# Historic Building Appraisal:

# The Roof Structure of
# The Tudor Wing
# Fawsley Hall Hotel
# Fawsley, Northamptonshire

Planning App. Ref. DA/2017/0246



May 2017


Souterrain Archaeological Services Ltd

*for*

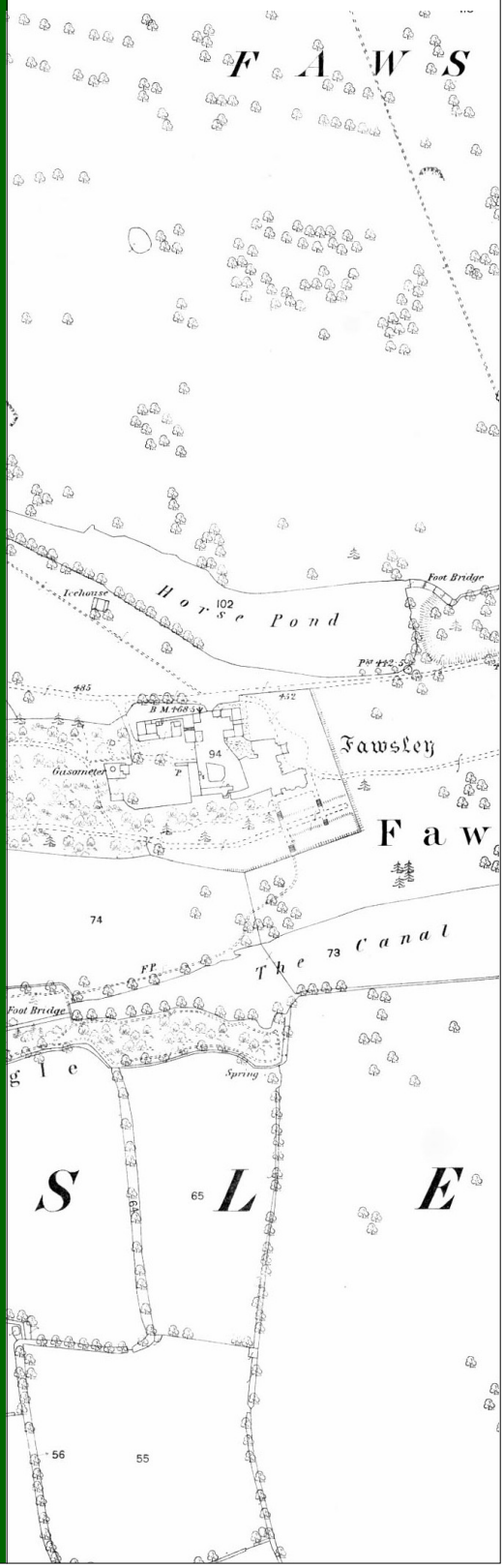
Architecture Design Development Ltd

*on behalf of*

Hand Picked Hotels


Souterrain

**Archaeological Services Ltd**



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# The Roof Structure of
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# Fawsley, Daventry,
# Northamptonshire NN11 3BA

(NGR 456203, 256799)

(LBC APP. REF.: DA/2017/0246)

SOU17-534

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**Souterrain Archaeological Services Ltd,**

*for*

**Hand Picked Hotels**
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***Preface***

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## 1. THE HISTORIC BUILDING APPRAISAL

1.1 This document is an historic building appraisal of the roof structure of the building known as 'The Tudor Wing. It has been prepared for *Architecture Design Development Limited*, on behalf of *Hand Picked Hotels*, to accompany an application for Listed Building Consent for the replacement / refurbishment of the roof structure. The appraisal has been prompted by Rachel Booth, Conservation Officer for Daventry District Council (DCC).

1.2 The appraisal presents an analysis the roof structure, assessing the character of its key components, chronology and phases of construction. It provides a diagrammatic phase plan of the roof structure, accompanied by a full set of annotated digital photographs and a plan showing the direction of each photograph.

1.3 The purpose of the assessment is to provide an informed record of the historic character of the roof structure that will, in turn, allow informed decisions to be made with regard to conservation needs.

