

BUILDING RECORDING  
AT  
HILLWORTH FARM,  
LONGDON, WORCESTERSHIRE

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## Building recording at Hillworth Farm, Longdon, Worcestershire

### Part 1 Project overview for Client

This section of the report is an overview of the building recording required to meet a planning condition relating to the redevelopment of the large timber-framed barn at Hillworth Farm.



The brief specified that the barn should be recorded to English Heritage level 3 standard. This required photographing the exterior and interior of the barn, drawing parts of the barn to scale and annotating existing survey drawings. Samples for tree-ring dating (dendrochronology) were also taken. This produced an archive of the barn before any changes were made to the building.

The brief also required an element of historical research and synthesis. Original records relating to Hillworth Farm were studied at Worcestershire Record Office along with historic maps and trade directories. Online census records were accessed along with digitised historic mapping, aerial photographs and other online sources.

Analysis of the building was based upon the recorded fabric and documentary research. The development of the barn was reconstructed and illustrated by phased ground plans and elevations. These have been reproduced at the end of the report along with relevant photographs.

The barn at Hillworth Farm is a large timber-framed structure with brick infill panels and a stone plinth. The south end is built of brick also on a stone plinth. The building was constructed as a 4-bay threshing barn in the late 17<sup>th</sup> century. Analysis of the records produced on site and the tree-ring samples showed that the structure was constructed entirely of reused timber of varying ages and from a number of different areas.

The function of the barn, when it was first built, was for the processing of grain crops by hand. This was usually carried out in the winter and required a large amount of space in order to swing a flail to thresh the grain. Grain was very important as it provided cash if sold, flour if milled and next year's harvest if kept.

The barn was extended to the north in the early 18<sup>th</sup> century. This extension housed an extra threshing floor and storage space. The brick extension to the south carried the inscription 'WR 1839'. The extension was a stable and gig house and was constructed by William Rayer in 1839 as part of a wholesale redevelopment of the farm. The stable and gig house may have housed the horse and coach for the house, Hillworth Court, which was also rebuilt by William Rayer around this time. An extension was added to the west of the barn around 1900. This was a shelter shed which was used to house cattle or sheep during the winter.



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## Building recording at Hillworth Farm, Longdon, Worcestershire

Shona Robson-Glyde

### Part 2 Building recording report

#### 1. Planning background

This building recording project was commissioned by Mr and Mrs Thatcher of Hillworth Farm, Longdon, Worcestershire. The project consisted of the recording of a listed timber-framed barn at Hillworth Farm (Fig 1, NGR SO 8360 3730) which it is planned to convert into holiday accommodation. A planning application has been submitted to, and approved by Malvern Hills District Council (08/1017). This will affect a heritage asset with architectural and archaeological interest (WSM 39466).

The project conforms to the *Standard and guidance for the archaeological investigation and recording of standing buildings or structures* (IfA 2008) and *Standards and guidelines for archaeological projects in Worcestershire* (HEAS 2008). It also conforms to English Heritage guidance *Understanding historic buildings: a guide to good recording practice* (EH 2006)

The project also conforms to a brief prepared by the Planning Advisory Section of Worcestershire Historic Environment and Archaeology Service (HEAS 2010a) and for which a project proposal (including detailed specification) was produced (HEAS 2010b).

#### 2. Aims

The aims of this project are to 'establish the character history, dating, form and archaeological development' of the building (IfA 2008, 1).

More specifically the following aims have been identified:

- To provide a detailed measured survey of the building or elements of it.
- To provide a descriptive account and interpretation of the building including discussion of its local, regional and national significance.
- To acquire dendrochronological dating of primary phase timbers.

#### 3. Methods

##### 3.1 Documentary research

A search was made of the records held in the Historic Environment Record (HER). This resulted in a list of HER records in the area of the site and maps showing the locations of these records.

In addition to these records a number of books and documents were referenced. These sources are listed below in the bibliography. The following photographs, maps, books and documents were also consulted.

##### *Cartographic sources*

- 1822 Greenwood map of Worcestershire
- 1840 Tithe map of Longdon (see below)
- 1:2500 Ordnance Survey maps dating to 1884-86, 1904, 1924-28 (Grid square SO 83 37)

##### *Aerial photographs*

- RAF Vertical Photographs taken for Ordnance Survey – 1964, Film 55/163, SO 83 37
- Google Earth images of 1999, 2005 and 2007

### *Documentary sources*

- Worcestershire Records Office
  - Tithe map of 1840 BA 419/2 ref b705:517
  - Tithe map apportionment BA 1572 ref f760:423
  - Papers re Rayer family (Romney Fraser and Ody solicitors) BA 4460/65 ref 705:174
  - Extract from article re church bells BA 11205 ref 899:831
  - Hillworth Farm account books BA 11516 ref b705:1224
- Name definitions
  - Place names (Mawer and Stenton 1927)
  - Field names (Field 1972)
- Architectural history (Brooks and Pevsner 2007).
- Land survey (Dudley Stamp 1944).
- Historical trade directories
- Census information for 1841-1901

## 3.2 **Building recording**

A detailed specification was prepared by the Service (HEAS 2010b).

### 3.2.1 **Fieldwork**

Fieldwork was undertaken between 5<sup>th</sup> and 15<sup>th</sup> July 2010. The site reference number and site code is WSM 42434.

Building recording consisted of a photographic survey of the interior and exterior of the buildings, analysis of their development, annotation of existing survey drawings and measured survey. All photographs were taken with photographic scales visible in each shot. The photographic survey was carried out with a Sony • 350 digital SLR camera. All photographs were recorded on a pro-forma Photographic Record Sheet. Annotation of existing ground plans and elevations, and completion of pro-forma Building Record and complemented the photographic record along with measured drawings completed to scale on permatrace drafting film at 1:20 scale.

The project conformed to the specification for a level 3 survey as defined in the English Heritage document *Understanding historic buildings: a guide to good recording practice* (EH 2006). This level of survey is described as ‘an analytical record’ comprising of ‘an introductory description followed by a systematic account of the buildings origins, development and use’ (EH 2006). This required the following elements of survey:

#### Survey and drawings

- Measure plans of all main floors and elevations as existing with annotations relating to the fabric, condition and appearance of the building.
- Measured drawings showing the form of any architectural or functional detail not more readily captured by photography.

#### Photography

- Overall appearance of rooms and circulation areas.
- Detailed coverage of the building’s external appearance.
- Any detail, structural or decorative, relevant to the building’s design, development and use, which does not show on general photographs.

### 3.2.2 **Building analysis**

Analysis of the building was based on the study of the photographic record, building recording forms, annotated drawings and measured drawings. It was also informed by the documentary sources listed above. This allowed plans to be drawn up showing the structural development of the building.



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The building as recorded is depicted in Plates 1-28. Ground plans, phase plans, elevations and sections have been reproduced as Figures 2-7.

### 3.2.3 **Dendrochronology** (extracted from Appendix 1 by Dr Martin Bridge)

The basis of dendrochronological dating is that trees of the same species, growing at the same time, in similar habitats, produce similar ring-width patterns. These patterns of varying ring-widths are unique to the period of growth. By taking several contemporaneous samples from a building or other timber structure, it is often possible to cross-match the ring-width patterns, and by averaging the values for the sequences, maximise the common signal between trees. The resulting 'site chronology' may then be compared with existing 'master' or 'reference' chronologies. This process can be done by a trained dendrochronologist using plots of the ring-widths and comparing them visually. There is no defined minimum length of a tree-ring series that can be confidently cross-matched, but as a working hypothesis most dendrochronologists use series longer than at least fifty years. One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites.

For Hillworth, initial sampling took place in July 2010, with a follow-up visit in August 2010. All the samples were of oak (*Quercus* spp.). Core samples were extracted using a 15mm diameter borer attached to an electric drill. They were numbered using the prefix **hlf**. They were removed for further preparation and analysis. Cores were mounted on wooden laths and then these were polished using progressively finer grits down to 400 to allow the measurement of ring-widths to the nearest 0.01 mm. The samples were measured under a binocular microscope on a purpose-built moving stage with a linear transducer, attached to a desktop computer. Measurements and subsequent analysis were carried out using DENDRO for WINDOWS (Bridge 2010, Appendix 1).

## 3.3 **Statement of confidence in the methods and results**

The methods adopted for this project have allowed the aims of the project to be met with the exception of the aim of dating the primary phase of construction. This aim states that should primary phase timbers be suitable for tree-ring samples to be taken, this should be carried out.

The dating of the building was made difficult due to the large amount of re-used timber in the building. Identifying original timbers was therefore difficult. A total of thirteen samples were taken on two different dates. Of the thirteen samples taken, two were discarded as the number of rings they contained was too few for analysis. One of the samples, from a re-used timber, was taken as a reference sample and provided a firm date of 1647-77. A further eight samples provided little cross-matching and gave a number of possible dates but there was no deciding factor that could give a firm felling date. Only two of the samples gave consistent matches that provided a felling date of 1531-61. This date was over a 150 years earlier than the barn dated architecturally and it was felt that these timbers were also re-used. The conclusion was that the barn had been constructed in its entirety from re-used timber from a number of different sources in the late 17<sup>th</sup> century. This is an unusual result, because barns constructed in this period would usually be built with newly felled timber. It is possible that the barn was a replacement for a similar structure and reused the timbers from that building.

It was felt that everything had been done to complete the aim of dating the primary phase timbers, but that in this circumstance it was not possible to do so.

## 4. **Context**

Hillworth Farm (Fig 1) is located in the north east of Longdon parish close to the parish boundary with Holdfast. Hillworth is around 1 mile north of Longdon village and 3 miles south west of Upton upon Severn. Hillworth Farm lies near the confluence of the Longdon Brook and Mill Brook.

Longdon is a large parish situated in the south of Worcestershire. It is an ancient place which was first recorded in the *Cartularium Saxonicum* in the 10<sup>th</sup> century as *langan dune* meaning 'long hill' referring to the long hill on the edge of Longdon Marsh. It became known as Longdon in the 14<sup>th</sup> century (Mawer and Stenton 1927, 208). The name Hillworth means 'enclosure hill' and derives from the Old English *worthig* (Field 1972, 261) and shows the site of a medieval settlement. Hillworth is not referred to in medieval documents related to Longdon as researched

by Mawer and Stenton (Mawer and Stenton 1927). This shows that whilst Hillworth was a medieval settlement it was probably subsidiary to another estate in Longdon.

The farm lies on the east edge of Coneyburrow Hill, a name which relates back to the medieval practice of creating rabbit warrens to farm the animals for meat. *Coni* is Middle English for rabbit and 'coneyburrow' translates as, literally, 'land on which rabbits are found' (Field 1972, 52). Indeed 'cony' is still used for the adult animals with rabbit only used for young animals. Coneyburrow Hill is also included on the HER (WSM 7604) as the site of a rabbit warren marked on a map of 1822 by Greenwood.

A search of Worcestershire Historic Environment Record (HER) returned 26 records in the area of Hillworth Farm. Of these, 17 were relevant to the project and are shown on Figure 2 and in Table 1 of Appendix 2. There are no activities recorded in the area of the site but ten buildings are recorded at Hillworth, along with other monuments in the area surrounding the site.

Hillworth Court (WSM 4229) is a grade II listed building which is recorded as dating to 1836. The listing description describes the building as *'House. 1836. Red brick with slate hipped low pitched roof. 2 storey, 3 window range. Sash windows, 16 panes to sides, 12 panes to 1st floor centre. Centre window with cambered head in cambered head recess. Flush panelled door in open pedimented Tuscan pilastered doorcase. Fanlight. Service wing attached to right'* (DoE 1984, SO 83 NW 1/6). The building recorded, a large timber-framed barn (WSM 39466), is also a grade II listed building. This has a much shorter description in the listing description. *'Barn. C18. Timber-framed with red brick panels and plain tile roof. Blue lias stone plinth, higher at North end. 2 cart entrances each side. 5 x 2 panels at North, 6 x 3 in centre and 4 x 3 at South. C19 brick ends'* (DoE 1984, SO 83 NW 1/5). The other buildings forming the farmstead are also included as individual records on the HER along with structures adjoining the farmhouse and the footprint of now demolished farm buildings (Fig 2).

The Worcestershire Historic Farmsteads Characterisation Project (Gough 2010) includes information on Hillworth Farm. It is described as a farm with a detached farmhouse in an isolated location. The Characterisation shows an arrangement of the buildings around a regular courtyard plan as the primary attribute with multi-yards as a secondary attribute. There is a dominant L-plan building within the dispersed multi-yard plan.

The HER also gives records for a mill (WSM 7602) and weirs (WSM 34542 and WSM 39034) on the Mill Brook. The name of Mill Brook shows that there was a mill on the brook, probably in the medieval period however its location has not been identified. The two weirs are recorded on the 1<sup>st</sup> edition Ordnance Survey map although one only (WSM 34542) is still extant (Fig 2).

Other HER records show that earlier settlement may have existed in the area of the farm. To the south of the farm is a field called Yard Bridge Meadow (WSM 30924) which the HER states indicates a site dating to the Roman and medieval period. Also south of the farm are cropmarks (WSM 11382) of a pair of curvilinear ditches of unknown date but could also be Roman. In Great Hill Pasture on Hillworth Farm land are traces of ploughed out ridge and furrow (WSM 33899). These are also visible on Google Earth mapping of 1999, 2005 and 2007. Further ridge and furrow can be seen around Coneyburrow Hill and shows a number of different orientations within the same field. Therefore they are probably showing the layout of earlier fields and date to the medieval period.

All of the evidence suggests that the area of Hillworth Farm and Hillworth Court has a medieval origin although the farm buildings no longer date to this era.

