F3/4 or it may be that it was decided to store all barley above the steep, thus allowing malt to be unloaded into F3/4 and bagged in G2/3 via the shute. It is also possible that Kiln 1 was for a period used as a hop kiln and that dried hops were unloaded into F3/4 and bagged through the 10 cm diameter shutes (G, H). The evidence points, as with other features of the building, towards a variety of uses for the rooms and it is likely that during its life F3/4 has been used for storage of both malt and barley and possibly hops.

5.4 Storage loft/roof structure

A timber floored storage loft is present above the first floor, in three main sections following the L-shaped Phase 1 building.

5.4.1 Northern storage loft

5.4.1.1 The main loft space is directly above the two growing floors, to the north of Kiln 1 and within the eastern half of the double hipped, M-shaped roof space (Figure 5). The roof to this side of the building has a single softwood purlin to either pitch, clasped by collar (underside 1.8 m above floor) and principal rafter (of only marginally larger section than common rafters). Five tie-beams directly support the timber boarded floor. For the main length of the roof there is no ridge-piece, but there is one within the bay adjoining the hipped, northern end (Plate 15). This suggests that the hipped end has been rebuilt, supporting the theory that the building originally extended further to the north, or that the roof formerly contained a loading dormer at this end.

5.4.1.2 The structure supporting the roof to the western half is similar but does additionally contain a pair of angled struts between each purlin and tie-beam. We can be certain that these struts were not added to support the stud partition between kiln bays, because a pair of posts is also present between the bays sharing a cowl vent (Kilns 2+3, 4+5) and where there is no partition. (For more information on the cowl vents and the roof structure above the kilns see 5.6 below). A curiosity of the roof above the kilns to the west, is the presence of 'split trusses'. There are four tie-beams, (each with struts supporting the purlin) above each hopper junction, but only three sets of principal rafters secured by collars off-line from the tie-beams and struts (Plate 8). This side of the roof may therefore have undergone some alteration, although a major rebuilding is unlikely as there is no ridge-piece in the western roof (except for in the location of the former cowls).

5.4.1.3 The contrast between the structures of the two sides of the roof is instructive in suggesting that the present arrangement, of open storage space to the east with divided space above the five kilns is original.

5.4.1.4 The main storage loft measures 18 x 3.55 m on plan with a floor to ridge height of 2.65 m. The floor is not the full width of the roof. It is instead bounded by two rows of short vertical studs (c 47 cm high), lined with partially intact wooden boards, latterly overlain with sheet metal lining.

5.4.1.5 There are two trap doors existing in the floor, one at the northern end of the building (C), directly above a similar opening in the first floor (referred to previously), and one at the southern end (K) adjacent to the kiln (1.55 x 9.5 m).

5.4.1.6 Among the most interesting features of the storage loft is the presence of a doorway at the northern end of the loft, between the main floor area and the adjacent roof space above Kiln 6. At this point there is a return on the double hipped roof (believed to be secondary), which allows such a link, and a lath and plaster partition, supported by stud-work, with a central, timber framed doorway dividing the two spaces. In addition to this there is a second timber stud frame, without evidence of laths, *c* 95 cm to the east of the parallel main partition. This frame is set on a horizontal timber floor plate.

5.4.1.7 The doorway appears to have no likely function within the present arrangement of the building, being directly above Kiln 6, and must be a clue to the malting's former arrangement. One possibility is that immediately above and beyond this doorway there was a loading pulley, within the building, for raising and lowering between floors. There is no evidence immediately apparent for such as feature but a comprehensive inspection of this area was not possible due to lack of light and it being beyond the extent of the floor. The

possibility that this end of the building was open to the north has been referred to above (5.1.5 and 5.1.6) and such a feature would easily allow wagons to be pulled into the building to be unloaded/loaded under cover and moved around the building vertically by a loading winch.

5.4.1.8 The evidence again points to the northern part of the storage loft having several functions over time. It is almost certainly primary (open trusses) and must therefore have been used for storage in the maltings process.

5.4.1.9 Logically, a large storage area such as this might sometimes have been used for storing kilned malt, prior to dispatch. However, as discussed elsewhere, the only two hatches within the kiln (other than that facing the upper growing floor used to load the kiln) are to the west and suggest that kilned malt was unloaded to this side. There is no direct link between the kiln and the main loft space although it would be possible (with certain spillage) to throw malt from the kiln through the adjacent hatch in the loft floor. The advantages of an angled hatch to this side would be overwhelming. It is possible that barley was stored in this area, although there is no link with the steep. It therefore appears likely that the loft was used for malt with a former angled hatch in the kiln hood. Such a hatch may have been in-filled when/if the kiln operated as a hop kiln or the hood may have been rebuilt at this time without a hatch. After a storage period of probably about a month the malt would have transfered from the loft to waggons for despatch, via a loading bay at the northern end of the building as discussed above.

5.4.1.10 Two hop sacks were found within the northern storage loft (stamped 1945), along with a straw filled sack mattress. These would both tentatively point towards the floor being used as a hop cooling floor. It would be common for the hop dryer to sleep close to the kiln during the season to allow him to closely regulate the dying process. However there is no link between the floor and the five small kilns (thought to have been for hops) and no direct hatch between the main kiln (possibly used for hops for a period). Hops could not therefore have been easily thrown to the floor making its use as a hop cooling floor unlikely. Additionally, there is no evidence of a hop press on the second floor to pack the hops once cooled (although sacks could have been hung through the hatches and manually pressed).

5.4.2 Western storage loft

5.4.2.1 The smaller western storage loft, which cannot be accessed from the northern loft, is in two sections following the layout of the main Phase 1 building, extending along the western projection and above the steep in a perpendicular direction. The main western loft floor is 3.4 m wide x 7.45 m long, extending to the end of the Phase 1 building where it is terminated with modern (twentieth century) timber tongue and groove boarding with a small hatch allowing a view through to the cottage kiln beyond. The smaller space is 3.4 m long (to the rear of the ashlar studs).

5.4.2.2 There is no existing staircase between the first floor and western storage loft and the only way of accessing it is to awkwardly climb into the kiln space (standing on the hatch frame) and then up through the angled hatch in the kiln hood above. There must originally have been a set of stairs allowing access to the western loft, either located in the area without floor joists (mentioned above) or possibly towards the western end above the other set of stairs. Unfortunatley it was not possible to make a detailed inspection of the whole of the western loft due to the fragile flooring and the dark making such an undertaking unsafe.

5.4.2.3 It was also not possible to conclusively date the roof structure above the western loft due to the ashlaring studs, rafters and roof ridge being covered by modern softwood tongue and groove boarding. The modern boarding obscures the construction of the roof but what is clear is that the trusses are open and that there is a softwood purlin supported by four unevenly spaced collars (underside 1.65 cm above floor).

5.4.2.4 The smaller perpendicular section to the storage loft, above the steep, is accessed via a wide (1.38 m) opening within the roof structure, immediately to the east of the central principal rafter. It is similarly covered with modern tongue and groove boarding partially obscuring its construction but there is a principal rafter and collar (underside 1.84 cm above floor). Immediately to the south of the collar is a small hatch on the western slope allowing external access to the roof gulley between the Phase 1 pitched roof and the adjacent extension to the second kiln.

5.4.2.5 As has been previously mentioned, it is thought probable that the area directly above F2 and the steep, would have been used for the storage of barley and a there is a slotted, timber hatch (I) visible in the floor to allow the dropping of the grain down into F2 or through a shute directly to the steep. Assuming that this area above the steep was for barley storage it seems certain that the rest of the western storage loft was also originally for this purpose as the only access to the area above the steep is through the adjacent loft and in malting it was important to keep malt and barley separate due to their different moisture contents. There would clearly have had to have needed to be a direct external access link to the western loft as there is no existing means of transfering materials to or from it. As discussed elsewhere it is assumed that the Phase 1 building must have included a loading bay at the western end of the projection, through which barley could enter the building, which was removed when the second kiln was constructed.

5.4.2.6 If this analysis of the primary layout is correct the angled hatch (90 cm high x 110 wide) within the western face of the kiln hood, which would allow malt, or dried hops, to be scooped up from the kiln floor and thrown into the western storage loft, must relate to a later phase of the building.

5.5 Main kiln

5.5.1 The primary kiln (No 1) is located at the south-eastern corner of the maltings, its location being immediately apparent by the pyramid shaped, tile covered, roof. The cowl is no longer in-situ but some of the timber members were found within the building, adjacent to the kiln and a new, ornamental cowl is to be added as part of the current development. The kiln floor was supported by a grid-iron of ten square, iron tie-bars visible on the south and east facades (Plate 1)

5.5.2 The kiln's base is *c* 2.2 m x 2.1 m in plan enlarging to 4.3 m x 4.4 m at the first floor drying surface and converging to a circular cowl kerb of approximately 70 cm diameter. The western face of the base, incorporating the arched opening to the hearth, adjacent to the main entrance to the building, is of brick, contrasting with the chalk walls of the rest of the base, and incorporates the arched hearth. The hearth surround consists of a narrow segmental brick arch, within a square headed projection, supported by an arched cast iron plate built into the side walls. The side walls taper gently towards the floor and form an entrance to the inner kiln base, the surface of which is raised above ground level but beneath the side walls. It is likely that there were fire-bars within the hearth supporting the fire, although there is no apparent evidence of these.

5.5.3 A ground floor passage allows access around the kiln and to a low level ventilating regulator in the north wall. This opening is 37 cm (w) x 29 cm (h) and is covered with a cast iron plate raised and lowered by a simple chain and pulley mechanism. This passage around the kiln would probably have been used for storage of some of the fuel required by the malt kiln, partly hinted at by a raised stone barrier (17 cm high) at the western end of the southern side of the kiln and by remnants of coal/anthracite found in the passage beneath later debris. Anthracite would normally have been used in such a kiln, due to the

material's low smoke emissions. A timber wall plate rests on the top of each wall of the kiln base supporting timber rafters rising to the drying floor. These rafters support a lath and plaster surface to the plenum chamber, the plaster being of a chalky, fibrous texture. It was not possible to undertake a detailed inspection of the inner lining of the plenum chamber but it was possible to confirm that it would have been tiled although few tiles appear to remain in-situ.

5.5.4 The drying floor of the kiln is a cast iron grill with openings 15 cm x 1.31 m, covered by a partially remaining woven iron mesh. This surface is 83 cm above the first floor of the malthouse which allows a relatively easy loading from the first floor and unloading to the second floor. Although the cast iron grill seems rather insubstantial for its purpose, needing to be strong enough to hold *c* 8 inches of malt as well as a man to unload, the surface of wire surface is typical of a malt kiln (and hop kiln).

5.5.5 The ten iron tie-bars, strengthening the kiln in a north-south and east-west direction, are located immediately beneath the drying floor and are secured to the internal timber frame of the kiln. There is no evidence of a louvred surface at the drying level, which is common in oast houses and which could be opened to drop hops down onto a large drawer, although this does not rule out its former use as a hop kiln.

5.5.6 The kiln walls at drying level (chalk to south and east, plastered timber frame partition to north and west) rise vertically *c* 1.5 m above the kiln floor. The hood of the kiln is constructed of timber rafters, resting on a timber wall-plate on top of the external chalk wall and on the inner timber frame, supporting a lath and plaster internal surface which becomes conical as it rises to the vent. There is a single angled hatch in the hood providing access to the western storage loft and two vertical hatches in the internal walls of the kiln opening to the upper growing floor (north) and to F3 (west). Each of these vertical openings have double timber doors opening away from the kiln.