## 2. LOCATION

2.1 Fawlsey Hall Hotel is located 5 km south of Daventry in Northamptonshire. It is situated within Fawsley Park, a registered parkland of 330 ha. The hotel complex occupies c.2 ha. and stands upon a low spur at about 143 m OD; centred at NGR 456221, 256786.

2.2 The focus of this historic building appraisal is the The West Range (Fig.1; Plates 1 to 3), now known as either the Tudor Wing or the Brewhouse. It is centred at NGR 456203, 256799.

## 3 THE HISTORIC BUILDING

### *Outline History*

3.1 Fawsley Hall is the name given to a historic manorial complex ranging in date from the 16th century through to the late 19th century. The manor of Fawsley was the principal possession of the Knightley family from 1416 until the 1930s. The construction of the primary building, the hall is credited to Sir Edmund Knightley and is understood to have taken place at some time between 1537 and 1540[1]. It is thought that, to some extent, the hall was a remodelling of an earlier manor house, although no fabric earlier than 16th century has yet been identified (Toleman, 1990, 6).

3.2 Further buildings were added in the 16th century. These were ranged around a service court on the west side of the hall (Fig. 1). All of the buildings were constructed in coursed, square ironstone, with limestone dressings. A Southern Range, which stands immediately SW of the hall, housed a kitchen and a bakehouse on the ground floor, while the first floor provided guest accommodation. A long West Range, running parallel to the hall, is also thought to have been built for accommodation (*post*. 3.4).

3.3 New residential buildings were erected by Lucy Knightley in 1732. The surrounding parkland, which originated in the 13th century, was landscaped in the late 18th century by Lancelot Brown. Further residential buildings were added in the 19th century by Sir Charles Knightley

[1] Wood, M 1965 (1981), *The English Medieval House* (London); Toleman, 1990, *Fawsley Hall: Genesis, Decline and Renaissance,* (unpublished BSc dissertation),Mackintosh School of Architecture

(d. 1864) and his son Rainald (d. 1895). The property was abandoned as a residence after 1913. For a while, the buildings were used by timber and agricultural industries, but later fell into decline and, ultimately, ruin. In 1975, Fawsley Hall was bought by Terry Saunders, a local entrepreneur, who began its restoration. It first opened as a hotel in 1998. Fawsley Hall is now a Grade I listed building[2] and the nearby Stable Block (Knightley Court) is Grade II listed[3]. It was designated a Grade II* park and garden in 1984.

***The West Range (Tudor Wing / Brewhouse)***

3.4 In 1990, Adam R. Toleman produced the first comprehensive architectural study of the chronological development of the building complex at Fawley Hall. He proposed that the stone-built Southern Range was the first building to be appended to the hall and that the erection of the West Range followed not long after. Interestingly, he suggested that, prior to construction of the West Range, a free-standing wooden kitchen had stood on the west side of the present service court. He postulated that the West Range was initially built as lodgings but underwent complete conversion in the latter half of the 16th century. The ground floor became a brewhouse, a laundry and a dairy, while the first floor was transformed into a gallery, running the full length of the range. The gallery incorporated a large timbered ceiling, which spanned the length of the building and featured an *oriel* at its south-eastern end. Significantly, Toleman states that the upper floor was re-roofed during the conversion project.

3.5 Toleman's 16th century development sequence for Fawsley Hall, while feasible, still remains hypothetical, based on superficial observations. No absolute dates have yet been achieved by dendrochronology (tree-ring dating) at Fawsley Hall.

## 4. THE ROOF RESTORATION PROPOSAL

4.1 The roof of the Tudor Wing has been a cause for concern for some time. Many tiles have slipped from the roof and significant movement has been evidenced[4]. In view of this, an application for Listed Building Consent has been submitted to DCC for the replacement/ refurbishment of the structure and the roof tiles (DA/2017/0246). The intention is to remove the roof covering and replace the oak rafters and purlins. The existing clay tiles are to be carefully removed and, where possible, re-used alongside reclaimed red clay tiles[5].

4.2 On 11th October 2016, the architect held a site meeting with the Conservation Officer. The building was inspected from outside and access was gained into the roof space. It was noted that although much altered, the roof incorporates original/historic fabric. Consideration was given to the existing purlins which appeared to undersized and incorrectly orientated to give support to the rafters[6].