## 5. **The building**

The large timber-framed barn at Hillworth Farm is situated to the north of the house, Hillworth Court (Fig 1). It has a late 20<sup>th</sup> century breeze block and metal frame barn to the east and a 20<sup>th</sup> century barn, now a butchery, to the west. Within the farm complex are also 19<sup>th</sup> century brick barns and a large pond, all arranged around a number of yards.

### 5.1 **Building description**

The barn is seven bays long (Plate 1) and is primarily constructed of timber-frame with red-brick infill panels. The central four-bay part of the structure is built on a sandstone plinth with timber-frame three panels wide and three panels high in each bay (Plate 2). This also has a threshing

floor of lias stone with full-height double doors on the east side. The doors on the west side of the threshing floor have been removed. To the north of this part of the barn are a further two bays of built on a tall lias plinth (Plate 3) with a stone floor threshing floor and full height doors to east and west. On top of the lias plinth the northern bay had timber-frame five panels wide and two panels high (Plate 4). The southern bay of the barn was constructed of brick on a lias plinth and has segmental arched openings (Plate 5). A limestone keystone marked WR 1839 is on the south gable. The west elevation of the barn is almost completely hidden by a lean-to shelter (Plate 6) constructed of timber tree-trunk posts and with brick gables.

## 5.2 Historical information

A document held in Worcestershire Record Office (BA 11205 ref 899:831; Pickford 1992, 1230-1233) records that William Rayer was born in 1769 in Forthampton, Gloucestershire, just over the border from Longdon. He came to Longdon in 1794 when he began renting Hill Court from Thomas Dowdeswell. This is reflected by the 1820 trade directory (Lewis 1820, 434) in which William Rayer is shown as a farmer in Longdon.

Documents written by William Rayer are also held in the Record Office (WRO BA 11516 ref b705:1224). These account books, almost diaries, give day-to-day details of the running of the lands held by William Rayer. At the beginning of 1825 he records that he is farming the land at Hill Court Farm, Robertsend Farm, Buckbury, part of Late Lees, Downing Farm and many others including Hillworth. In May of that year, William Rayer recorded that he had started building the new barn at Hillworth and that a new house would also have to be built. He moved into Hillworth in 1829 (Pickford 1992, 1230-1233), so it is fair to assume that Hillworth Court was built by William Rayer in the 1820s.

In 1840 William Rayer is listed as the owner and occupier of Hillworth on the tithe (WRO BA 1572 ref f760:423). The tithe map (Fig 3) shows Hillworth Court and the barn along with other structures on the farm. The barn is shown on the map with its northern timber-framed extension in place but without the brick southern extension. This is not surprising given that the extension was only constructed in 1839, probably after the survey for the map was completed. The first primary source for William Rayer is the 1841 census and trade directories (Appendix 2, Table 2) which for that year show that William Rayer was resident at Hillworth (Bentley 1841, 96). The 1841 census (Appendix 2, Table 3) also shows that William Rayer was a widower in 1841 and was a farmer with four live-in servants.

The 1851 census (Appendix 2, Table 3) gives more information about Hillworth. William Rayer is listed with his second wife Mary and is farming 750 acres, employing 36 labourers and has four live-in servants. William died at Hillworth in 1853 (Pickford 1992, 1230-1233) and in 1855 a trade directory (Appendix 2, Table 2) lists John Rayer at Hillworth (Billing 1855, 335). The 1861, 1871 and 1881 censuses also give more information about the farm. They all show John Rayer as the farmer. In 1861 he is listed with his wife Mary and two children. They are farming 430 acres with five men and two boys and they have four live-in servants. In 1871, he is listed with his new wife Elizabeth and three children. By this time they are farming 345 acres, employing eight men and two boys with two live-in servants. By the 1881 census John and Elizabeth Rayer have four children and one live-in governess. They are farming 330 acres and employing five men and three boys. The number of acres being farmed by the owners of Hillworth decreases gradually during the 30 years following the death of William. This could be for a number of reasons. It may be that John Rayer was tenanting out some of his other properties and land and only dealing with the land around Hillworth. William Rayer's account books suggest that he was also doing this (WRO BA 11516 ref b705:1224). Another possibility is that John Rayer was selling land or property and thereby reducing his own holdings, as he needed to have the money. However the fact that he employed a governess for his children suggests that this was not the case.

The 1<sup>st</sup> edition Ordnance Survey map of 1884-86 (Fig 3) shows no substantial change to the farm since the tithe map and even the field boundaries are unaltered. There are a few small changes to the farm buildings shown. Two new buildings have been constructed to the west of the large central pond. The brick extension to the barn, which was missing on the tithe map, is also showing on this map.

The 1891 census (Appendix 2, Table 3) contains very little information in comparison to its predecessors. John and Elizabeth Rayer are both listed as farmers at Hillworth and they have

eight children by this time. An 1896 trade directory (Appendix 2, Table 2) is the last time John Rayer is documented before his death. He is listed as being a landowner and farmer at Hillworth (Kelly 1896, 151). Following this in 1900 another trade directory shows Mrs Elizabeth Rayer as farmer at Hillworth (Kelly 1900, 155).

The 1901 census (Appendix 2, Table 3) gives an insight into the farm following the death of John Rayer. This records Elizabeth Rayer as the farmer of Hillworth with six children still at home. It records that she is an employer but does not detail of how many. The oldest five of her children are listed as working at home. Soon after this the 2<sup>nd</sup> edition Ordnance Survey was produced (Fig 3) which shows the lean-to shelter against the west side of the barn. Also between 1884 and 1904 a further shelter shed was built immediately opposite the lean-to shelter with their open sides facing each other.

Following the death of Elizabeth it is Harry Rayer, one of Elizabeth and John's children, who takes on Hillworth. He is first recorded in a trade directory of 1912 (Appendix 2, Table 2) but it just lists him as being of Hillworth Court under the gentry (Kelly 1912, 173). This suggests that Harry was not farming Hillworth but may have tenanted the land and barns to other people. This record is repeated in trade directories throughout the 20<sup>th</sup> century (see Appendix 2, Table 2).

### 5.3 **Building development**

#### 5.3.1 **Phase 1 Late 17<sup>th</sup> century (Fig 4)**

The first phase of construction of the barn created a four-bay threshing barn (Plate 7). The layout of the structure had a threshing floor with two storage bays to the north and only one to the south. The barn was built on a sandstone plinth, probably constructed from the local Arden Sandstone outcrops of the area (Buchanan 1944, 419). Above the plinth, the building was of oak post and rail construction with posts stretching from sole-plate to wall-plate and two rails between the plates to create a structure three panels high. The panel infill was of brick. A large amount of the timber appeared to be re-used and contained empty mortices from the previous use.

Dendrochronological sampling of the barn took place during the recording of the structure (Appendix 1). Whilst thirteen samples were taken, three had to be discarded and only three others could be dated. Cross-matching between the ten retained samples was very poor and resulted in seven of the samples not being dated. Two of the samples gave a felling date of 1531-61 and another, a reused post, gave a felling date of 1647-77.

Architecturally, the date of the barn cannot be as early as the mid 16<sup>th</sup> century. The rather crude construction, using only posts and rails, shows that the building must be much later. The mid 17<sup>th</sup> century date of the re-used post shows that the building must date after this timber had been used in another building. Therefore a construction date of the late 17<sup>th</sup> century is most likely. Given this evidence it is probable that the barn was constructed entirely of reused timber from a number of different sources. This date ties in with the date of the infill brick used in the panels. Two different sizes of brick were recorded, 9" x 4" x 2 3/4" and 8 3/4"-9" x 4" x 2". Bricks of this size were made around 1700 (WCC Brick Reference Collection).

The building was planned and laid out before being brought to the site for construction. Given the large amount of reused timber, it is likely that this took place on the farm rather than in a carpenter's yard as was usual. Carpenter's marks are clearly visible at the timber joints (Plate 8) on the exterior of the barn. A sequence of Roman numerals (Plate 9) was used to distinguish which timbers needed to be attached together to complete the structure. There are also a small number of construction notches (Plate 10) that were used to prop the building during its construction.

#### 5.3.2 **Phase 2 Early 18<sup>th</sup> century (Fig 4)**

In the early 18<sup>th</sup> century, two stone walls were constructed on the interior of the threshing barn along both sides of the threshing floor (Plates 11 & 12). These walls were made of lias stone and effectively divided the barn into three separate areas. However there is no evidence to show that the structure was being used for anything other than its original function of a threshing barn. If anything, the walls would provide support for the unthreshed grain and straw that were stored in the building.

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At the same time two similar lias stone walls were constructed to the north of the threshing barn (Plate 13 and 14). The walls probably formed part of a structure built to the north of the threshing barn although its full extents and function have now been lost.

### 5.3.3 Phase 3 Mid 18<sup>th</sup> century (Fig 4)

At this time a two-bay extension (Plate 15) was added to the north gable of the threshing barn. The bay adjoining the phase 1 threshing barn consisted of another threshing floor of stone. To the north of this was another timber-frame bay used for crop storage or even for stabling. There were double doors to both sides of the threshing bay. This was constructed with a lias plinth on the ground floor and timber-frame on the first floor. The construction of this bay mirrored that of the original threshing barn with cill to wall plate posts with one rail between the posts to create two panels between the plates. The carpenter's marks for this section of the barn do not carry-on the numbering of those marks on the original threshing barn but use their own sequence (Fig 7-9).

The phase two lias walls to the north of the threshing barn were incorporated into the structure of this extension and even the timber-frame was built over the top of them (Plate 16) with the plinth walls being constructed between the two.

The brick infill to the panels has two phases the earliest of which can be dated to the late 18<sup>th</sup> century. These bricks measure 8 • " x 4 ¼" x 3" in size and the later bricks dating to the mid 19<sup>th</sup> century measure 9" x 4 ½" x 3" (WCC Brick Reference Collection). Therefore the brick infill was probably inserted in the late 18<sup>th</sup> century and partially replaced in the mid 19<sup>th</sup> century. Currently there is no evidence to suggest what the original infill of the panels was. It may have been brick with the later date brick being a replacement of the original.

### 5.3.4 Phase 4 Early to mid 19<sup>th</sup> century (Fig 4)

In the early 19<sup>th</sup> century, the farm was bought by William Rayer. His farm account books (WRO BA 11516 ref b705:1224) record that in May 1825 he began building a new barn at Hillworth and that other buildings and a new house also had to be built.

It is during this phase of building that a brick building was construction against the south gable of the original threshing barn (Plate 17). The building was built of brick on a lias plinth, which the internal dividing wall was also sitting upon. The building was constructed of brick coursed in Flemish Bond, a brick bond typical for this period of construction. The bricks themselves date to the mid 19<sup>th</sup> century and measure 8 ¾" x 4 • " x 3 • " in size (WCC Brick Reference Collection). The building has two individual rooms each with a door on the south elevation (Plate 18) and a window on the side elevation (Plate 19). Piercings in the brickwork (Plate 20) were to allow ventilation into the structure and were included on the ground floor as well as the first floor which housed a hay loft. Also on the first floor was a pigeon roost (Plate 21) which unusually was only built with access from within the building.

It is possible that the building was used as a stable with a hayloft above, although the width of the rooms is possibly too small for this function. The doors of the two rooms were different suggesting different functions for them such as a horse stable and a carriage or gig house. The door on the left has a decorated Arts and Crafts handle (Plate 22) of the late 19<sup>th</sup> century which is obviously an addition to the door. The handle incorporates a Saltire cross, a ritual symbol of protection used commonly as decoration in the Arts and Crafts movement.

### 5.3.5 Phase 5 Between 1884 and 1904 (Fig 4)

At some time between 1884, the date of the Ordnance Survey 1<sup>st</sup> edition map, and 1904, the date of the 2<sup>nd</sup> edition map, a lean-to shelter (Plate 23) was constructed against the west elevation of the barn. The 1884 map does not show the lean-to but it is shown on the 1904 map.

The shelter was constructed of brick with an open front. The roof was supported on tree-trunk piers with v-struts (Plate 24) with half trusses cut into the brick infill panels of the west elevation of the barn (Plate 25). The two walls of the structure were built of red brick of different sizes but with the same date of around 1900 which agrees with the cartographic evidence. The bricks measure 9 x 4 " x 3 ¼" and 9" x 4 ¼" x 3" (WCC Brick Reference Collection) and were coursed in Flemish Garden Wall bond.

The construction of the lean-to blocked off the west elevation of the timber-framed barn. The large openings on the threshing floors would have become redundant. It is possible that the barn

was therefore not being used for threshing at this period. It is also possible that the lean-to housed some form of threshing machinery but this is less likely as its form does not suggest this. The structure was probably used as a shelter shed for cattle or sheep and may also have incorporated a feeding trough.

#### 5.3.6 **Phase 6 Mid to late 20<sup>th</sup> century (Fig 4)**

In the mid to late 20<sup>th</sup> century the north space within the original threshing barn was taken up by the insertion of three large grain silos (Plate 26)

Also at this time the frontage of the south part of the lean-to shelter was in-filled with corrugated iron panels attached to wooden posts (Plate 27). This created a sealed area against the west wall of the barn for storage or as an extra animal shelter, for hens for example. At the same time, the north part of the threshing barn had a concrete feeding trough inserted against the west wall of the threshing barn (Plate 28); this may have been a replacement for an earlier trough. It is obvious that whatever the previous function of this part of the shelter, it was now being used as a shelter shed for housing cattle or sheep. It may only have had this function at certain times of the year, such as during the spring for birthing of calves or lambs, or during the winter for protection from the weather.