5.5.7 Interpreting the hatches of Kiln 1 is relatively straightforward, although as with other aspects of this maltings there are questions raised and deviations from logic. When operating as a maltings the green malt would clearly arrive at the kiln from the upper growing floor and would then be loaded into the kiln through the timber double doors in the north wall of the kiln. The kilned malt would then be unloaded to the west, either through the doors to F3 or through the angled hatch to the western storage loft, where it would be dressed to remove rootlets and prepared for storage.

5.5.8 Although it is known that the kiln was originally constructed for the drying of malt, its dimensions would be very typical for a hop kiln and other features such as the vent and heat regulator would allow its easy conversion. It has been suggested that the front of the kiln hood has been rebuilt to allow its conversion to a hop kiln but comparing the front face of the plenum chamber with the sides does not convincingly suggest two phases. It appears highly likely that the entire hood has been rebuilt, possibly several times, as they were probably considered to be relatively ephemeral structures, to be rebuilt occasionally while reusing the masonry base. The timber studs supporting the plenum chamber are either hand-sawn or roughly machine-cut, generally being wavey edged and joined with nineteenth century cut nails.

5.5.9 It is quite possible that a kiln of this type could be used for either process without undergoing any structural alteration as the difference in heat required for each process is not so great as to prohibit their dual use and kilns have been used for both processes elsewhere. Hop kilns more usually have three or four fires in the base to ensure a more even heat, as opposed to the single hearth in the kiln at Boxley, but again this does not seem to rule out the possibility of its dual use.

5.5.10 Having acknowledged that in all probability the original kiln could have been used for drying hops it seems unlikely that it would have done so, if, as is believed, the five smaller kilns were for hops (see below). An alternative scenario, in which this kiln is used for hop drying, may be that the five smaller kilns were built for hops (possibly replacing the kiln then converted to a cottage) while retaining the older kiln for malting, but that they were not successful so hop drying was also undertaken using Kiln 1.

5.6 Five smaller kilns (Figure 9)

5.6.1 The main puzzle at the start of the project was the existence of the five smaller kilns along the western side of the malthouse. The largely chalk base of each kiln measures *c* 1.5 m x 1.5 m in plan, and above each is a timber framed hopper rising to first floor drying floor (not in-situ) at which point each measures *c* 3 m x *c* 3.5 m in plan. Above each hopper there are no individual enclosed hoods, just an unventilated hipped roof (Figures 4, 5). The arrangement of kilns fits the building neatly with each kiln one bay in width.

5.6.2 Each kiln base is formed with three chalk walls to rear and sides (20 cm deep walls) enclosing a brick base, the top of which is *c* 60 cm above ground and *c* 45 cm below the height of the side walls (Plate 5). The front of each kiln consists of a (partially remaining) projecting brick horseshoe arch forming an opening to the fire chamber of the kiln and surrounding the recessed hearth. The full brick arched surround only survives on Kiln 2, the front of the others having been demolished. The brick inner base of this kiln also projects forward within the hearth front which may have allowed a fire box to be inserted. The construction of the plenum chambers of Kilns 2-5 is identical to that of Kiln 1, consisting of a timber stud frame supporting a lath and plaster surface with a tiled inner lining.

5.6.3 A horizontal timber plate rests on top of the three chalk walls and above the brick arch, and supports a series of parallel, angled rafters supporting the lath and plaster inner surface. The front face of each of the hopper frames is white-washed while the timber and plaster to the outer surfaces of the sides and rear are bare. A possible reason for this may be the greater heat below the front face, with the loading of the kiln, requiring the protection of the white-washed surface. Each plenum chamber shows the outline of a ceramic tiled inner surface, a few tiles remaining in-situ, laid on a chalky, crumbly plaster containing fibres of hair. From the limited inspection possible it appears that these were old, reused roof tiles.

5.6.4 A timber stud partition with white-washed lath and plaster inner face runs north-south, dividing the space above the hoppers from the adjacent first floor growing floor. Any smoke is therefore prevented from spreading within the building. Five door openings exists within this partition, without doors in-situ, providing access to the kiln floor within each bay. The doorways are raised *c* 10 cm above the suspected level of each of the former kiln drying surfaces and 42 cm above that of the upper growing floor. The former existence of drying floors above each kiln is largely conjectural and based on logical assumptions. No evidence appears to survive of any of the drying floors but what this does show is that, assuming there were such features, in contrast to Kiln 1 they were relatively light and that not integrated into the maltings structure.

5.6.5 Clear evidence exists to show that above the five kilns there were formerly three simple upstanding chimney/cowls (K, L, M) (Plate 8). This evidence consists of pairs of diagonal timbers between rafters with the rafters cut immediately above the diagonal members. Added to that is the existence of a ridge-piece in each section above the diagonals, contrasting with the rest of the roof. This demonstrates that the rafter sections immediately above the cut are secondary, along with the whole section of roof above the diagonals. The evidence strongly suggests that light-weight vent surrounds would have rested on each of

the pairs of diagonals, projecting above the roof line and allowing for the release of smoke generated in the kilns below.

5.6.6 There is evidence of a lath and plaster inner surface part way up each roof slope, from the eaves to the underside of each of the former vent openings, at the lower end of the diagonal members (Plate 9, Fig 4). This demonstrates that there was a suspended ceiling at this level to ensure the smoke and fumes only rose through the cowl openings. This also explains the lack of smoke marking the now exposed roof rafters. Additional evidence of the former cowl/chimney structure is present in the form of a horizontal timber, similar to a truss collar spanning between purlins, directly beneath each of the three former openings, *c* 45 cm below the underside of the diagonal members. This member would presumably have supported the base of the upstanding vent structure (Plate 8).

5.6.7 It is apparent from the location of the three roof vents that the first would have been used by Kiln 2, the second would have been shared by Kilns 3 and 4 and the last shared by Kilns 5 and 6 (See Figure 4). This arrangement is confirmed by the two timber stud partitions rising from the top of the hopper ridges between Kilns 2 and 3, and 4 and 5 (Plate 5). Each of these partitions rises to the level of the former suspended ceiling at the underside of the vent openings.

5.6.8 The main questions to be answered at the start of the project regarding the five small kilns were: what was their function, are they original and if not what is their phasing?

5.6.9 As suggested above the evidence points towards the conclusion that the five kilns were used for drying hops. This is based as much by ruling out other possibilities as by direct evidence of hop drying. It seems inconceivable that they were for kilning malt due to the improbability of such an increase in malting capacity, adding five kilns to the existing one. It also seems highly unlikely that they would be for drying barley (prior to storage and soaking) as there was normally only a need for a single barley kiln. The existence of multi-kiln oasthouses is common however and the arrangement at Boxley, of several small upstanding cowls sharing a single roof ridge, is also a relatively common feature of oast houses. This is particularly so in buildings adapted to oasting from other purposes. For example at Rock Farm, in Nettlestead, an oast house in Kent with a row of five kilns beneath a hipped roof with a small conical vent above each kiln. Other examples in Kent can be found at Mayfield Manor, Orpington and Catt's Place, Mile Oak (Walton, 1998).

5.6.10 There is some doubt placed on this assumption by the fact that hop drying requires higher temperatures and that it appears that these smaller kilns would probably generate lower temperatures than the larger one. This is suggested by the lack of an efficient hood to funnel away fumes and generate air flow. As stated above, however, the difference in temperatures required for the two processes is not particularly great and too much importance should not be placed on this evidence doubting the kiln's use for hop drying.

5.6.11 As for whether the kilns are original, we can be fairly certain from the evidence that they were not but that they may have replaced a similar arrangement. That they are secondary is suggested by a single joist hole, visible at ground floor level, in either face of each main beam between each kiln (see Fig 5), implying that the first floor originally extended slightly further west than that existing. The joist holes are located so that if they held a joist it would coincide with the front faces of the plenum chamber frames. It may be that the hoppers were rebuilt on existing, primary kiln bases, although this is doubtful because the chalk bases to the kilns suggests that they were seen as ephemeral. What does seem certain, from the fact that there is only a single joist hole in each beam, is that an open vertical space was always intended on the west side of the malthouse.

5.6.12 It is also clear that the kilns should not be seen as having identical processes and developments. The five kilns may each have been originally built for the same purpose but there is evidence to show that Kiln 2 (and probably Kiln 3) was adapted, either for a different purpose or in an attempt to make this kiln operate more successfully so that it is now quite distinct from the neighbouring kilns. The most obvious indication that there is a distinction between Kiln 2 and its neighbours is that it is the only kiln which has not had its brick fronting roughly knocked off and retains its projecting arch.

5.6.13 An important additional piece of evidence, also suggesting such a distinction, exists to the rear of Kiln 2. The feature is hinted at by the fact that while the side walls of the other 4 small kilns are entirely of chalk, the uppermost 21 cm (3 courses) of the side walls of Kiln 2 are of brick (Plate 12). This is explained to the rear where an arched brick flue enters the kiln through the three upper brick courses. The flue extends through the outer wall of the malthouse and into a later lean-to structure where it adjoins a shared chimney shaft (Plate 2, see below for more detail). The flue is clearly shown to be secondary by the later brick vertical extension to each of the walls of the kiln base, being at the same level and of the same date as the flue. The flue exits the kiln at the base where the fuel would placed and the conclusion may be that it was added to draw air through the kiln to generate a greater heat. Another possibility may be that it was used to draw off some of the heat if the kiln generated too much or possibly it was an attempt to allow the use of a different, cheaper type of fuel by drawing off most of the smoke up the chimney. Charcoal was the standard fuel for hop drying up to the 1930s. (Filmer R, 1982)

5.6.14 Kiln 2 is the only kiln with such an arched flue adjoining to the rear but there is evidence to suggest that Kiln 3 also formerly had a similar feature and there are further chimney shafts to the exterior of the malthouse, which may have been connected to the kilns. It would be logical to think that they were originally linked to the other kilns, similarly to Kiln 2, but there are no apparent holes within the external wall of the malthouse to suggest such a link and it seems more likely that they relate to a separate operation undertaken in a former lean-to along the building's west elevation. (For more detail on the external chimney features see 5.7).

5.6.15 If number 2 (and No 3 ?) was the only kiln to have a flue added this would either suggest that when this occurred Kiln 2 was moved to a different process and the others retained their original function or that it retained its function (with the chimney added to improve efficiency) and the other kilns were abandoned. At first glance each of the five plenum chambers appears to be of roughly the same date (apparently contemporary with Kiln 1) which suggests that, as the hoppers were seen as ephemeral structures to be rebuilt every few years, all five kilns continued in operation after the insertion of the flue to Kiln 2 (and 3?). This points towards the interpretation that Kiln 2 (3?) moved to a different purpose while the others remained in operation as hop kilns.

5.6.16 If the chimney was added to increase the heat it may be that the revamped kiln/s represents an extension to the malting capacity, while the other remained as hop kilns, as malting seems to have required a greater heat than oasting. Amber Patrick's comments on Boxley Malthouse include the assertion that 60 ° C is the maximum for hops compared with 105 ° C for malt. There were doubtless differing techniques for each process, allowing a successful operation at various different temperatures, but a general rule seems to be that malting required greater heat than oasting.

5.6.17 It is likely, however, that the timber members within the kiln frames were reused when the plenum chambers were rebuilt and that attempting to distinguish between hoppers of different dates may be misleading. This may well mean that the five kilns did not operate efficiently and that it was decided to abandon numbers 3-6 and concentrate hop drying on number 2, which already had its own individual cowl. It would seem a drastic measure to

reduce the number of hop kilns from five to one, rather than attempting to improve the efficiency of all the kilns, but it could be that the five small kilns had been an attempt to introduce some form of rotational hop drying system. The intention may have been for a continuous system in which one kiln would be used while the others were loaded and unloaded. In this way none of the kilns would operate at full capacity and it could be that such a system was abandoned in favour of a simpler operation where Kiln 2 functioned at a greater capacity.