4.3 An inspection of the roof was subsequently made by the structural engineer on the 26th October 2016[7]. Observed from the outside, the following was noted: '*visible undulations could be viewed at at the ridge level and to the tiled finish of the roof. The peaks of the roof*

[2] List Entry Number: 1075281, 18.09.1953
[3] List Entry Number: 1075282, 18. 09.1958
[4] *Hand Picked Hotels Limited, Fawsley Hall Hotel, Daventry Design & Access Statement : Refurbishment/Replacement Of Tudor Wing Roof,*1616 - D01, March 2017
[5] Ibid. Section 8
[6] op. cit. *Design & Access Statement*
[7] Bell Munro Consulting, Re. Fawsley Hall Hotel, Daventry – Roof Survey ref. J488608116, 8.11.2016



**Plate 1. The West Range (Tudor Wing) from the northwest, 2017**



**Plate 2. The West Range (Tudor Wing) from the northwest, c. 1970s**

*conicided with the truss positions and the toughs coincided with the mid span of the ridge beams and purlins. A visible sag in the roof finishes could also be viewed extenally where the rafters had distorted just above eaves level.'* On inspecton of the roof interior, numerous defects to the structure were observed, a number of which are described in BMC drawing ref. J4886/01 submitted with the application for Listed Buidling Consent.

4.4 It is known that the hotel was extensively refurbished/rebuilt in the late 1970s and that repairs were made to the roof timbers of the West Range at that time. An approved drawing with DDC Planning Application DA/77/0178/LB (1977) notes: '*existing roof structure & oak beams are in good condition. Renew roof tiles. Treat all timbers with preservative and replace any defective rafters. Provide and fix new roofing felt and battens and retile using existing tiles. Provide 2" fibreglass insulation to roofspace*.'[8]



**Plate 3. The West Range (Tudor Wing) from the north, 2017**

[8] Information from Rachel Booth, Conservation Officer DDC

## 5. OBSERVATIONS

5.1 In this section the numbers in bold refer to photographs at Section 8. The photograph viewpoints are shown on Figure 3. The red and white metric scales which appear in the photographs are 2 m in length with divisions of 0.2 m.

***Trusses***

5.2 The West Range is aligned SE/NW. The roof has six bays, divided by A-frame trusses (collar and tie beam with a ridge purlin and two tiers of trenched purlins). The facing side of each truss is to the NW. The trusses are numbered consecutively from SE to NW using incised Roman numerals (Fig, 2; **49** to **55**). An additional incised mark, or 'flag' has been used to denote the SW side. Six trusses are visible (II to VII), Truss I being obscured by a 20th century gable end wall and stack (**1**, **11**). Carpenter's setting-out marks are visible on other faces of principal rafters and collar beams (**56**, **59**). The members of Truss VII are flush on its facing side, possibly denoting that it was intended as an external face (i.e. to allow water run-off). The principal rafters have trenched purlins. The tie beam of each truss (in this case also the ceiling beam) has empty diminished haunch joint joists (**34** and **35**).

5.3 All of the trusses (II to VII) are intact, *in situ*, and consistent with a single build phase, which probably took place in the latter half of the 16th century (*post.* 6.7).

5.4 The principal rafters were either adze-cut (**58**) or trestle-sawn (**57**), the collar beams trestle-sawn. The collars are cranked. Trusses II to IV are of notable clean appearance (as are the common rafters in each of these bays). Truss V has suffered severe damage from a fire at some juncture, particularly to its facing side (NW) which is charred. Trusses V to VII are smoke-blackened from the fire (as are the common rafters in these bays). The collar-beam of Truss VII (end frame) is partially decayed, probably as a result of exposure.

***Purlins***

5.5 The main purlins are consistent with the original build phase (Fig 2). It is likely that outer face of each purlins was utilised with cortex intact. The broken purlins are noted in the bay descriptions (*post*. 5.10 – 5.24) and are shown on Figure 2.

***Rafters***

5.6 The majority of the rafters are consistent with the original build phase (Fig 2). These are oriented flatways and pegged. Significantly, the weathering/decay of the outer side of each purlin has produced a 'plinth' effect below the majority of the rafters, evidence that they are likely to be *in situ* (**16**). Replaced rafters, are noted in the bay descriptions (*post.* 5.10 – 5.24) and differentiated in Figure 2.