## 6. **Discussion**

The development of Hillworth has been a complicated story to decipher. The place name evidence suggests that there was a medieval settlement in the vicinity of the farm, although none of the existing buildings on the site show any signs of having a medieval origin. Of these buildings the earliest is the phase 1 part of the barn that was recorded for this project. The dendrochronological dating of this structure shows that it was completely built of reused timber dating from a number of periods and felled in a number of areas. It is probable that much of the timber came from buildings that existed at Hillworth prior to the construction of the barn. It is the earliest reused timber, dating from the mid 16<sup>th</sup> century, which shows that it is possible medieval buildings stood in the vicinity of the farm.

When the barn was constructed in the late 17<sup>th</sup> century, its function was a threshing barn. These structures are the most important on a farm due to their function. Grain was the cash crop of the farm, the seed for the following year's harvest and was also used to mill into flour for everyday needs. Threshing barns were almost always the largest structures within a farmstead. The building needed to contain a large amount of storage space to either side of a central floor. The space was to store the crop once it was brought in from the fields. The crop was brought in piled high on carts that were usually driven into the building through one set of double doors. They were unloaded whilst standing on the stone floor and then driven out of the opposite set of double doors. In winter, once the crop had dried, it was threshed. This involved laying the crop on the stone floor and hitting it with a flail (a long wooden stick attached to a wooden handle by eel skin). Once the grain had been knocked off the stalks, the crop was thrown in the air. The grain fell to the floor with the straw on top and the chaff would blow away in the draft from the open doors. The straw was then gathered together and stored in the barn while the grain was stored in the granary.

The extensions to the barn recorded at Hillworth were constructed in the mid 18<sup>th</sup> century, early 19<sup>th</sup> century and late 19<sup>th</sup> century. The early to mid 18<sup>th</sup> century was a time of agrarian revolution with changes to high-yielding crops, wheat or barley instead of rye, taking place and developments to increase the yield of the soil. This therefore required increased provision for the processing of the crops. At Hillworth this was achieved by constructing two further bays to the threshing barn for an extra threshing floor and storage. The use of this extra space would also have been needed at the end of the 18<sup>th</sup> and early 19<sup>th</sup> century during the Napoleonic Wars. At this time the British ports were blockaded by the French and there was increased pressure for England to produce greater amounts of food.

It is not for this reason, however, that the barn was extended to the south in the early 19<sup>th</sup> century with the construction of the brick stable. This extension occurred at the time when the entire farmstead was being redeveloped by its new owner, William Rayer. The house had been rebuilt and the stable was built close to the house and therefore may have provided housing for a horse and gig associated with the house rather than the running of the farm. A more detailed look at

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William Rayer's account books in Worcestershire Record Office is likely to give more information about the changes that William Rayer carried out at Hillworth.

By the late 19<sup>th</sup> century, after the repeal of the Corn Laws, the price of wheat dropped drastically. As the industrial nation Britain demanded cheaper and cheaper food and more wheat was being imported than ever. The number of acres given over to crops dropped significantly and more farm land was being turned over to pasture. On the other hand, more cattle were being farmed and it is probably for this reason that the lean-to shelter, and the shelter shed to the west, was constructed at Hillworth.

## 6.1 Research frameworks

Farms and farm buildings are increasingly being recorded and analysed. As a result studies of their types and forms have been produced which provide a comparison for the barn at Hillworth. These include *Historic Farm Buildings* (Wade Martins 1991) and *Tradition Farm Buildings of Britain and their conservation* (Brunskill 1999). Other studies of farm buildings have provided regional analyses such as *Farm Buildings of the Weald: 1450 – 1750* (Martin and Martin 2006) and *The Development of Farm Buildings in Western Lowland Staffordshire up to 1880* (Peters 1969).

The West Midlands Regional Research Framework for Archaeology seminars for the early and late post-medieval periods in Worcestershire are decidedly lacking in their discussion of the recording of historic buildings. Atkin acknowledges that 'there has been increasing building recording on farms and barns' but also recognises that 'we are not yet at a stage at which synthesis has been undertaken' (Atkin 2003). For Worcestershire this is something that may be an end product of the Historic Farmstead Characterisation project that has looked at each farm shown on the 1<sup>st</sup> edition Ordnance Survey map and recorded its attributes (Gough 2010).

## 7. Publication summary

The Service has a professional obligation to publish the results of archaeological projects within a reasonable period of time. To this end, and unless directed otherwise, the Service intends to publish the following summary in an appropriate journal or journals.

*Archaeological building recording was undertaken on behalf of Mr and Mrs Thatcher at Hillworth Farm, Longdon, Worcestershire (NGR ref SO 8360 3730, HER ref WSM 42434). The project produced a record of a listed timber-framed barn at Hillworth Farm. Documentary research produced further information relevant to the site and the ownership of the farm. The barn recorded was first constructed in the late 17<sup>th</sup> century and consisted of a four bay threshing barn. It was constructed on a sandstone plinth and was topped by a timber-frame superstructure. Dendrochronological sampling of the structure gave a confused story that was able to be unravelled to reveal that the building was constructed of completely re-used timber from a number of different sources and may have utilised timber from earlier structures on the site. Further development of the building included a mid-18<sup>th</sup> century extension to the north. This was constructed in a similar fashion with a full-height ground floor stone plinth, of lias, topped with a timber-framed superstructure. The early to mid 19<sup>th</sup> century saw a brick stable extension added to the south of the original threshing barn by an ancestor of the client.*

## 8. Acknowledgements

We thank Mr and Mrs Thatcher of Hillworth Farm for being so tolerant during our time on site, Mr Mungo Park for being a very helpful agent and Mr Mike Glyde, the Curator. We would also like to thank all of these people for their kind assistance in the successful conclusion of this project.

## 9. Personnel

The project leader was Shona Robson-Glyde. The project manager responsible for the quality of the project was Hal Dalwood. Fieldwork was undertaken by Shona Robson-Glyde and Elizabeth A Curran with illustration by Shona Robson-Glyde and Steve Rigby. Dr Martin Bridge of Oxford Dendrochronology Laboratory contributed the dendrochronology report (Appendix 1).

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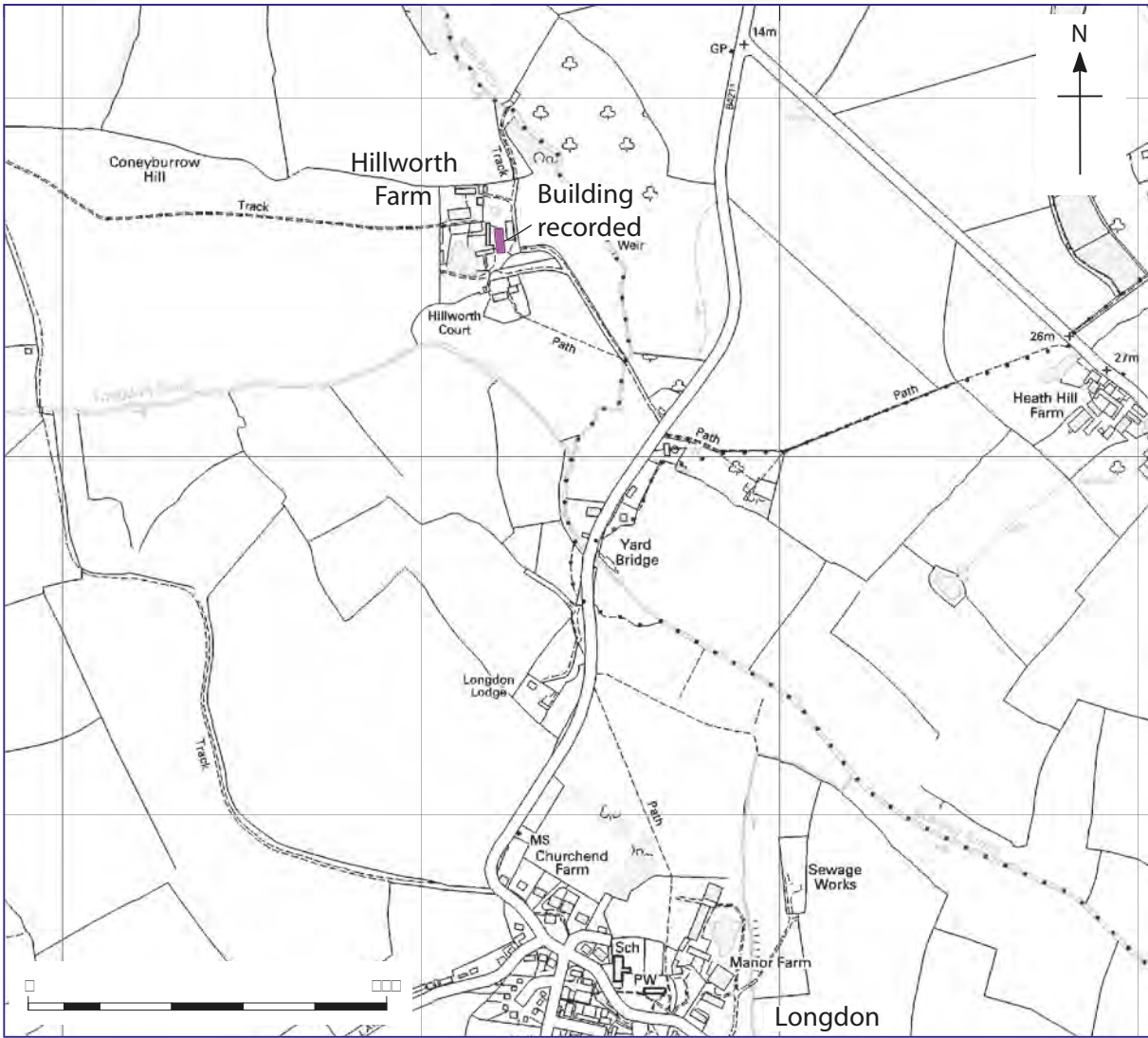
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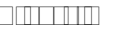
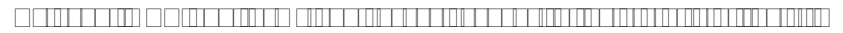
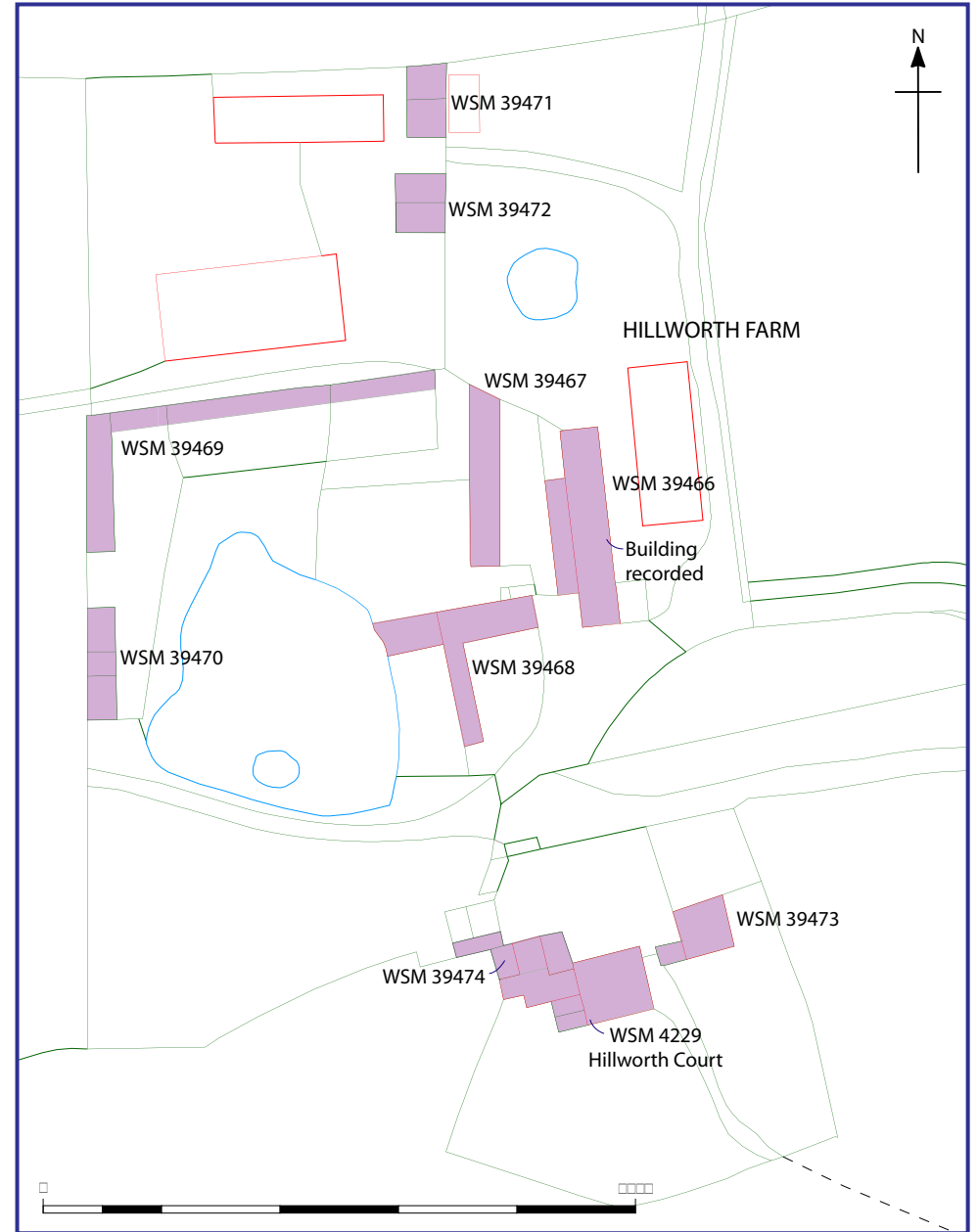
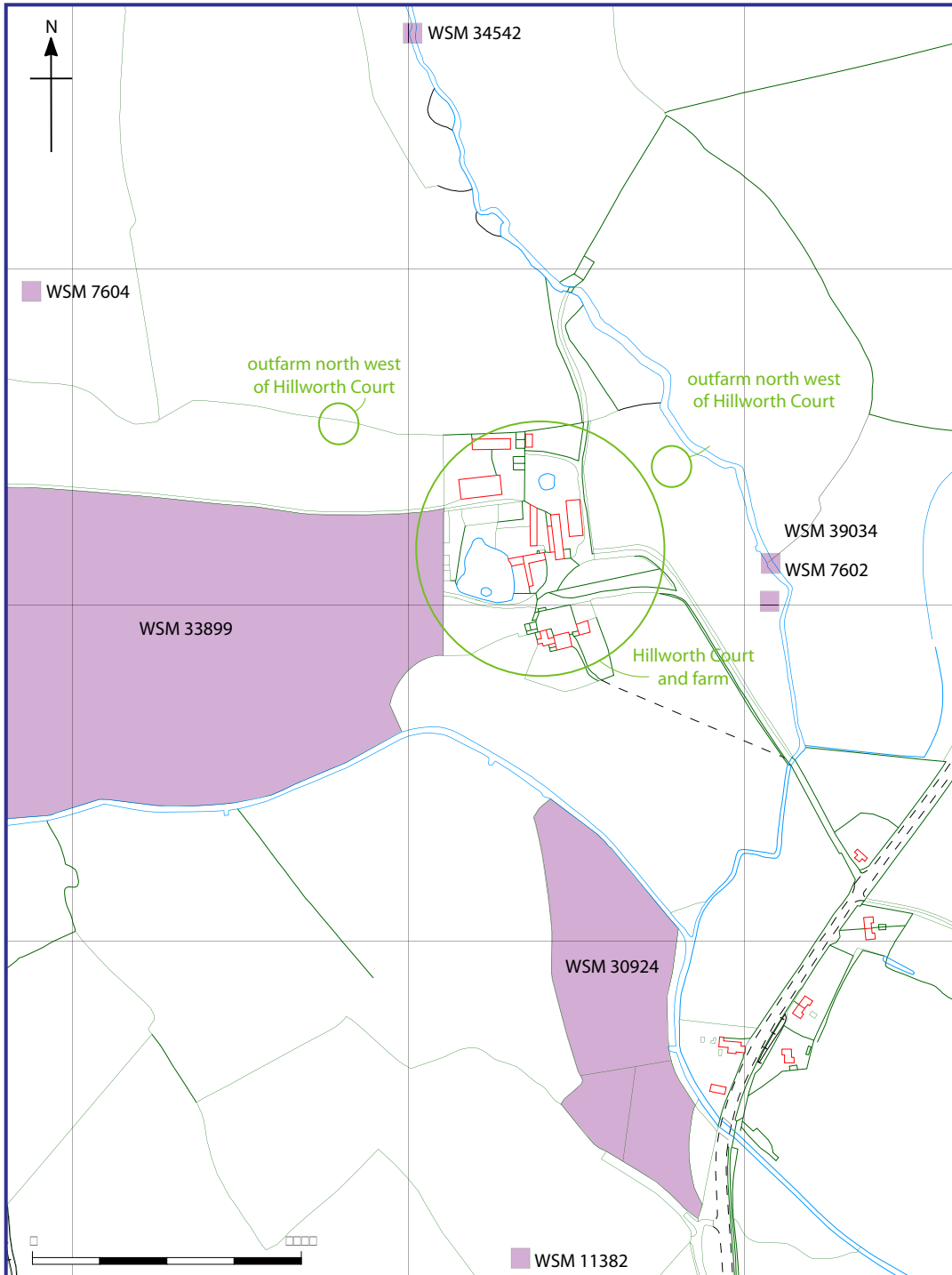