5.7 **Lean-to with chimney flue** (Figure 9, Plates 17/18)

5.7.1 The lean-to referred to above, which contains the chimney attached to the rear of Kiln 2, is a simple structure abutting the west wall of the maltings at the angle with the cottage, which it also abuts. It is 2.4 m wide and is between 4.8 m and 5.15 m long, the longer side against the malthouse. The west wall is of brick (nineteenth century, painted white to inner face) to eaves level and contains an opening with timber framed door and a window with central timber mullion and 6 lights to either side. The north wall is of similar brick to a height of 67 cm above floor level, with timber stud above, plastered to eaves level and exposed within the lean-to roof angle. The floor is of brick pavers.

5.7.2 The structure encloses the remains of a chimney and an elaborate system of flues. The brick chimney, which is directly to the rear of Kiln 2 and is linked to it by the arched flue within the malthouse, is 55 x 50 cm in section above three small steps which widen the base. The shaft abuts the malthouse wall and the section above the roof has been removed, with the roof structure reformed over. There is an iron tie-bar (16 cm long) securing the chimney to the malthouse wall at a height of 97 cm above the floor. There is no evidence of an opening to the base of the shaft within the lean-to. To the left (north) of the chimney is another brick base, projecting from the malthouse wall by a similar amount to the shaft. The southern section of the base corbels out from the malthouse and then, at a height of 68 cm, arches to the south where it connects with the main shaft at a height of 85 cm. The arched link abuts the shaft suggesting it was added to the existing chimney. An inspection to the side of this feature shows an angled shaft immediately above the brick arch, rising to utilise the vertical shaft. The angled flue has been truncated at the left (north) side of the second pier but it is clear that it would have extended to the left beyond the pier which retains its original dimensions.

5.7.3 Above this first angled flue is a second, similarly truncated angle flue rising up to the shaft. It would formerly have adjoined the shaft at the approximate location of the existing lean-to roof, but the connection has been removed with the partial demolition of the shaft to allow the extension of the roof structure. The brick inner faces of both angled flues are smoke blackened.

5.7.4 Although this chimney has been truncated at the lean-to roof there is another similar shaft against the west wall of the malthouse which extends vertically above the eaves of the main building (Plate 2). This shaft, which is similarly dimensioned to the first, is located *c* 1.2 m to the north of the lean-to and is 30 cm to the south of a low brick base. The base is *c* 45 cm high and is in the shape of a rectangle (1.15 m x 40 cm) with a chamfered north-west corner. It is clear from various pieces of evidence that the existing lean-to extended substantially to the north, probably for the full length of the malthouse, enclosing both of these features. The first piece of evidence is that the west wall of the lean-to continues slightly beyond the existing structure, as a low garden retaining wall. There is also a clear trace of roof flashing against the existing chimney shaft, consistent with a lean to roof, and there are small joist holes within the chalk wall, extending to the north end of the building, at the height of the lean-to roof ridge.

5.7.5 It is clear that the shaft furthest south is linked to the adjacent kiln (No 2) to aid ventilation and it would be logical to assume that the other flues were similarly linked to the kilns, forming part of the hop drying process. However, there is plenty of evidence to doubt this and to suggest that the other flues and chimney relate to an unknown process undertaken within the lean-to. Firstly, there are no holes, and apparently no evidence of blocked holes, within the west wall of the malthouse to carry the flues through to the kilns. It would also seem that if the chimneys and flues were simply serving the internal kilns there would be no need for a lean-to enclosing them. It also seems likely that if the kilns and chimneys were integrated they would line up more effectively than they do.

5.7.6 That the lower angled flue was linked to Kiln 3 does seem logical (presumably with a hole effectively in-filled) but the upper angled flue is at such a steep angle that it could not have continued to Kiln 4, c 5.75 m to the north. In addition the second chimney shaft is close to Kiln 4 so a ventilating flue to that kiln would have utilised that shaft. Thus, there is no clear explanation to what the upper flue was linked to. The evidence does not seem to fit the existing layout of the kilns and it is tentatively assumed that they, at least partially relate to a previous arrangement within the lean-to, with Kiln 2 and Kiln 3 utilising the existing chimney.

6 COTTAGE

6.1 Introduction

6.1.1 The cottage is located to the west of the small Phase 1 projection, wrapping around it in an L-shape. The structure has the classic appearance of a square plan, pyramid roofed kiln (plain tile covered) and the evidence points towards the conclusion that the cottage was converted from such a structure, possibly in the late nineteenth century. The evidence suggests that the kiln was probably originally constructed around the 1860s/1870s.

6.2 Exterior

6.2.1 The cottage is brick built with a decorative main (south) façade of Flemish bond at first floor (red stretchers, blue headers) above plain red Flemish bond at ground floor and a parapet top with dentil brick course. The south façade consists of a central ground floor doorway with brick segmental arch and an inserted (mid-twentieth century), single pane, top hung casement at the centre of the first floor. A single pane dormer window has been inserted to the south side of the kiln roof. There is a narrow (57 cm wide) bricked-up former doorway to the south façade between the existing central doorway, providing the main entrance to the cottage, and the malthouse.

6.2.2 The brickwork to the other two facades is again broadly Flemish bond but has various inconsistencies. The west elevation consists of four windows to ground floor, the two to the south being recessed beneath brick segmental arches, the two to the north (secondary, mid-twentieth century) being square headed and beneath hidden lintels. The window furthest to the south appears to have been created from a bricked up doorway. There is a single window (timber-framed six-light) lighting the first floor towards the northern edge of the building, directly beneath eaves level. The north elevation has a single window to each floor, that on the ground floor being of three lights beneath segmental arch and that above being six lights with two mullions.

6.2.3 Some phasing evidence may be provided by the brick segmental arches and the windows and door which they are above. The ground floor windows beneath segmental arches are: the window furthest to the south on the west elevation (timber framed, four-paned cross window); the window adjacent to the above (with modern window inserted); the window on

the north elevation (again with modern window inserted). These are all believed to be primary openings. The first floor windows on the north and west elevations cannot be dated by the absence of segmental arch due to each opening being located directly beneath eaves level. However both windows appear to be primary probably dating to the original construction of the kiln.

6.2.4 The existing doorway to the south elevation is also beneath a segmental brick arch but as this arch is known to be later (almost certainly dating to the conversion) it must be a misleading feature. If it was assumed that all the arches were of the same date as that above the doorway then almost the whole kiln/cottage would have to have been refaced as part of the conversion which is very unlikely.

6.2.5 The one area which does appear to have been refaced is the south elevation above ground floor level. There is a distinction in the brickwork facing the ground and first floors, that above being formed with much clearer and more regular Flemish bond (with blue headers, red stretchers) than that below which is monochrome. The ground floor skin is shown to be original by the scarring of the in-filled primary doorway so the difference in the brickwork suggests that the upper section has been refaced. This is supported by the decorative dentil course and projecting parapet wall, possibly added to provide a more architectural quality to the main elevation when the kiln was converted to a cottage.

6.3 Plan

6.3.1 The plan of the cottage is slightly irregular due to the west wall not being perpendicular to the northern and southern walls. The reason for this is that building follows the angle of the property boundary although it is not constructed against the boundary. The cottage is entered through a secondary, central doorway on the south façade into a narrow corridor (G4), with stone flagged floor and white-painted brick walls. To the north side of the corridor is a plastered timber stud partition, dividing the corridor from the main dining room (G5) and linked to it via a timber framed doorway beneath a twin pane light. The walls within G5 are again painted white directly onto brick, the floor is boarded and a timber binder (painted black) projects into the room. There is a fireplace in the north of the room, with a simple timber mantel piece surround and a modern boiler within the white tiled inner cavity.

6.3.2 Within the north-west corner of the ground floor, reached from the dining room, is a bathroom (G6) and small ante-room. The walls and ceiling are plastered and painted white, and the room is dominated by the angled rear of the chimney stack. The kitchen (G7) is reached by a single step from the dining room (G5) and through a reused door of vertical timber panels, with two full width horizontal, iron strap hinges. Each hinge is set on a horizontal timber member and the imprint remains of a further two horizontals.

6.3.3 The subtle change in floor level (15cm) between the dining room and kitchen could suggest a separate build between the kiln area and the storage area. The floor of the kitchen is covered by modern floor tiles while the walls are clad with modern chip-board, painted yellow. In the eastern wall, adjoining the malthouse, is a former opening (82 x 60 cm, now blocked with studding) beneath arched head. The arched head suggests that this was a window in the formerly external wall of the malthouse rather than a hatch to the adjacent steep. There is a small larder to the west of the room, created between the brick stack and outer wall, covered in blue painted modern chip-board.

6.3.4 The timber staircase linking the ground and first floors of the cottage is located within the malthouse Phase 1 projection, adjacent to the cottage, thus allowing sufficient space for a kiln structure. This could suggest that the staircase pre-dates the cottage conversion

although it is clearly of a domestic rather than an industrial nature. The suggestion is that the existing stairs replaced a previous staircase which had served the maltings.

6.3.5 The first floor of the cottage is divided into three main rooms set around the secondary brick chimney stack in the area adjacent to the former kiln. There is a single living room (F5) within the former kiln with a truncated kiln shaped ceiling. The floor is boarded and the walls and ceiling are plastered and painted white. To the north wall there is a typically Victorian cast iron fireplace utilising the chimney, surrounded by a softwood (stripped and varnished pine) mantel-piece and cupboard to either side, also with stripped pine panelled doors. The cupboard to the west uses the space beneath the stairs while that to the east is set within the chimney stack. There are further matching stripped pine panelled doors to either side of the cupboards as well as panelled pine doors leading to the other two rooms. All the joinery is of high quality indicating increasing prosperity and social status of the inhabitants.

6.3.6 F6 is a small (2.45 cm x 4.37 m) bedroom opening off the north wall of room F5. It has boarded floors, plastered and painted walls, and small fireplace with cast iron grate at the south-west corner of the room. The skirting board, window frame, thin mantel-piece and panelled door (to F7) are all painted an ochre colour.

6.3.7 F7 is another small bedroom, in the north-west corner of the cottage, linked by a doorway to F6 and by a small passage to F5. The floor of the room is boarded, the walls, ceiling and woodwork are all white and there is a small cupboard beneath the stairs, lined by timber studding, backing onto the cupboard accessed from F5. The south wall of this room bisects the only first floor window in the cottage's west façade, the other half of the window provides light to the adjacent staircase.

6.3.8 The doorway at the south-west corner of the room leads into a small passageway (to F5) at the foot of the staircase rising to the second floor. The timber staircase rises between the chimney stack (to the north) and the sloped frame of the former hood of the kiln (to the south), in an awkward double curved direction to fit with the shape of the building. The lower 6 original risers, which curved around to the south to allow access from F5, have been removed and replaced by a small set of open steps, continuing in a E-W direction, which are wedged between the end wall (west) of the cottage and the remaining staircase. This allows access to the staircase from both F5 and F7. The surfaces to either side of the staircase (non-plastered brick to chimney, studding to rear of former kiln hood, plastered face to main ceiling) are all painted pink with white timber (studding, purlin, handrail).

6.3.9 The first 7 primary risers are to the west of the chimney and can thus be 1.15 m wide. The succeeding two risers (80 and 85 cm wide) are narrowed by the adjacent chimney breast but are also allowed to widen slightly to the east by the slope of the kiln hood framework. The remaining four risers curve to the south where they enter the only second floor room in the cottage.

6.3.10 The second floor room is inevitably small (2.8 m x 2.6 m at floor level), and somewhat impractical with the pyramid shaped hood converging to a former opening (80 cm x 80 cm) at a height of 2.05 m above floor level. The floor is boarded, all the surfaces are plastered and painted white and the room is lit by a small dormer window to the south. The single pane window is secondary but was probably inserted into an existing opening dating from the conversion from kiln to cottage. The square opening beneath the former cowl has been covered over with a simple timber board and edging.

6.3.11 The domestic detailing throughout the cottage, dating from the conversion, is all indicative of a mid/late nineteenth century date. Features such as the timber panelled doors, cast iron

looped door handles (eg on second floor), the wide staircase to the second floor and cast iron fire places are all typically Victorian and of high quality.

6.4 Discussion

6.4.1 There are several possibilities as to the origins and phasing of the cottage. It was clearly gutted at the time of the conversion from kiln to cottage and the remaining evidence is only able to give suggestions (albeit strong ones) regarding the phasing of the structure. An unlikely theory, which has been considered, is that it never actually operated as a kiln but was built as a cottage with a kiln appearance to blend in with the rest of the building. This can be discounted, mainly because if they were trying to balance the original kiln and blend in, they would have made a much better match, and also because the design would have been more unified and logical.

6.4.2 A more plausible theory, which the evidence ultimately suggests is unlikely, is that the (roughly) square kiln was originally added to the small malthouse projection without the adjoining block (G6, G7, F6, F7) to the north. This structure would then have been added when the kiln was converted to a cottage to increase its floor area. The lack of structural breaks could be explained by the unlikely theory that almost the entire building was refaced at the time of the conversion.

6.4.3 The key evidence discounting this and suggesting that it was a single build structure may be the first floor window to the west façade of the cottage (to the north of the kiln) which is awkwardly divided by a partition and which provides light to both F7 and the adjacent passageway at the foot of the stairs. The partition, together with the adjacent staircase rising to the second floor, can be assumed to date from the conversion from kiln to cottage and yet the way that the partition abuts the window shows that the window, along with this section of building, must already have existed before the conversion. The window itself appears to date from the conversion and it is probable that it replaced an earlier window.

6.4.4 The two main possibilities are that the area to the north of the kiln was constructed to either provide additional storage space for the new kiln or more likely to provide accommodation. The size of the maltings would make it unlikely that the accommodation was for the owner and his family, although it is possible that it was permanent accommodation for a maltster (assuming it was a malt rather than a hop kiln) employed by the owner. Alternatively it may have provided more flexible accommodation for one of several employees who may have slept close to their work in shifts during busy periods while the malthouse operated continuously.

6.4.5 A piece of evidence which tentatively suggests that the area was for accommodation (rather than storage) is that there is no evidence of a doorway linking this area with the main malthouse and additionally the floor heights between the two areas are different. The evidence is far from conclusive but if they were both working areas it seems likely that a link would be created because the existing route from F6 to F2 (two rooms adjacent to each other) involves going down the stairs, out of the front door of the cottage, in to the malthouse and up the stairs again.

7 CONCLUSION

7.1 The malthouse at Boxley is a regionally significant building which was found in Kent County Council's recently completed assessment of the malting industry in Kent to retain more original features than any other maltings in the county. The building is additionally interesting due to its use as an oast house and due to the complicated and sometimes confusing evidence of the structure's development and expansion.

7.2 What is clear is that the original L-shaped maltings was constructed with a single kiln between its two wings, two growing floors in the main body of the building, a stowage in the opposite wing, a steep located between the two areas and probably two storage lofts. It is highly likely that the operations of such a building would be flexible and would change over time. There would not have been a fixed sequence of operations (particularly regarding the storage at either end of the process) which remained unchanged over the decades, but the process would probably generally have been organised thus: barley would have been stored in the western storage loft and in F2 above the steep. It would then have been dropped down to the steep to be soaked before being spread out on the lower growing floor. The piece would be gradually turned and moved along the floor away from the kiln before being hoisted through a hatch at the north end of the building to the upper growing floor. It would be moved slowly back towards the kiln and the green malt would then be shovelled onto the kiln floor through the double doors in the kilns north face, to curtail the germination process. At this point there are two possible continuations to the process. Either the malt would have been unloaded to the west into the first floor stowage (F3/F4) where it could have been dressed and stored prior to dispatch or the malt could have been unloaded into the northern storage loft.

7.3 The location of the main elements of the malthouse would suggest the former existence of two loading bays, at the northern and western ends of the building, serving each of the storage lofts. Barley could then have entered the building to the west and malt exited the building to the north. However, the second kiln/cottage has externally obscured any evidence of such a feature to the west and it has not been possible to closely examine the roof in this area. Therefore while a former western loading bay may theoretically have existed no evidence has been revealed. There is also limited, although slightly stronger, evidence of a northern loading bay. The main evidence is the apparently rebuilt roof to the end bay and the doorway within the loft space. As detailed in 5.3.7 it is also thought probable that the existing first floor loading door was inserted, which tentatively adds to the suggestion that there was formerly at least one loading bay serving the loft.

7.4 However, without firm evidence it must be assumed that there were no additional loading doors and that material entered, exited and was moved around the building with a great deal of man-handling. Labour was cheap and when this malthouse was originally built (probably late-eighteenth century) mechanisation in buildings such as this and the planned layout of industrial structures to increase their production efficiency would still have been relatively rare.

7.5 Five smaller kilns appear to have been inserted into the malthouse probably as a set of hop kilns in the early/mid nineteenth century and then around the mid/late-nineteenth century a another large kiln was added to the west of the structure, probably as second malt kiln. It is likely that the second malt kiln did not remain in operation for a long period and that by the end of the century it had been converted to a cottage.

7.6 It seems that the five 'hop' kilns may also not have been particularly successful and at least one was revamped with the addition of a ventilating flue to its rear. When operating as an oast house, using the five small kilns to dry hops, it is assumed that the upper growing floor, and possibly the northern storage loft, was used as the main cooling floor. The hops would have been unloaded from the kilns and spread over this area to redistrubute moisture and then bagged and stored prior to dispatch through the existing first floor loading door. It is thought that hop drying was ceased in the 1950s.

7.7 The interpretation outlined above involves a certain amount of speculation and it should not be accepted as fact. The structure appears to have undergone various changes to its processing layout and some of the evidence may be misleading. What is certain is that the

building has had a varied and unusual history and that several questions remain to be answered some time in the future. Further documentary research may be able to provide information on the dating of the kiln/cottage and excavation beneath the floor of the cottage may one day provide information about the former kiln. Further evidence would also come to light during any other invasive refurbishment of the cottage.

Oaudata 1 on Server 1(Z)/personal/jong/reports/BOXMABS

Bibliography

Brown J., 1983 *Steeped in Tradition: The Malting Industry Since the Railway Age*

Filmer R., 1982 *Hops and Hop picking*

Patrick A., 1977 *Maltings in Nottinghamshire*

Patrick A., 1996 *Establishing a Typology for the Buildings of the Floor Malting Industry* Industrial Archaeology Review XVIII..

Walton R. and I., 1998 *Kentish Oasts 16th –20th Century*

Pevsner N. (ed), 1969 and Newman J. *The Buildings of England: North East and East Kent*

APPENDIX A RESULTS OF WATCHING BRIEF

A watching brief was carried out during the removal and lowering of the ground floor of the maltings, on 4 August 1998. No evidence was found from deposits pre-dating the malthouse.

A small area (2 m x 2 m x 37 cm deep) was initially excavated in the NW corner of the malthouse, practically all of which was a chalk rubble floor make-up. The concrete covering the eastern half the ground floor was also subsequently removed and the chalk make-up was found to be more powdery than to the west. Below this layer a very disturbed dark brown silt was found with large patches of fine, powdery chalk inclusions as well as sub-rounded chalk gravel (from 3 mm to 2 cm in size) and fragments of ceramic building material.

Due to the natural slope of the ground from north to south, the chalk floor make-up, creating a horizontal surface, became deeper further to the south and was only shallow enough to expose the brown silt beneath for the 3 m furthest to the north. Thus it was not possible to determine a great deal about the silty layer except that it strongly appeared not to be natural and was probably part of a former floor make-up. There was no foundation cut on the inside through the silt but it is possible that the wall was built flush against the cut (unlikely). This suggests that the silt was deposited within the building.

The concrete was a milk chocolate colour with inclusions of flint gravel (1 cm), coal (3 cm) and fragments of ceramic building material. The type of concrete, along with the coal inclusions suggest a late-Victorian date for the floor. The interface between the concrete floor and chalk make-up was found to be smooth and there was found to be no discolouration or wear on the chalk surface below the concrete, which could have provided evidence of the former floor surface.

There were two courses of brick, off-set by 7 cm, at the base of each malthouse wall above a foundation constructed of stone, sarsen? flint nodules and occasional red tile. The stone foundation shows on the external wall in the south-east corner of the malthouse, fronting The Street, due to the natural slope of the ground from north to south descending beneath the horizontal ground floor of the malthouse.

The kiln bases were exposed at the far north-west end and the chalk block surround removed to expose the brick inner base, which descends 27 cm beneath the present floor level. All the chalk rubble make-up was found to abut the structural components of the building, such as the foundations of the kiln bases and the flared stone bases supporting the timber posts.

APPENDIX B PHOTOGRAPHIC REGISTER

Film 1 (Black and white and colour slide)

Neg No	View from	Context
1	SW	Ground floor prior to clearance
2	NW	ditto
3	N	ditto
4	E	ditto
5	NE	ditto
6	-	Under exposed
7	-	ditto
8	S	Fragments of cowl
9	S	South façade
10	S	ditto
11	SE	ditto
12	SE	ditto
13	SE	ditto
14	SE	ditto
15	SE	ditto
16	S	ditto
17	S	ditto
18	NW	West façade of cottage
19	NW	ditto
20	NW	ditto
21	NW	Lean-to
22	N	Junction between lean-to and house
23	SW	Lean-to
24	NW	Lean-to
25	NW	W elev of maltings
26	NW	ditto + N elev of house
27	NW	ditto
28	NW	W elev of maltings
29	NW	ditto
30	NW	W elev of maltings
31	SW	ditto
32	SW	ditto
33	NW	chimney
34	SE	F1
35	SE	F1 trimming
36	SW	F1 pulley mechanism

Film 2 (Black and white and colour slide)

F1 – First floor maltings

Neg No	View from	Context
1	E	Bay 5
2	E	Hatches below and above
3	E	Hatch below
4	N	No 225 on N side of 2nd tie-beam from N
5	W	Shutter

6	W	Open window
7	E	Down into hopper 5
8	NE	Roof above hopper 5
9	NE	Bay 4
10	NE	Bay 4 partition
11	NE	Gulley
12	SE	Above hopper 5
13	E	Bay 4 elevation
14	E	ditto
15	NW	Wall step looking down to gr floor
16	SE	Bays 2 + 3
17	NE	Gen
18	NW	Gen
19	S	Gulley
20	S	Panelling
21	W	Roof in bays 2 + 3
22	S	Gen bays
23	E	Bay 2 roof laths
24	S	Down into bay 2
25	W	Bays 2 + 3
26	W	Windows above hoppers 2 + 3
27	NE	Rain gulley in bay 2
28	N	Kiln 6 doors etc
29	NE	Kiln 6 doors + hatch
30	N	Kiln 6 hatch
31	N	Hatch
32	-	Non shot
33	N	Interior Kiln 6
34	N	ditto
35	W	ditto