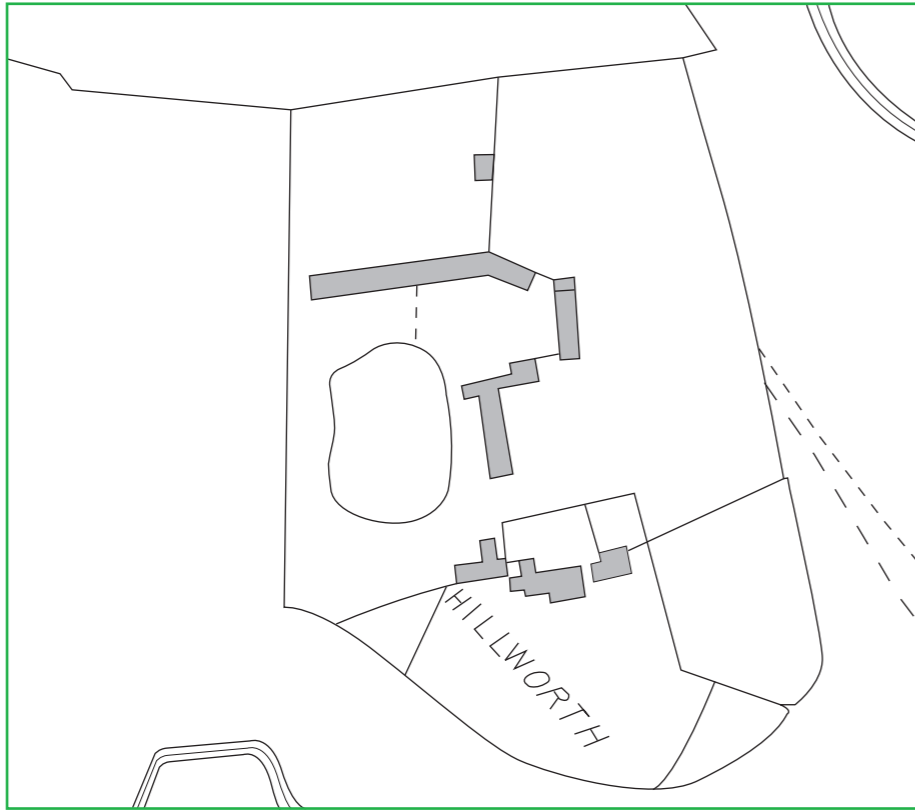
## Figures

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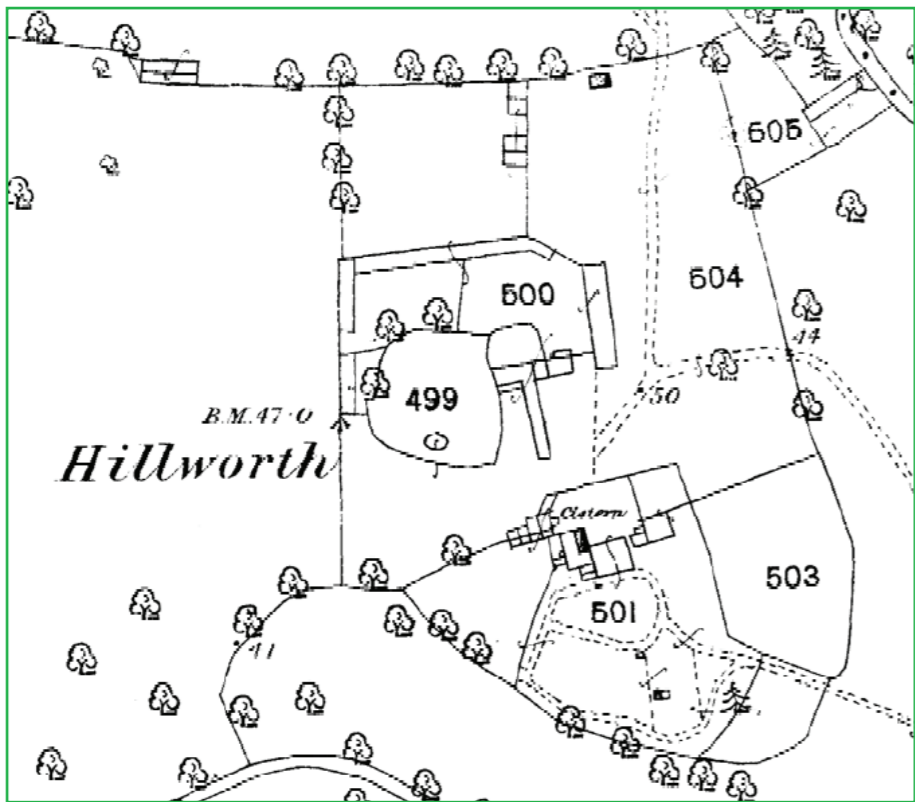
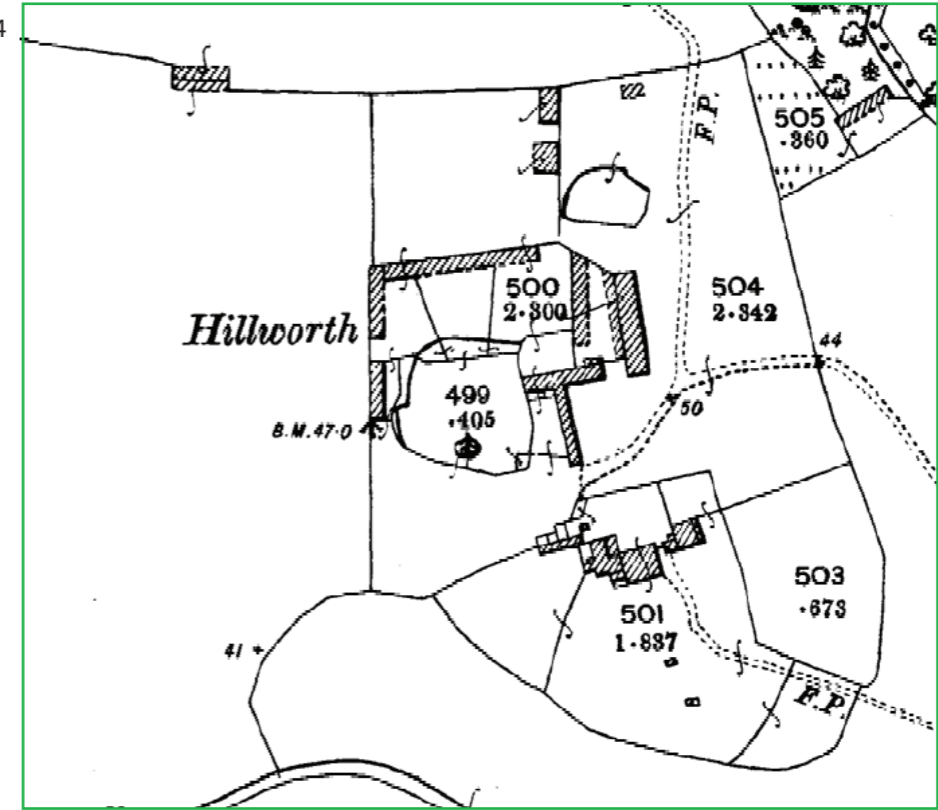