Film 3 (Black and white and colour slide)
Ground floor malthouse

Neg No	View from	Context
0	E	Kiln 1
1	E	Kiln 2
2	E	ditto
3	E	Kiln 3
4	E	ditto
5	E	Kiln 4
6	E	ditto
7	E	Kiln 5
8	E	ditto
9	SW	Joist holes + floor structure
10	NE	ditto
11	E	Down into kiln 1
12	E	Roof over hopper 1
13	SE	Corner over kiln 1
14	S	G1 - general
15	-	no flash
16	SE	Kiln 2 at angle
17	S	Post with long head

18	S	Post over other
19	S	Eaves + floor 2
20	S	Floor ridge – G1
21	N	ditto
22	E	Beam between kilns 4 + 5
23	E	Detail of kiln 5
24	N	G1 - general
25	SE	Kilns 1 + 2 general
26	E	Steep
27	S	Steep + flue
28	N	Flue
29	N	Flue
30	NE	Steps
31	S	ditto
32	SE	Joist holes by stairs
33	NE	Old joist hole, kiln 2

Film 4 (Black and white and colour slide)

Neg No	View from	Context
1	E	Steep
2	NE	Floor construction
3	N	ditto
4	NE	Kiln 1
5	NW	Kiln 1
6	NW	Rear Kiln 5
7	N	ditto
8	NE	Kiln 5 front
9	NE	Kiln 4 front
10	NE	Kiln 3 front
11	E	Steep
12	W	Kiln 1
13	-	Under exposed
14	-	Under exposed
15	-	Under exposed
16	W	Floor junction
17	W	Kiln 1 - front
18	E	G2 – shute
19	N	G2 – floor general
20	S	G2 - opening
21	S	Lobby – table ledge
22	S	Northern storage loft
23	N	ditto
24	NW	loading beam
25	N	Kiln face in storage loft
26	N	No ridge-piece
27	N	Ashlaring
28	NW	Sack and press

Film 5 (Black and white and colour slide)

Neg No	View from	Context
2	SW	F5 - Vertical
3	S	F5 - stairs
4	S	F5 - fireplace
5	W	Stairs from below
6	E	Stairs from above
7	N	Second floor - apex
8	S	Second floor
9	S	ditto
10	SW	ditto
11	N	ditto
12	E	Rear false ceiling
13	E	F6 – little fireplace
14	S	F6 - window
15	E	F6 – double sloped ceiling
16	E	F6 – door handle etc
17	NE	F7 – Under stairs
18	E	F7 – corner of ceiling
19	W	F7 – towards F6
20	W	F5 – towards maltings
21	NW	F5 – Little window by staircase
22	E	kiln from stairs
23	N	Down stairs
24	E	Door detail
25	NE	Second Floor
26	E	ditto
27	N	Ridge-piece
28	N	On roof
29	S	ditto
30	S	Hatch
31	N	Hatch

Film 6 (Black and white and colour slide)

Neg No	View from	Context
1	S	F3 – ceiling section without joists
2	W	Kiln hatch
3	E	F1 – Bay 5
4	NE	F1 bays 3 + 4
5	SE	F1 bay 5 roof
6	NE	ditto
7	SE	bays 2 + 3
8	SE	Bays 3 + 4
9	SW	Rear of stair well
10	W	F3 – kiln hatch
11	SW	F3 – partition with pulley
12	S	F4 – wall
13	E	F4 – window and door
14	NW	F4 – window and hatch
15	E	F4 – door open
16	SW	G3 - general

17	SE	G3 - fireplace
18	W	G4 - toilet
19	E	G3 - window
20	W	G5 – general to hatch
21	N	G5 - door
22	SE	G5 – window etc
23	W	Outbuilding – elev of chimney
24	S	ditto – floor construction
25	SW	ditto – join with chalk
26	NW	ditto - flues
27	NW	ditto
28	N	ditto – joists and slots
29	S	ditto - window
30	NW	ditto - chimney
31	E	Hall in house
32	E	ditto
33	W	ditto

Film 7 (Black and white and colour slide)

Neg No	View from	Context
1	SE	South and east elevations
2	SE	South elev
3	E	East elevation
4	E	ditto
5	NE	ditto
6	E	ditto
7	NE	ditto
8	NE	ditto
9	S	First floor during demolition
10	S	ditto
11	S	ditto
12	SW	Ground floor during demolition
13	-	ditto
14	-	ditto
15	NE	ditto
16	NW	Gr floor house
17	E	ditto
18	E	First floor units
19	E	ditto
20	E	ditto

Plate 1: South façade of malthouse with cottage to left

Plate 2: West façade of malthouse (to left) adjacent to north wall of cottage

Plate 3: Roof structure above Kiln 6

Plate 4: Upper growing floor viewed from north-east

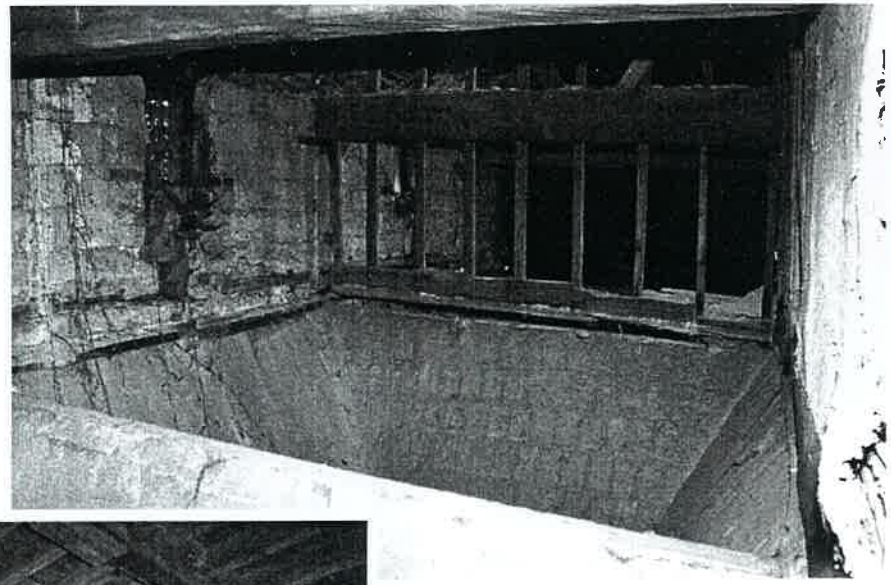


Plate 5: Hopper above Kiln 4

Plate 6: Brick front to Kiln 2

Plate 7: View towards Kilns 3 and 4 from within area of collapsed first floor

Plate 8: Angled supports between rafters for former cowl above Kiln 2

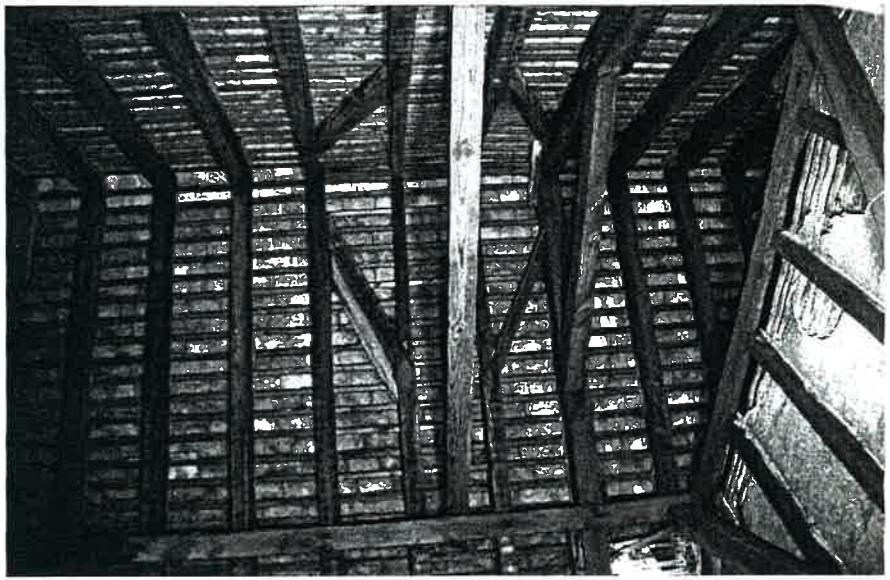


Plate 9: Partition between Kilns 2 and 3

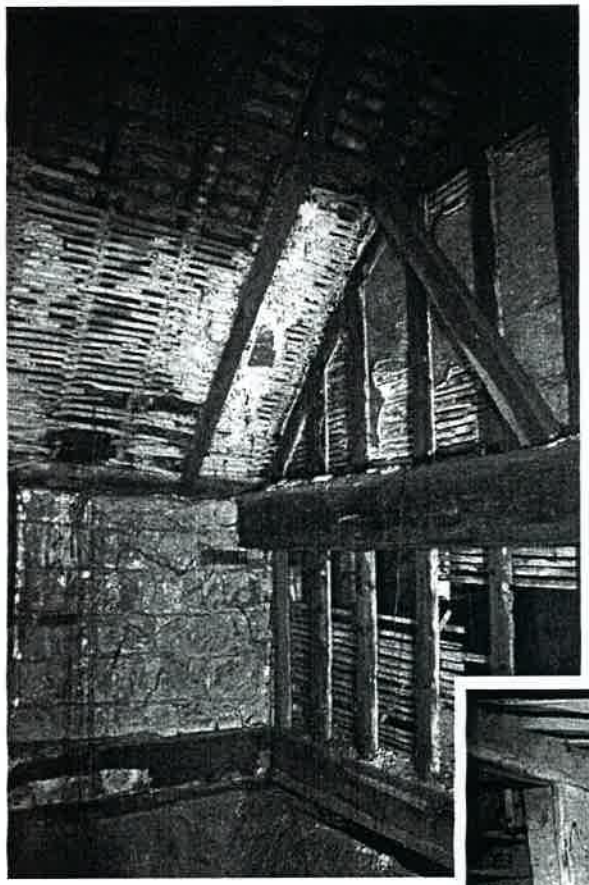


Plate 10: Lower growing floor within malthouse

Plate 11: Steep (behind balustrade not linked to malthouse)

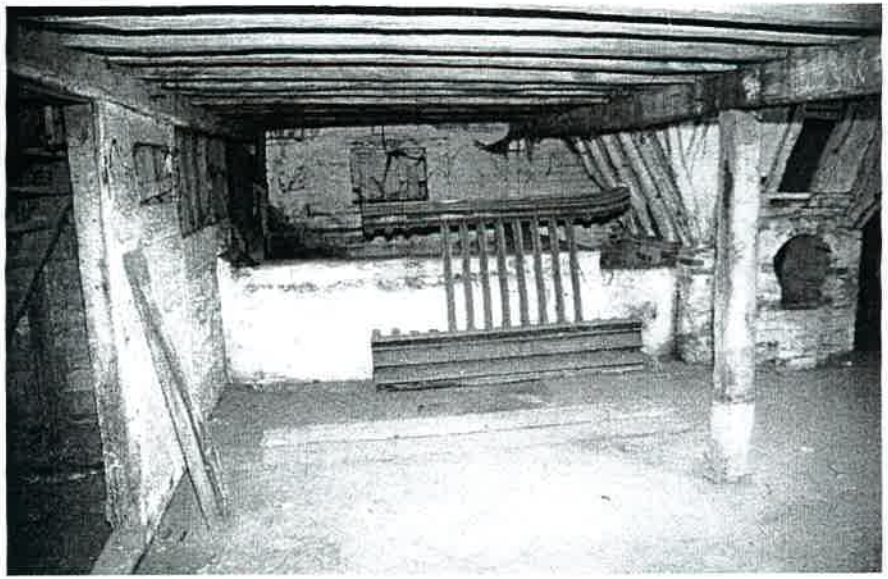


Plate 12: Curved flue to rear of Kiln 2

Plate 13: Secondary stairs in G0

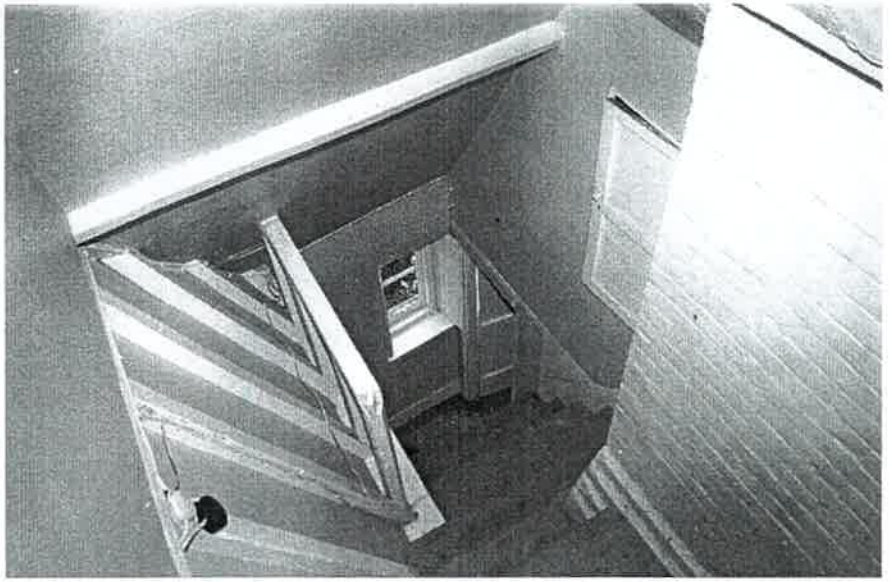


Plate 14: View down cottage stairs from second floor

Plate 15: Ridge-piece within northern-most bay of storage loft

Plate 16: Section of floor structure within F3 without floor joists

Plate 17: Chimney stack within lean-to to rear of Kiln 2

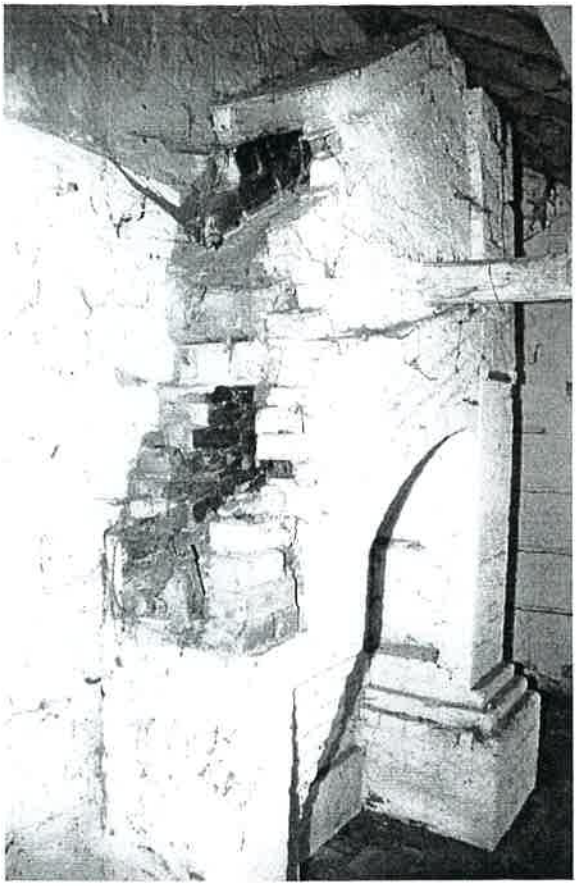


Plate 18: Flues linked to stack to rear of Kiln 2

Plate 19: Loading door to east façade of malthouse

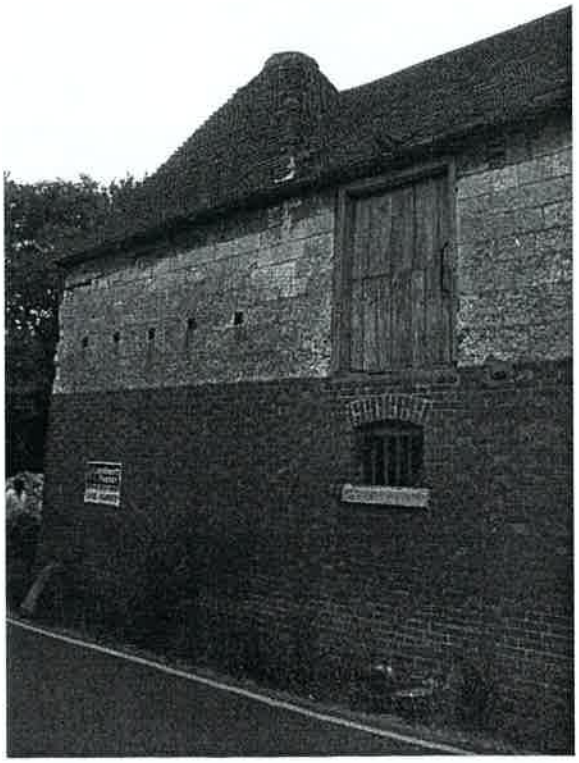
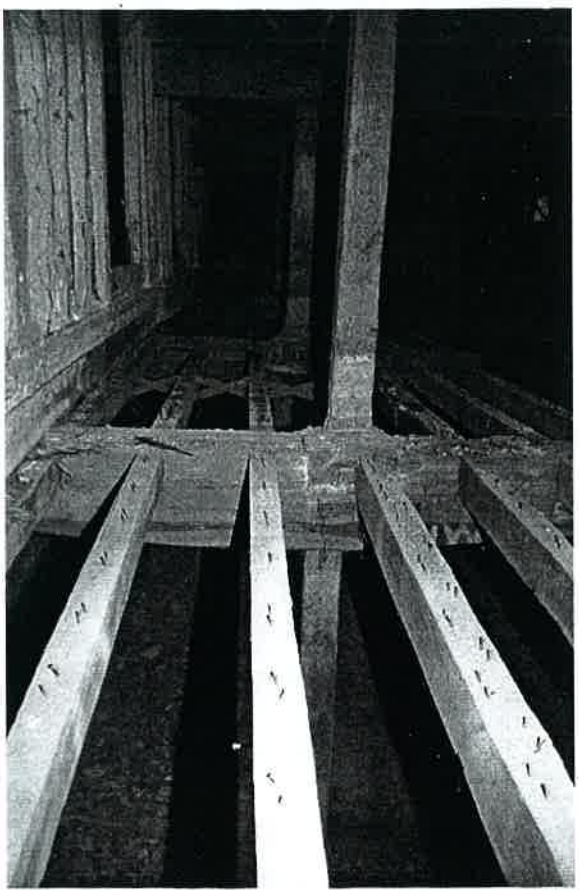


Plate 20: Joists formerly supporting first floor



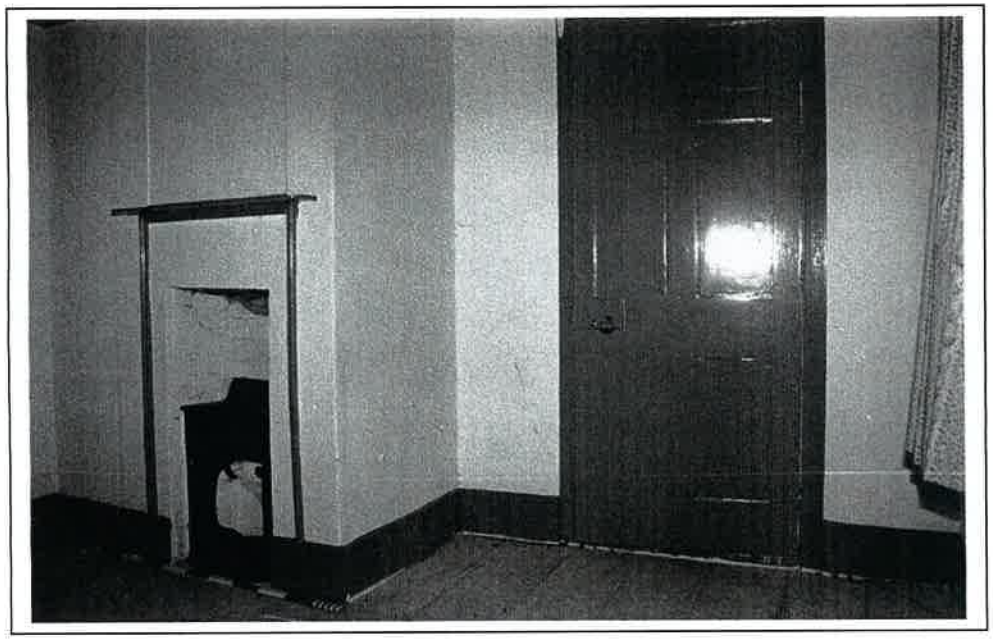
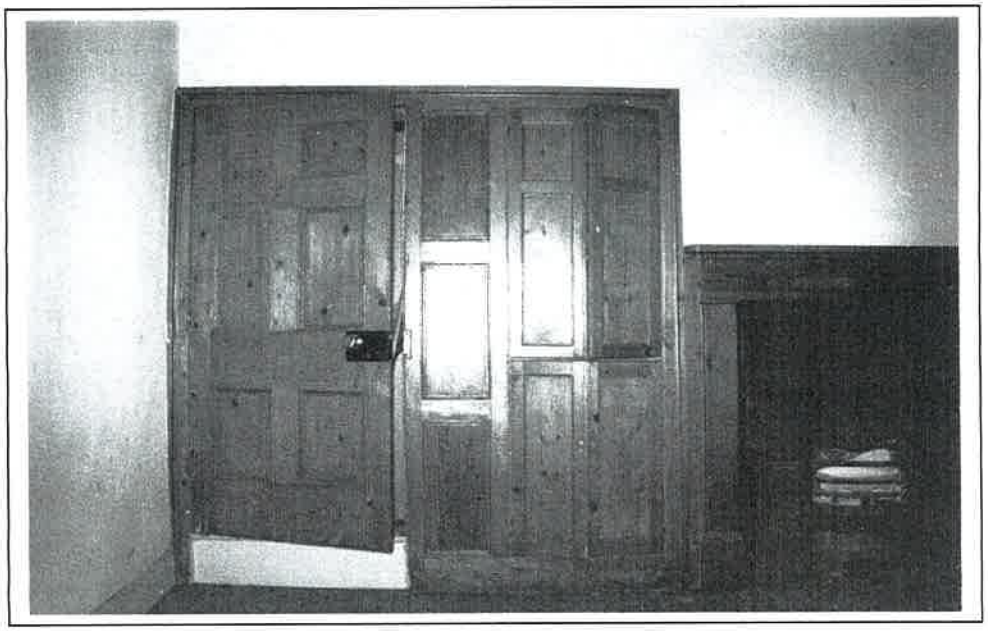