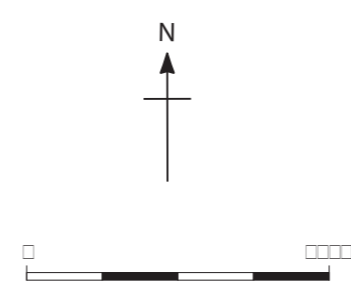
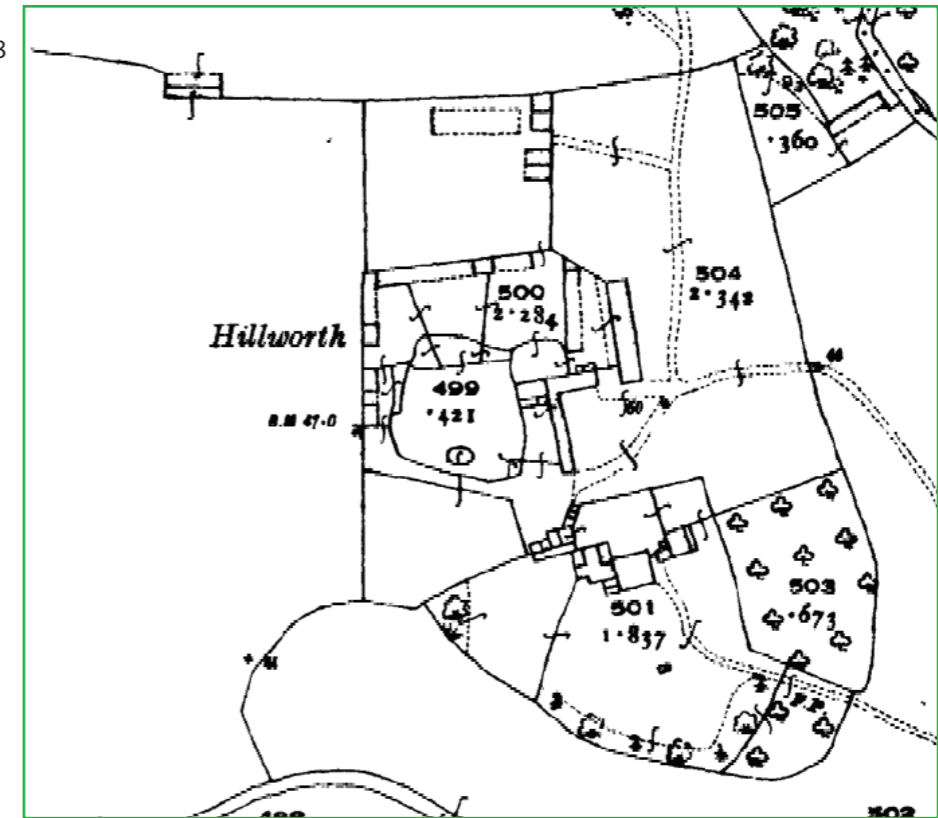
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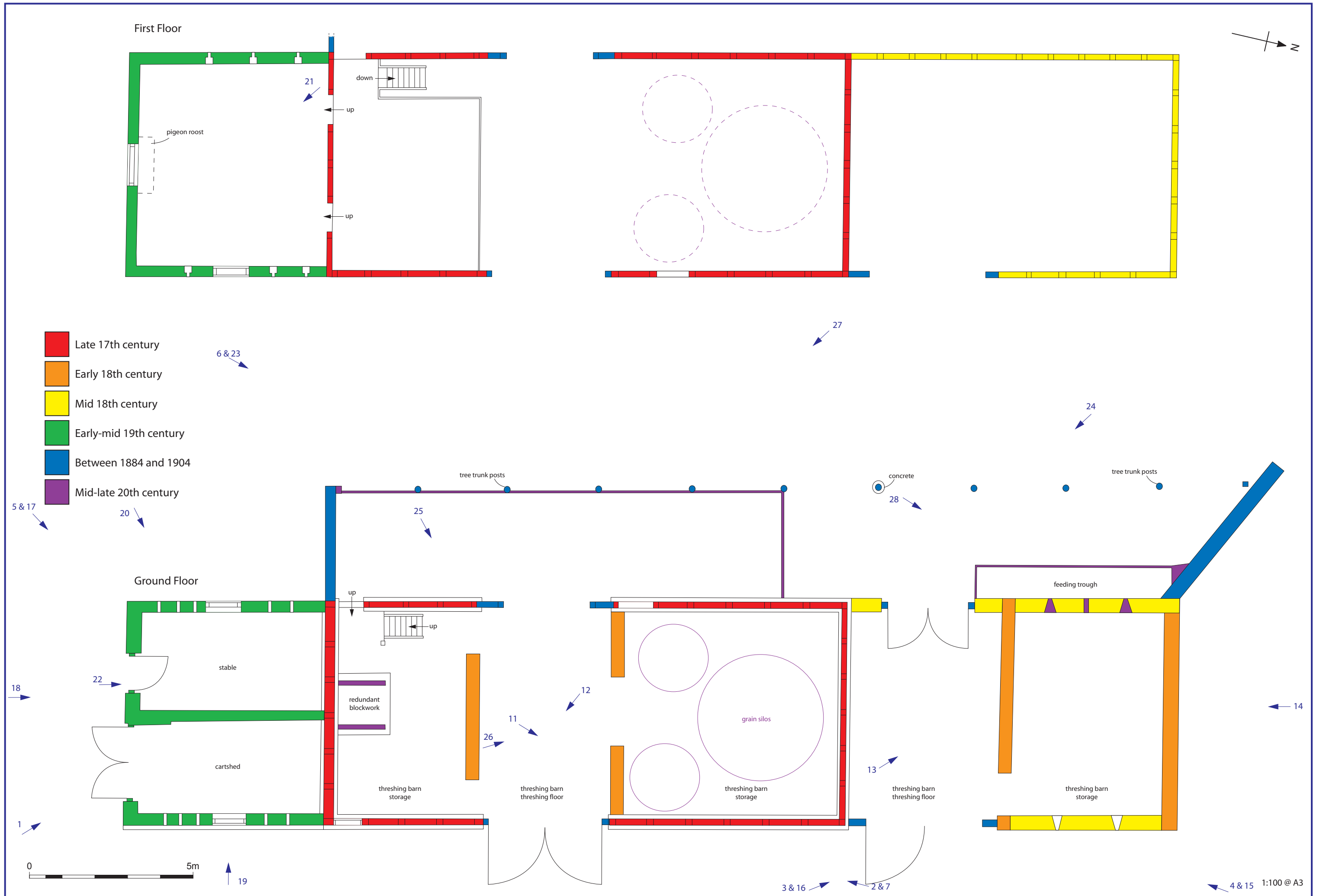
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1st edition OS of 1884-6

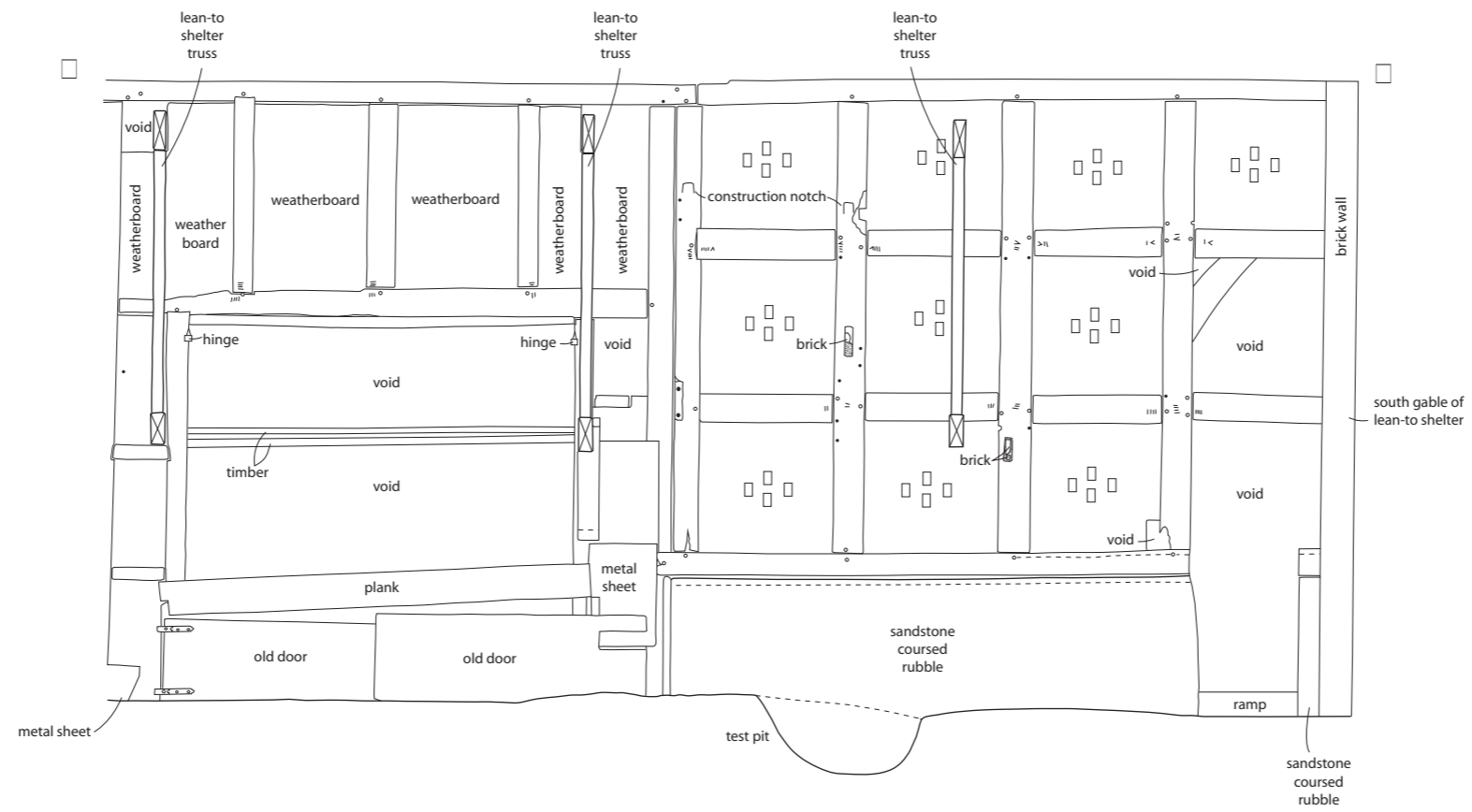
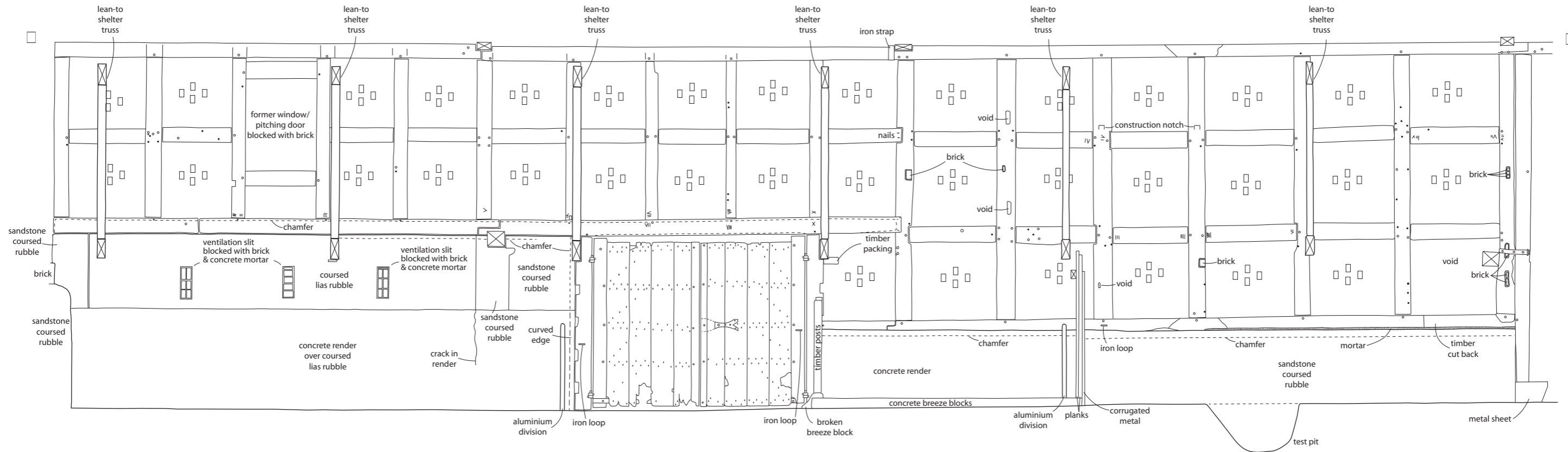
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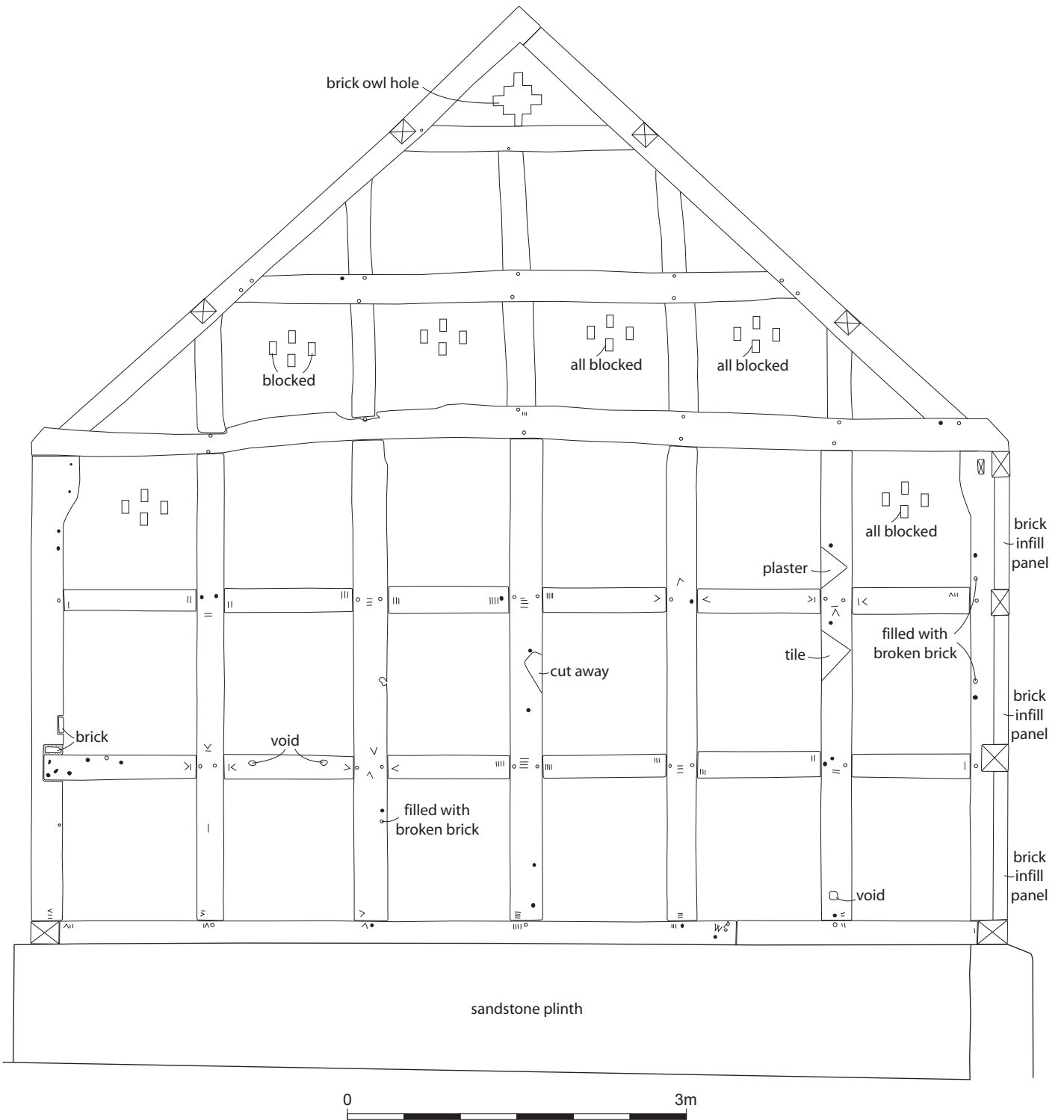


Phase plan and plate locations

Figure 4



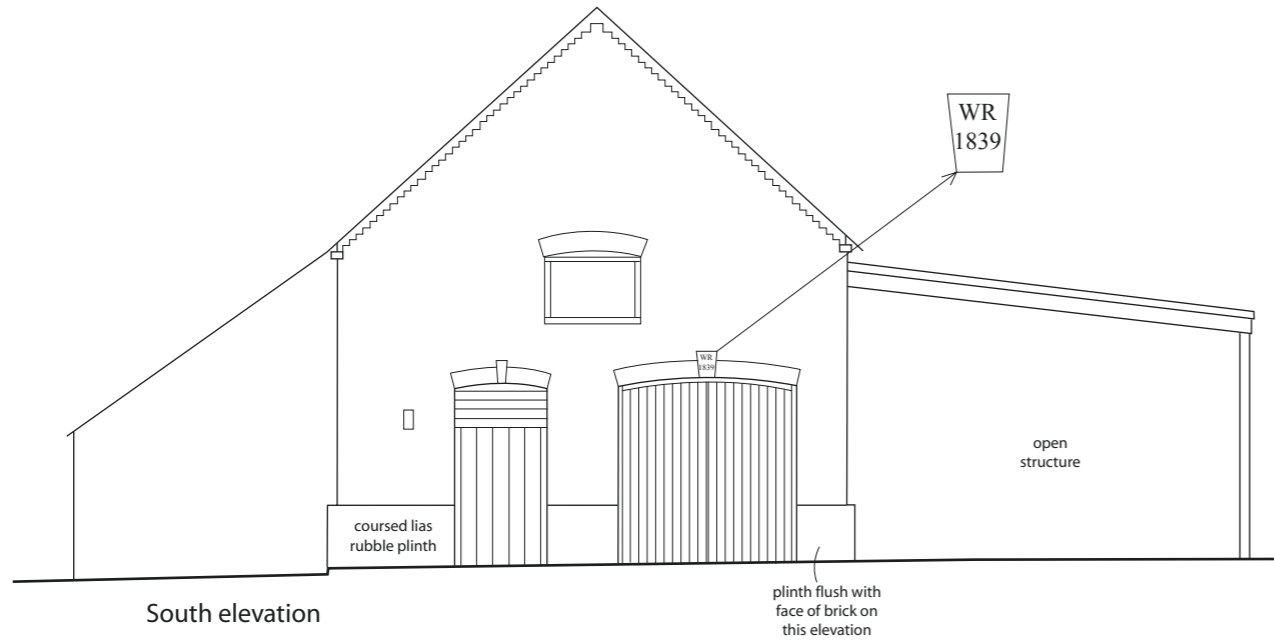
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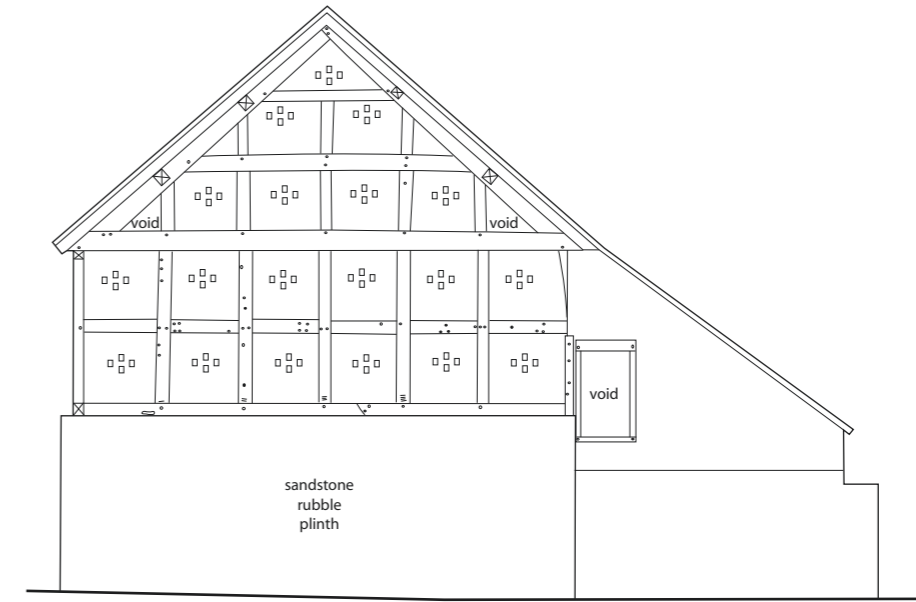
North elevation of 1st phase threshing barn

Figure 6

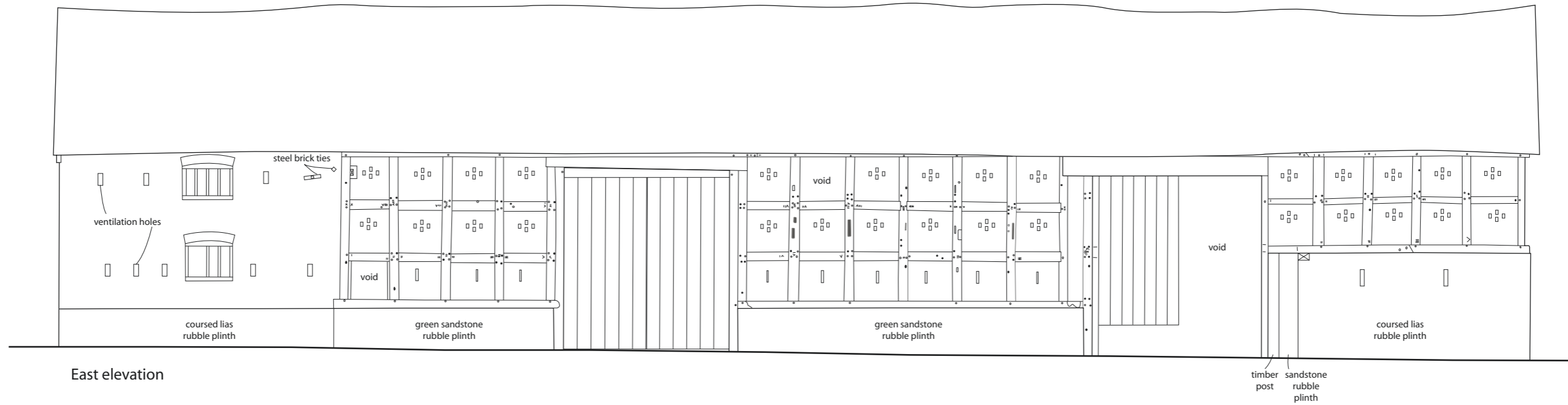




South elevation



North elevation



East elevation



## **Plates**

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*Plate 1: Barn at Hillworth from the south east*



*Plate 2: Central bays from the north east*

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*Plate 3: North extension from the south east*

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*Plate 4: Northern most bay of barn from north east*

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*Plate 5: South extension of barn from south west*



*Plate 6: West elevation of barn, lean-to extension from south west*





*Plate 7: Original threshing barn from north east*

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*Plate 8: Carpenter's marks*



*Plate 9: Roman numeral carpenter's marks*



*Plate 10: Example of construction notch*

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*Plate 11: North lias stone wall built in phase 2 within phase 1 barn*



*Plate 12: South lias stone wall built in phase 2 within phase 1 barn*

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*Plate 13: Phase 2 wall built to north of original barn*



*Plate 14: Phase 2 wall built to north of original barn*



*Plate 15: Phase three extension from the north east*



*Plate 16: Phase three lias wall and timber frame overlying phase two walls (left and right ground floor)*

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*Plate 17: Brick 1839 extension from the south west*



*Plate 18: Different doors on brick extension south elevation*





*Plate 19: Stable window*

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*Plate 20: Ventilation holes on stable*

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*Plate 21: Internal pigeon roost*

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*Plate 22: Arts and Crafts handle of late 19<sup>th</sup> century*



*Plate 23: Lean-to against west elevation of barn*



*Plate 24: Tree trunk posts of the lean-to shelter*

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*Plate 25: One of the lean-to half-trusses*



*Plate 26: Grain silos in original phase threshing barn*



*Plate 27: Corrugated infill to part of lean-to shelter*



*Plate 28: Concrete and aluminium feeding trough in lean-to shelter*

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## **Appendix 1 Dendrochronological Survey**

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Oxford Dendrochronology Laboratory  
Report 2010/36a

**THE TREE-RING DATING OF  
TIMBERS FROM  
HILLWORTH FARM BARN,  
LONGDON,  
WORCESTERSHIRE  
(NGR SO 836 373)**



**Summary**

A total of eight timbers were initially sampled in the middle 'original' section of this barn, which has been extended at either end. The tree-ring series from the samples did not match each other well, nevertheless, three individual timbers did date against reference chronologies. Two posts, one towards the south end in the west wall, and one towards the north end in the east wall, dated to the early sixteenth century, giving a combined felling date range of **1531–61**. A re-used post from the south wall gave an early seventeenth-century date, with a likely felling date range of **1647–77**. These results were somewhat surprising, and an additional five cores were taken on a second visit. None of the additional cores dated, not did they match each other. The lack of internal matches between all the samples suggests that timber may have used from a number of different sources.

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September 2010

## **The Tree-Ring Dating of Timbers from Hillworth Farm Barn, Longdon, Worcestershire. (NGR SO 836 373)**

### **BACKGROUND TO DENDROCHRONOLOGY**

The basis of dendrochronological dating is that trees of the same species, growing at the same time, in similar habitats, produce similar ring-width patterns. These patterns of varying ring-widths are unique to the period of growth. Each tree naturally has its own pattern superimposed on the basic 'signal', resulting from genetic variations in the response to external stimuli, the changing competitive regime between trees, damage, disease, management etc.

In much of Britain the major influence on the growth of a species like oak is, however, the weather conditions experienced from season to season. By taking several contemporaneous samples from a building or other timber structure, it is often possible to cross-match the ring-width patterns, and by averaging the values for the sequences, maximise the common signal between trees. The resulting 'site chronology' may then be compared with existing 'master' or 'reference' chronologies.

This process can be done by a trained dendrochronologist using plots of the ring-widths and comparing them visually, which also serves as a check on measuring procedures. It is essentially a statistical process, and therefore requires sufficiently long sequences for one to be confident in the results. There is no defined minimum length of a tree-ring series that can be confidently cross-matched, but as a working hypothesis most dendrochronologists use series longer than at least fifty years.

The dendrochronologist also uses objective statistical comparison techniques, these having the same constraints. The statistical comparison is based on programs by Baillie & Pilcher (1973, 1984) and uses the Student's *t*-test. The *t*-test compares the actual difference between two means in relation to the variation in the data, and is an established statistical technique for looking at the significance of matching between two datasets that has been adopted by dendrochronologists. The values of '*t*' which give an acceptable match have been the subject of some debate; originally values above 3.5 being regarded as acceptable (given at least 100 years of overlapping rings) but now 4.0 is often taken as the base value. It is possible for a random set of numbers to give an apparently acceptable statistical match against a single reference curve – although the visual analysis of plots of the two series usually shows the trained eye the reality of this match. When a series of ring-widths gives strong statistical matches in the same position against a number of independent chronologies the series becomes dated with an extremely high level of confidence.

One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites. Data now exist covering many thousands of years and it is, in theory, possible to match a sequence of unknown date to this reference material.

It follows from what has been stated above that the chances of matching a single sequence are not as great as for matching a tree-ring series derived from many individuals, since the process of aggregating individual series will remove variation unique to an individual tree, and reinforce the common signal resulting from widespread influences such as the weather. However, a single sequence can be successfully dated, particularly if it has a long ring sequence.

Growth characteristics vary over space and time, trees in south-eastern England generally growing comparatively quickly and with less year-to-year variation than in many other regions (Bridge, 1988). This means that even comparatively large timbers in this region often exhibit few annual rings and are less useful for dating by this technique.

When interpreting the information derived from the dating exercise it is important to take into account such factors as the presence or absence of sapwood on the sample(s), which indicates the outer margins of the tree. Where no sapwood is present it may not be possible to determine how much wood has been removed, and one can therefore only give a date after which the original tree must have been felled. Where the bark is still present on the timber, the year, and even the time of year of felling can be determined. In the case of incomplete sapwood, one can estimate the number of rings likely to have been on the timber by relating it to populations of living and historical timbers to give a statistically valid range of years within which the tree was felled. For this region the estimate used is that 95% of oaks will have a sapwood ring number in the range 11 – 41 (Miles 1997a).

### **HILLWORTH FARM BARN**

The barn is listed as an 18<sup>th</sup>-century barn, with 19<sup>th</sup>-century extensions at either end. The central ‘original’ section is box-framed, with panels in-filled in brick. The listing description attributes this barn to the 18<sup>th</sup> century. There are some clearly re-used timbers incorporated within the main structure.

### **SAMPLING**

Initial sampling took place in July 2010, with a follow-up visit in August. All the samples were of oak (*Quercus* spp.). Core samples were extracted using a 15mm diameter borer attached to an electric drill. They were numbered using the prefix **hlf**. They were removed for further preparation and analysis. Cores were mounted on wooden laths and then these were polished using progressively finer grits down to 400 to allow the measurement of ring-widths to the nearest 0.01 mm. The samples were measured under a binocular microscope on a purpose-built moving stage with a linear transducer, attached to a desktop computer. Measurements and subsequent analysis were carried out using DENDRO for WINDOWS, written by Ian Tyers (Tyers 2004).