Plate 21: Fireplace and door within F6 leading to F7

Plate 22: Door, cupboards and fireplace within F5



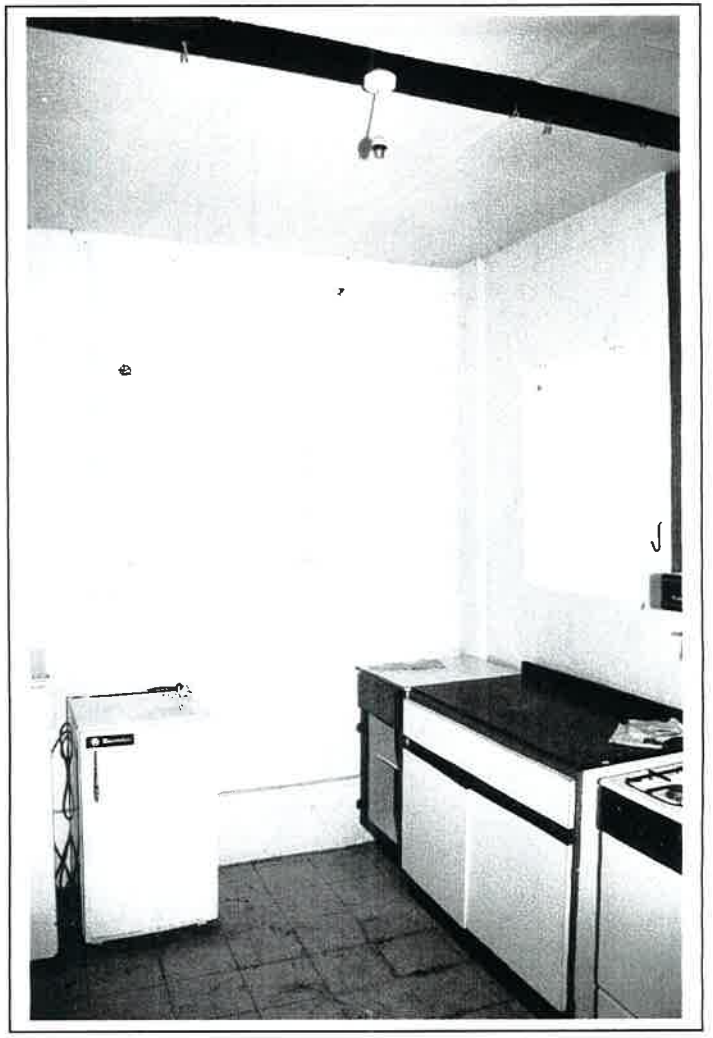


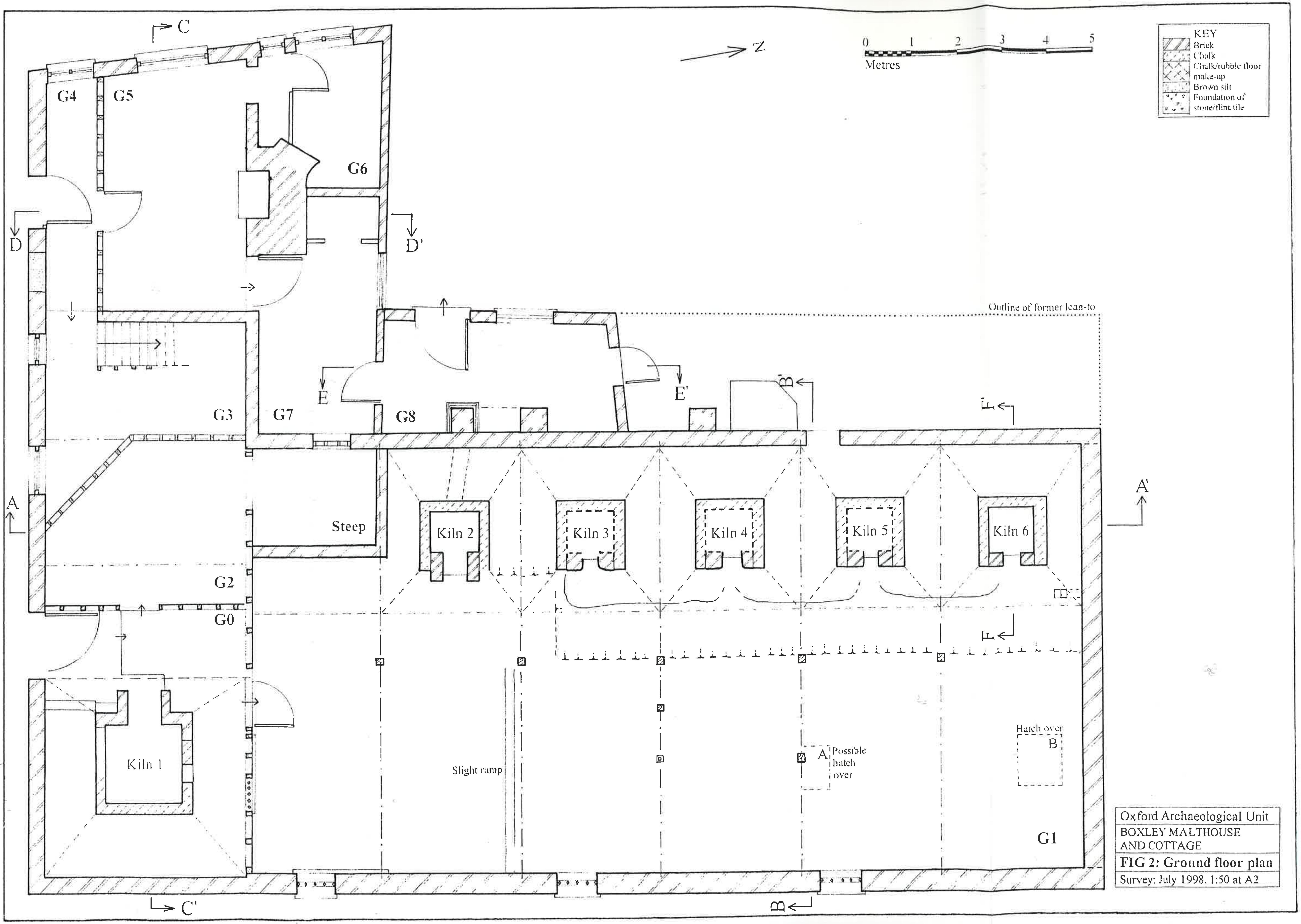
Plate 23: Formerly external hatch between G7 and steep


Site location
Boxley Wood
North Downs Way
Water Works
Boxley House
Reservoir
PH
Warren Farm
Street Farm
Donkey Shaws
Boxley
Park House
Park Wood
Boxley Road
BOXLEY CP
Harpole
Harple Lane
The Larches
The Lynch
High Noon Farm
Hermitage Lane
Pilgrims Way
Yewtree Shaw
Harbourlands Farm
Harbourland
Park Wood
Kiln Wood
Beulah Wood
Horish Wood
Heath Wood
Penenden Heath
Mon
Newham Court
Honeyhill Wood
Bearsted Road
Crem
Pope's Wood
Upper Fullingpits Wood
Chapel Lane Farm
Birling House
Ware Street
HM PRISON
Offices
TA Centre
Park
New Cut Road
Grove Green
Vinters
Weavering Street
Playing Field
Cherry House
Roseacre
Miniature Railway
Boat House
Yacht Station
MOTE PARK
Playing Field
MAIDSTONE (MB & CP)

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIGURE 1: Site location



Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIG 2: Ground floor plan

Survey: July 1998. 1:50 at A2

N

0 1 2 3 4 5
Metres

KEY
- Brick
- Chalk
- Chalk/rubble floor make-up
- Brown silt
- Foundation of stone/flint/tile

F1
F2
F3
F4
F5
F6
F7

Plastered
Hardboard
Floor above without joists

A
B
C
D
E
F
G
H
J
K
L
M

Former cowl
Former cowl
Former cowl

Lead-lined water channel

Outline of storage loft above

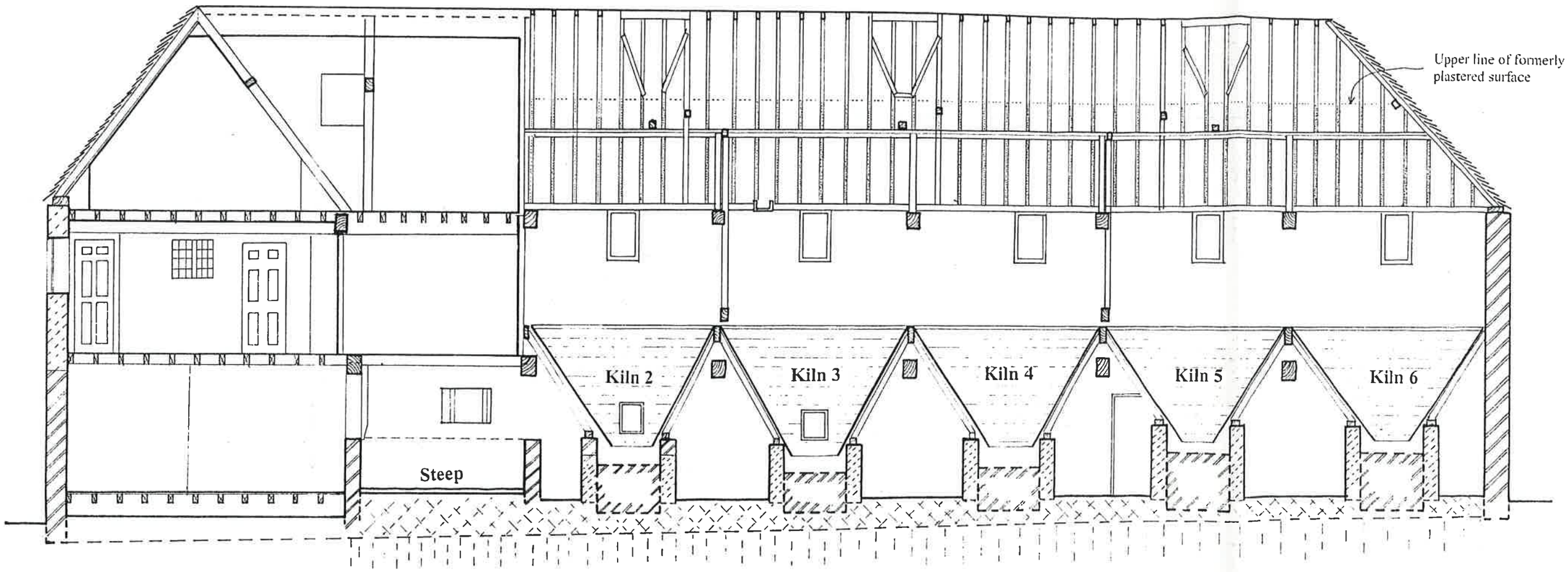
Area of collapsed floor

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIG 3: First floor plan

Survey: July 1998. 1:50 at A2



KEY

- Brick
- Chalk
- Chalk/rubble floor make-up
- Brown silt
- Foundation of stone/flint/tile