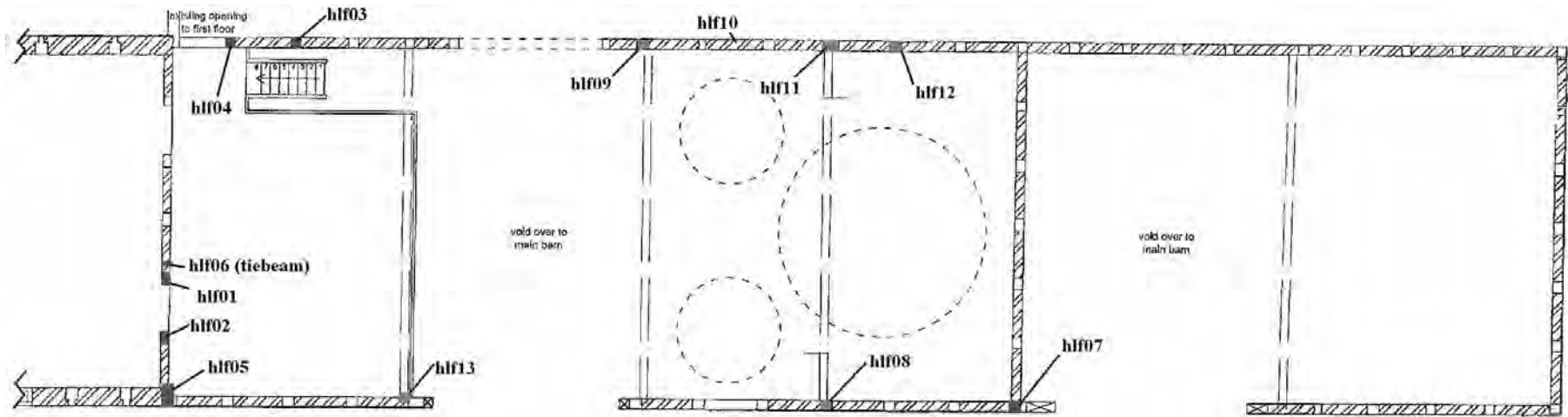


Fig. 1 Plan of the barn showing the approximate locations of timbers sampled for dendrochronology

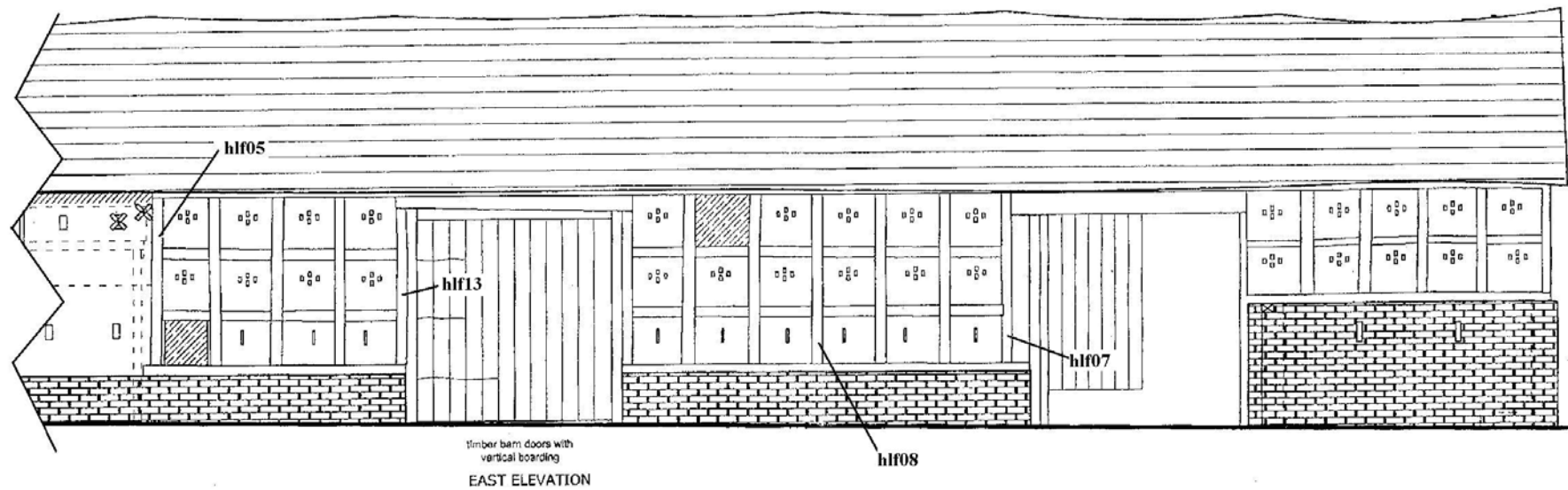


Fig. 2 East elevation showing some of the timbers sampled for dendrochronology

## **RESULTS AND DISCUSSION**

All the timbers were sampled were of oak (*Quercus* spp.). Details of the locations of the samples are given in Table 1, and illustrated in Figs 1 and 2. Two samples, **hlf05** and **hlf12**, contained too few rings for analysis and were discarded from further analysis. Sample **hlf02** was noted at the time of sampling as being from a re-used timber, and was therefore treated separately. Its ring-width series dated readily against reference material (Table 2d) and it was found to be from a tree most likely felled in the period **1647–77**. This was no surprise as a re-used timber in a supposedly 18<sup>th</sup>-century building.

Cross-matching between the remaining ten samples was very poor indeed, and each sample was therefore treated as an individual in subsequent dating attempts. Several samples gave good statistical matches at a variety of possible dates, none being acceptable because of the lack of replication. Two samples did however give consistent cross-matches that were accepted as dating the samples. Series **hlf04** and **hlf08** dated to 1436–1526 and 1397–1516 respectively (Tables 2a and 2b). Both had some sapwood remaining on them, and both gave overlapping likely felling date ranges. The cross-matching between was very weak ( $t=0.9$  with 81 years overlap) and there would normally be no justification for meaning the two series, however, the resulting mean **hlf48m** does give much stronger matches against local chronologies.

At least two of the timbers considered to be likely to be primary timbers therefore date to the early 16<sup>th</sup> century, with a combined likely felling date range of **1531–61**. This raises questions over either a) the original attribution of the date on the barn, or b) whether these timbers were primary timbers, or were possibly re-used from an earlier construction. The level of cross-matching between the samples was very low, even though many of the series are relatively short. This may suggest that several sources were used for the timbers, many of which may be re-used in their current positions.

The results are summarised graphically in Figure 3.

## **ACKNOWLEDGEMENTS**

I would like to thank Shona Robson-Glyde of Worcestershire Historic Environment and Archaeology Service for introducing me to the building, supplying background information, and making all the necessary access arrangements. I also wish to thank my fellow dendrochronologists for permission to use their data.

**Table 1:** Details of samples taken from the ‘original’ section of Hillsworth Farm Barn, Longdon, trusses numbered from the north end of the original barn

Sample number	Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens	Felling seasons and dates/date ranges (AD)
hlf01	South wall, 3 <sup>rd</sup> post from east	undated	-	H/S	69	1.59	0.47	0.18	unknown
hlf02	South wall, 2 <sup>nd</sup> post from east ( <b>R</b> )	1530-1636	1636	H/S	107	1.47	0.81	0.31	1647–77
hlf03	West wall, post 2 <sup>nd</sup> N of T5	undated	-	-	43	1.36	0.25	0.16	unknown
hlf04	West wall, post 1 <sup>st</sup> N of T5	1436-1526	1524	2	91	2.27	0.79	0.20	1535–65
hlf05	South-east corner post (T5)	undated	-	H/S	<40	NM	-	-	unknown
hlf06	South end tie beam (T5)	undated	-	19?C	66	2.21	0.82	0.27	unknown
hlf07	North-east corner post (T1)	undated	-	H/S	98	2.50	1.00	0.17	unknown
hlf08	East wall, post (T2)	1397-1516	1515	1	120	1.44	1.00	0.15	1526–56
hlf48m	Mean of <b>hlf04</b> and <b>hlf08</b>	<b>1397-1526</b>	<i>1520</i>	-	130	1.87	0.77	0.16	<b><i>1531-61</i></b>
hlf09	West wall, post (T3)	undated	-	18	64	1.91	0/57	0.20	unknown
hlf10	West wallplate, bay T2-T3	undated	-	H/S	52	2.92	1.51	0.34	unknown
hlf11	West wall, post (T2)	undated	-	H/S	63	2.21	0.84	0.20	unknown
hlf12	West wall, post 2 <sup>nd</sup> S of T1	undated	-	H/S	<40	NM	-	-	unknown
hlf13	East wall, post (T4)	undated	-	H/S	54	2.96	0.96	0.22	unknown

Key: **R** = re-used timber; H/S bdry = heartwood/sapwood boundary - last heartwood ring date; std devn = standard deviation; mean sens = mean sensitivity; C = bark edge present, felled the following winter; NM = not measured.

**Table 2a:** Dating evidence for the series **hlf04 1436–1526** – regional multi-site chronologies in **bold**

<i>County or region:</i>	<i>Chronology name:</i>	<i>Short publication reference:</i>	<i>File name:</i>	<i>Spanning:</i>	<i>Overlap (yrs):</i>	<i>t-value:</i>
Herefordshire	Dore Abbey	(Tyers and Boswijk 1998)	DORE2	1363–1612	91	6.9
Worcestershire	Church House, Areley Kings	(Miles <i>et al</i> 2003)	ARELEY	1365–1535	91	6.7
Herefordshire	Cradley Village Hall	(Miles <i>et al</i> 2004)	CRADLEY	1347–1530	91	6.6
Gloucestershire	Mercer's Hall, Gloucester	(Howard <i>et al</i> 1996)	GLOUCMH	1289–1541	91	6.6
Herefordshire	Pikes Farm, Michaelchurch, Escley	(Miles <i>et al</i> 2006)	MLCHRCH2	1342–1590	91	6.1
Wales	Welsh Master Chronology	(Miles 1997b)	<b>WALES97</b>	404–1981	91	6.0
Herefordshire	Dinmore Manor	(Miles and Worthington 2000)	DINMORE1	1371–1603	91	5.7
Herefordshire	Court Farm Barn, Aylton	(Bridge 2007)	AYLTON	1375–1502	67	5.6
Wales/borders	Hillside oaks	(Siebenlist-Kerner 1978)	<b>GIERTZ</b>	1341–1636	91	5.4
Essex	Magdalen Laver	(Tyers and Boswijk 1998)	MLAVER	1411–1534	91	5.4

**Table 2b:** Dating evidence for the series **hlf08 1397–1516** – regional multi-site chronologies in **bold**

<i>County or region:</i>	<i>Chronology name:</i>	<i>Short publication reference:</i>	<i>File name:</i>	<i>Spanning:</i>	<i>Overlap (yrs):</i>	<i>t-value:</i>
W Midlands	Manor House, West Bromwich	(Arnold and Howard 2009)	WBRASQ01	1318–1590	120	6.7
Worcestershire	The Commandery, Worcester	(Arnold <i>et al</i> 2006)	WORDSQ01	1284–1473	77	6.3
Shropshire	New Hall, Eaton-under-Heywood	(Miles <i>et al</i> 2004)	NEWHALL1	1390–1564	120	6.0
Herefordshire	Cathedral Barn, Hereford	(Tyers 1996)	HERECB2	1359–1491	95	6.0
Shropshire	Shropshire Master Chronology	(Miles 1995)	<b>SALOP95</b>	881–1745	120	5.8
Wales	Ty Mawr, Castell Caereinion	(Miles and Haddon-Reece 1996)	TYMAWR1	1346–1459	63	5.8
Worcestershire	Barn at Butts Bank, Broadwas	(Bridge 2006)	BUTTSEBNK	1322–1495	99	5.8
Oxfordshire	Lower Farm, Berrick Salome	(Miles <i>et al</i> 2006)	BERRICK	1352–1612	120	5.8
Oxfordshire	Magdalen College, Oxford	(Miles and Worthington 2000)	MAGDALN1	1321–1476	80	5.8
Herefordshire	Court Farm Barn, Aylton	(Bridge 2007)	AYLTON	1375–1502	106	5.5

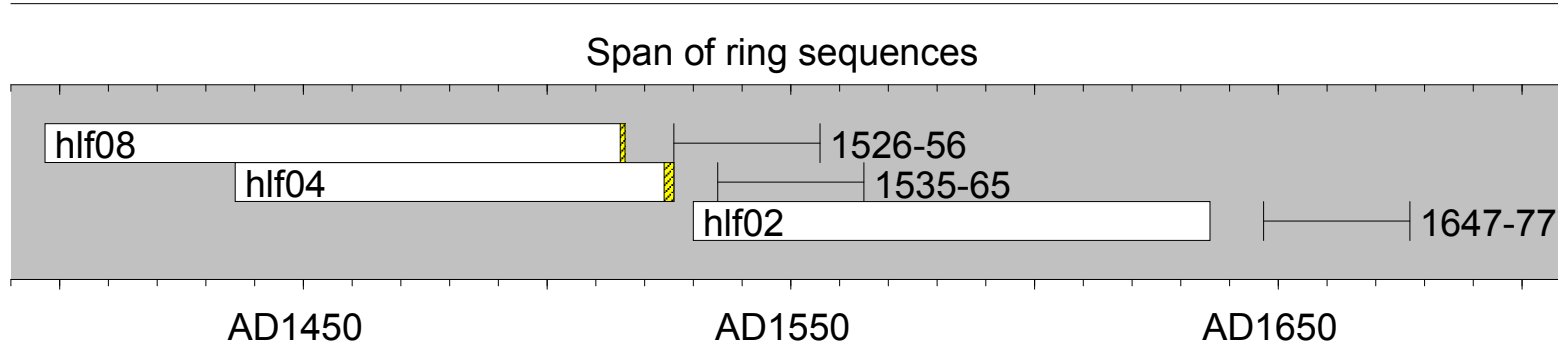


**Table 2c:** Dating evidence for the site series **hlf48m 1397–1526** – regional multi-site chronologies in **bold**

<i>County or region:</i>	<i>Chronology name:</i>	<i>Short publication reference:</i>	<i>File name:</i>	<i>Spanning:</i>	<i>Overlap (yrs):</i>	<i>t-value:</i>
Herefordshire	Cradley Village Hall	(Miles <i>et al</i> 2004)	CRADLEY	1347–1530	130	8.8
Herefordshire	Court Farm Barn, Aylton	(Bridge 2007)	AYLTON	1375–1502	106	8.2
Worcestershire	Church House, Areley Kings	(Miles <i>et al</i> 2003)	ARELEY	1365–1535	130	7.8
Gloucestershire	Mercer's Hall, Gloucester	(Howard <i>et al</i> 1996)	GLOUCMH	1289–1541	130	7.8
Shropshire	Shropshire Master Chronology	(Miles 1995)	<b>SALOP95</b>	881–1745	130	7.5
Wales	Welsh Master Chronology	(Miles 1997)	<b>WALES97</b>	404–1981	130	7.5
Herefordshire	Cathedral Barn, Hereford	(Tyers 1996)	HERECB2	1359–1491	95	7.4
Herefordshire	Pikes Farm, Michaelchurch, Escley	(Miles <i>et al</i> 2006)	MLCHRCH2	1342–1590	130	7.1
Staffordshire	Sinai Park	(Tyers 1997)	SINAI	1227–1750	130	7.0
Wales/borders	Hillside oaks	(Siebenlist-Kerner 1978)	<b>GIERTZ</b>	1341–1636	130	6.9