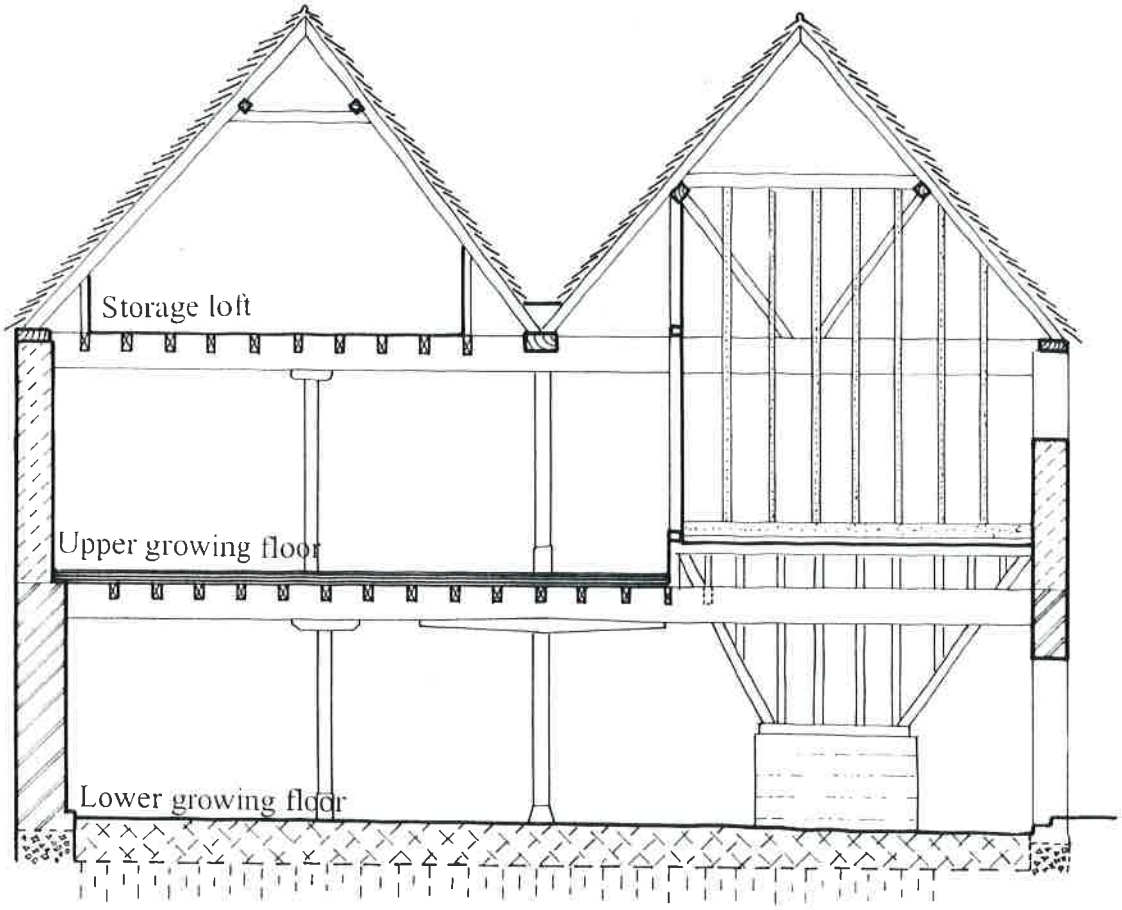
0 1 2 3 4 5
Metres

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIGURE 4: Long section (A-A') through malthouse

Survey date: July 1998 Scale: 1:50 at A2



KEY

- Brick
- Chalk
- Chalk/rubble
- floor make-up
- Brown silt
- Foundation of stone/flint/tile

0 1 2 3 4 5

Metres

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIGURE 5: Cross section (B-B') through malthouse

Survey date: July 1998 Scale: 1:50 at A3

KEY

- Brick
- Chalk
- Chalk/rubble
- floor make-up
- Brown silt
- Foundation of stone/flint/tile

0 1 2 3 4 5

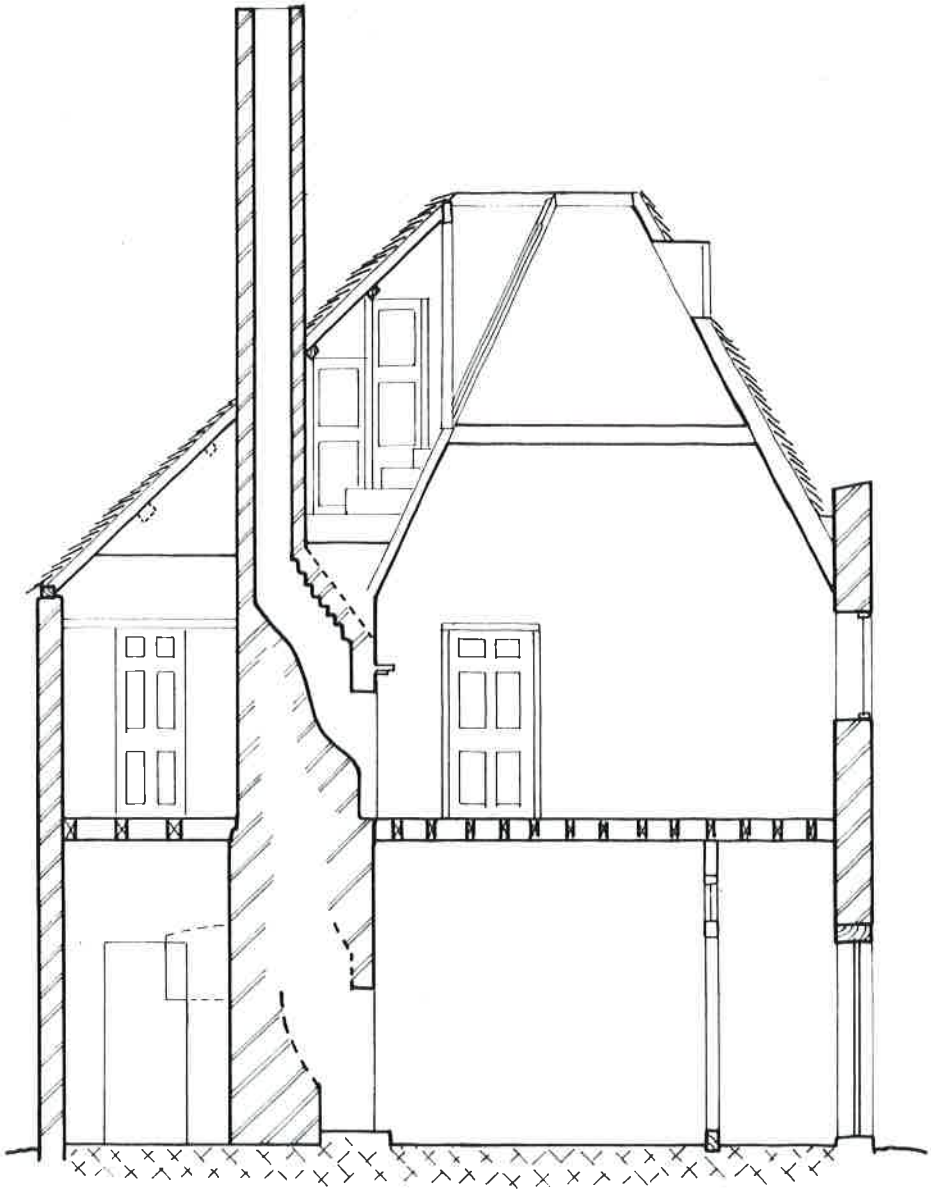
Metres

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIGURE 6: Long section (C-C') through cottage and malthouse

Survey date: July 1998 Scale: 1:50 at A2



KEY

- Brick
- Chalk
- Chalk/rubble floor make-up
- Brown silt
- Foundation of stone/flint/tile

0 1 2 3 4

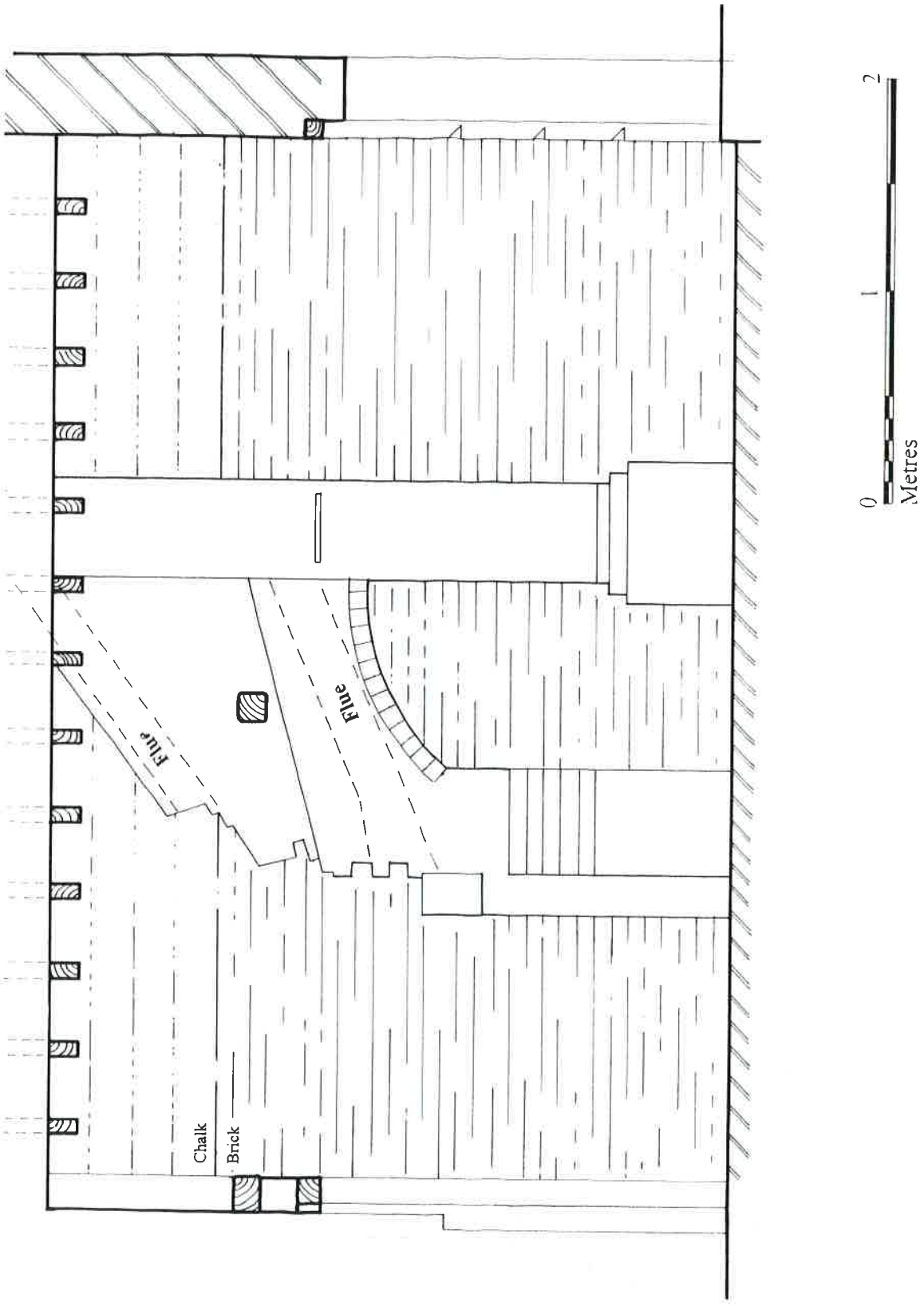
Metres

Oxford Archaeological Unit

BOXLEY MALTHOUSE AND COTTAGE

FIGURE 7: Cross section (D-D') through cottage

Survey date: July 1998 Scale: 1:50 at A3



Oxford Archaeological Unit
BOXLEY MALTHOUSE AND COTTAGE
FIGURE 8: Section (E-E') through lean-to detailing flues
Survey date: July 1998 Scale: 1:20 at A3

KEY
Brick
Chalk
Chalk/rubble floor make-up
Brown silt
Foundation of stone/flint/tile

0 1
Metres

Oxford Archaeological Unit
BOXLEY MALTHOUSE AND COTTAGE
FIG 9: Section (F-F') through Kiln 6
Survey date: July 1998 Scale: 1:10 at A2

OXFORD ARCHAEOLOGICAL UNIT

Janus House, Osney Mead, Oxford, OX2 0ES

Tel: 01865 263800 Fax: 01865 793496

email: postmaster@oau-oxford.demon.co.uk

Director: David Miles B.A., F.S.A., M.I.F.A. Oxford Archaeological Unit Limited.
Private Limited Company Number: 1618597 Registered Charity Number: 285627.
Registered Office: Janus House, Osney Mead, Oxford OX2 0ES