**Table 2d:** Dating evidence for the series **hlf02 1530–1636**– regional multi-site chronologies in **bold**

<i>County or region:</i>	<i>Chronology name:</i>	<i>Short publication reference:</i>	<i>File name:</i>	<i>Spanning:</i>	<i>Overlap (yrs):</i>	<i>t-value:</i>
Wiltshire	Salisbury Cathedral	(Miles <i>et al</i> 2005)	SARUM12	1556–1703	81	7.7
Hampshire	Hampshire Master Chronology	(Miles 2003)	<b>HANTS02</b>	443–1972	107	7.6
Gloucestershire	100 Church St, Tewkesbury	(Nayling 2000)	TEWKES2	1484–1664	107	6.9
Hampshire	St Michael's Cottage, Chilbolton	(Miles <i>et al</i> 2007)	CHLBLTN2	1504–1634	105	6.8
Wiltshire	Salisbury Cathedral	(Miles <i>et al</i> 2005)	SARUM13	1557–1719	60	6.6
Gloucestershire	Owlpen Manor	(Miles and Bridge 2010)	OWLPEN	1424–1585	56	6.2
Derbyshire	Bretby Hall	(Howard <i>et al</i> 1999)	BRTASQ04	1525–1604	75	6.2
Wiltshire	Bishop's Palace, Salisbury	(Miles and Worthington 2000)	SARUMBP7	1562–1661	75	6.1
London	London Master Chronology	(Tyers pers comm)	<b>LONDON</b>	413–1728	107	6.0
Oxfordshire	Oxfordshire Master Chronology	(Haddon-Reece <i>et al</i> 1993)	<b>OXON93</b>	632–1987	107	6.0



**Fig. 3:** Bar chart showing the relative positions of overlap of the dated samples. Yellow sections represent sapwood rings.

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## Appendix 2 HER and historical information

Table 1: Historic Environment Records (Bold indicates the building recorded, italics indicate related records)

HER no	Name	NGR	Type	Date	Description
<i>WSM 4229</i>	<i>Hillworth Court</i>	<i>SO 8360 3722</i>	<i>House</i>	<i>1836</i>	<i>Grade II listed. Red brick. Slate hipped roof. 2 storey, 3 window range. Sash windows. Centre window with cambered head in cambered recess. Door in open pedimented Tuscan pilastered doorcase. Fanlight. Service wing to right.</i>
WSM 7602	Mill Brook	SO 8377 3725	Mill	Medieval to post-medieval	Place name evidence for existence of a mill.
WSM 7604	Coneyburrow Hill	SO 8320 3750	Rabbit Warren	Post-medieval	Site of rabbit warren. Labelled on 1822 map
WSM 11382	North of Longdon	SO 8360 3680	Cropmarks	undated	Pair of linear ditches showing as cropmarks
WSM 30924	Yard Bridge Meadow	SO 8385 3670	Place name	Roman Medieval	Field name on tithe map indicates site dating to Roman and medieval period.
WSM 33899	Great Hill Pasture, Hillworth Farm	SO 8318 3726	Ridge and furrow	Post-medieval	Traces of ploughed-out ridge and furrow aligned east-west
WSM 34542	Hillworth Farm	SO 8350 3765	Weir	18 <sup>th</sup> /19 <sup>th</sup> C	Extant weir also shown on 1 <sup>st</sup> edition OS map
WSM 39034	Weir on Mill Brook	SO 8377 3728	Weir	Post-medieval	Weir recorded on 1 <sup>st</sup> edition OS map.
<b>WSM 39466</b>	<b>Hillworth Farm</b>	<b>SO 8361 3730</b>	<b>Barn</b>	<b>18<sup>th</sup> C 19<sup>th</sup> C</b>	<b>Grade II listed. Barn N of Hillworth Court. 18<sup>th</sup> C. Timber-framed. Red-brick panels. Plain tile roof. Blue lias stone plinth, higher at N end. 2 cart entrances. 19<sup>th</sup> C brick ends.</b>
<i>WSM 39467</i>	<i>Hillworth Farm</i>	<i>SO 8359 3730</i>	<i>Barn</i>	<i>Early 20<sup>th</sup> C</i>	<i>Brick and stone barn constructed between 1<sup>st</sup> and 2<sup>nd</sup> edition OS map</i>
<i>WSM 39468</i>	<i>Hillworth Farm</i>	<i>SO 8358 3727</i>	<i>Barn</i>	<i>18<sup>th</sup>/19<sup>th</sup> C</i>	<i>Brick barn shown on 1<sup>st</sup> edition OS map</i>
<i>WSM 39469</i>	<i>Hillworth Farm</i>	<i>SO 8352 3731</i>	<i>Barn</i>	<i>18<sup>th</sup>/19<sup>th</sup> C</i>	<i>Shown on 1<sup>st</sup> edition OS map. Now demolished. Part of complex of barns at Hillworth Farm.</i>
<i>WSM 39470</i>	<i>Hillworth Farm</i>	<i>SO 8352 3727</i>	<i>Barn</i>	<i>18<sup>th</sup>/19<sup>th</sup> C</i>	<i>Brick barn shown on 1<sup>st</sup> edition OS map</i>
<i>WSM 39471</i>	<i>Hillworth Farm</i>	<i>SO 8358 3737</i>	<i>Outbuilding</i>	<i>19<sup>th</sup> C</i>	<i>Shown on 1<sup>st</sup> edition OS map</i>
<i>WSM 39472</i>	<i>Hillworth Farm</i>	<i>SO 8358 3735</i>	<i>Outbuilding</i>	<i>19<sup>th</sup> C</i>	<i>Shown on 1<sup>st</sup> edition OS map</i>
<i>WSM 39473</i>	<i>Hillworth Court</i>	<i>SO 8362 3723</i>	<i>Coach house</i>	<i>19<sup>th</sup> C</i>	<i>Red brick coach house, now garage, probably same date as house (1836). Built by 1880s.</i>
<i>WSM 39474</i>	<i>Hillworth Court</i>	<i>SO 8359 3723</i>	<i>Outbuilding</i>	<i>19<sup>th</sup> C</i>	<i>Adjacent to Hillworth Court. Shown on 1<sup>st</sup> edition OS map now part demolished</i>

Table 2: Historical Trade Directories

Directory	Date	Publisher	Page	Place	Person	Information
Worcestershire General & Commercial Directory	1820	S Lewis	434	Longdon	Rayer, William	Farmer
History Gazetteer & Directory of Worcestershire	1841	Bentley	96	Longdon	Rayer, John	Farmer, Church Farm
					Rayer, Thomas	Farmer, Hill Court
					Rayer, William	Farmer, Hillworth
Post Office Directory of Birmingham with Staffordshire and Worcestershire	1850	W Kelly & Co	448	Longdon	Rayer, William	Esq. Hillworth
			449		Rayer, Thomas	Farmer, Hill Court
Directory & Gazetteer of the County of Worcestershire	1855	M Billings	335	Longdon	Rayer, John	Farmer, Hillworth
					Rayer, Thomas	Farmer, Hill Court
Post Office Directory of Worcestershire	1860	Kelly & Co	1218	Longdon	Rayer, John	Esq.
					Rayer Thomas	Farmer
History, Topography & Directory of Worcestershire	1860	Cassey & Co	193	Longdon	Rayer, Mrs	Hillworth
Post Office Directory of Worcestershire	1870	E R. Kelly	1324	Longdon	Rayer, John	Esq. Farmer, Hillworth Farm
					Rayer, Thomas	Farmer
Post Office Directory of Worcestershire	1872	E R Kelly	1609	Longdon	Rayer, John	Farmer
					Rayer, Thomas	Farmer
Directory of Worcestershire	1872	Littlebury	435	Longdon	Rayer, John	Farmer, Hillworth

Directory & Gazetteer of Worcestershire	1873	Littlebury	435	Longdon	Rayer, John	Farmer, Hillworth Farm
					Rayer, Thomas	Farmer, Buckbury
Post Office Directory of Worcestershire	1876	E R Kelly	1006	Longdon	Rayer, Thomas & Albert	Farmers
					Rayer, John	Farmer, Hillworth
Directory of Worcestershire	1884	Kelly & Co	1131	Longdon	Rayer, John	Landowner & farmer, Hillworth Farm
Directory of Worcestershire	1888	Kelly & Co	128	Longdon	Rayer, John	Landowner & farmer, Hillworth Farm
Directory of Worcestershire	1892	Kelly & Co	135	Longdon	Rayer, John	Landowner and farmer, Hillworth
Directory of Worcestershire	1896	Kelly & Co	151	Longdon	Rayer, John	Landowner and farmer, Hillworth
Directory of Worcestershire	1900	Kelly's Directories Ltd	155	Longdon	Rayer, Albert	Farmer
					Rayer, Elizabeth (Mrs)	Farmer, Hillworth Court
Directory of Worcestershire	1912	Kelly's Directories Ltd	174	Longdon	Rayer, Albert	Farmer
					Rayer, Harry	Hillworth Court
Directory of Worcestershire	1916	Kelly's Directories Ltd	169	Longdon	Rayer, Harry	Hillworth Court
Directory of Worcestershire	1924	A Lindsay Kelly	498	Longdon	Rayer, Albert jr.	Farmer, Slades Green
					Rayer, Mrs E J	Farmer
					Rayer, Edward	Farmer, Hill Court
					Rayer, Harry	Farmer, Hillworth Court
Directory of Worcestershire	1928	A Lindsay Kelly	178	Longdon	Rayer, Harry	Hillworth Court
Directory of Worcestershire	1932	Kelly's Directories Ltd	179	Longdon	Rayer, Harry	Hillworth Court
Directory of Worcestershire	1936	Kelly's Directories Ltd	181	Longdon	Rayer, Harry	Hillworth Court
Directory of Worcestershire	1940	Kelly's Directories Ltd	180	Longdon	Rayer, Harry	Hillworth Court

Table 3: Census Information

Year	Address	Name	Status	Age	Occupation	Other info
1841	Hillworth	William Rayer	Widower	74	Farmer	With 4 live-in servants
1851	Hillworth	William Rayer	Married	84	Farmer of 750 acres, employer of 36 labourers	With 4 live-in servants
		Mary Rayer	Wife	73		
1861	Hillworth	John Rayer	Married	28	Farming 430 acres with 5 men and 2 boys	With 4 live-in servants
		Mary Rayer	Wife	24		
		William R Rayer	Son	5		
		John Rayer	Son	3		
1871	Hillworth	John Rayer	Married	38	Farmer of 345 acres employing 8 men and 2 boys	With 2 live-in servants
		Elizabeth Rayer	Wife	22		
		William Rayer	Son	15		
		Thomas Rayer	Son	9	Scholar	
		Mary Rayer	Daughter	6	Scholar	
1881	Hillworth	John Rayer	Married	48	Farming 330 acres with 5 men & 3 boys	With a live-in governess
		Elizabeth Rayer	Wife	32		
		Jane Rayer	Daughter	9	Scholar	
		Albert Rayer	Son	8	Scholar	
		Fanny Rayer	Daughter	3	Scholar	
		Hannah Rayer	Daughter	2	Scholar	
1891	Hillworth	John Rayer	Married	58	Farmer	
		Elizabeth Rayer	Wife	42		
		Jane Rayer	Daughter	19		
		Albert Rayer	Son	18		
		Fanny Rayer	Daughter	13	Scholar	
		Hannah Rayer	Daughter	12	Scholar	
		Edward J Rayer	Son	10	Scholar	
		George Rayer	Son	8	Scholar	
		Harry Rayer	Son	5	Scholar	

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		John Baker Rayer	Son	4		
1901	Hillworth	Elizabeth Rayer	Widow	52	Farmer	Employer
		Jane Rayer	Daughter	29		Work at home
		Hannah Rayer	Daughter	22		Work at home
		Edward J Rayer	Son	19		Work at home
		Harry Rayer	Son	16		Work at home
		John Baker Rayer	Son	14		Work at home
		Elizabeth F Rayer	Daughter	9		

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### **Appendix 3 The archive**

The archive consists of:

- 8 Fieldwork progress records AS2
- 10 Photographic records AS3
- 357 Digital photographs
- 14 Scale drawings
- 1 Computer disk

The project archive is intended to be placed at:

Worcestershire County Museum  
Hartlebury Castle  
Hartlebury  
Near Kidderminster  
Worcestershire DY11 7XZ  
Tel Hartlebury (01299) 250416