5.7 In the course of 20th century repairs the eaves of the roof were raised above the wall plate (e.g. **6**, **31**, **32**), to control rainwater run-off into guttering. This was done by means of fixing a pinewood rafter extension (on-edge) to the bottom end of each of the original flatways rafters, all of which were set in cement above the wall plate; the latter no longer visible. This modification undoubtedly accounts for the structural engineer's observations (*ante*. 4.3), viz: [the] '*visible sag in the roof finishes when viewed extenally where the rafters had distorted just above eaves level*'. It is presumed that the use of cement in this manner will have had a detrimental effect on the bottom end of each original rafter, although the extent of damage is presently unknown.

***Tiles***

5.8 The roof is clay-tiled. The presence of roofing felt throughout the roof shows that all of the tiles were removed and replaced in the 1970s restoration. Since the felt is intact, the method of fixing could not be ascertained, but the use of cement mortar cannot be precluded, particularly as it has been used extensively in the 1970s restoration to secure rafters and rafter extensions (*ante*.5.7).

***Phases of repair***

5.9 At least two clear phases of repair and or replacement are present in the roof structure. The first phase is thought to have probably taken place in the late 19th century. The second phase, took place in the late 20th century. Repairs were also made to Bay 6 following fire damage, which may denote a separate phase, perhaps prior to the 19th century (*post.* 5.21).

***Bay Descriptions***

***Bay 1***

5.10 The ridge purlin, upper and lower purlins, and the majority of flatways rafters are all consistent with the original build phase, and are *in situ* (Fig 2; SW side: **2** - **5**; NE side: **7** - **9**). On either side of the bay, the bottom ends of the flatways rafters are set in cement above the wall plate. Each rafter has a modern pine extension (**6**). The upper purlin on the NE side has evidence of localised historic weathering.

5.11 A lower tier purlin has been fitted to the NE side, fixed by pine blocks and iron bands. The apparent use of cut nails suggests that the repair was carried out in the 19th century.

***Bay 2***

5.12 As with Bay 1, the majority of timbers are consistent with the original build phase and are *in situ* (Fig 2; SW side: **11** - **13**; NE side: **10**, **14** & **15**). On either side of the bay, the bottom ends of the flatways rafters have modern extensions and are set in cement above the wall plate.

5.13 The additional lower tier purlin (19th century) continues on the NE side, fixed by pine blocks and iron bands. Three of the flatways rafters were foreshortened in the 19th century to insert a brick stack. The upper purlin on the SW side has a fracture near to the principal rafter of Truss III (**17** & **18**). This has a 19th century pine block support nailed to the truss.

***Bay 3***

5.14 The majority of timbers are consistent with the original build phase (Fig 2). As in Bays 1 and 2, the extent of survival is better on the SW side of the bay. The flatways rafters are likely to be *in situ.* On the NE side, only four complete flatways rafters survive.

5.15 At some juncture in antiquity, the NE side of the bay suffered serious damage and/ or decay (**22**-**24**). Both the upper and the lower purlin have a corresponding missing section. In the 19th century, the gaps were bridged by means of pine splints, fastened to the surviving purlin sections by iron bands and held by pine blocks nailed to the principal rafters (**20** - **23, 25** - **26**). Above the damaged side of the roof, the ridge purlin has a fracture where it is scarfed close to Truss IV (**24**-**24a**). The ridge was supported in the late 20th century, by an improvised collar and post ridge nailed to the upper purlins. The lower tier purlin of Bays 1 and 2 is continued in bay 3. This is comprised of two lengths of pine, fastened with iron bands.

5.16 On both sides of the bay, the bottom ends the flatways rafters have modern extensions and are set in cement above the wall plate.

***Bay 4***

5.17 The majority of timbers are original and consistent with the original build phase (Fig. 2). All of the original flatways rafters appear to be *in situ*. However, the NE side purlins have failed and crude attempts have been made to prop them (**28**, **30**). The lower purlin has two fractures towards Truss V (**30**, **30a**), and the upper purlin has a fracture in its centre (**29**, **29a**). Both purlins are bowed.

5.18 As witnessed in Bays 1 to 3, the extent of preservation of original fabric is much better on the SW side of the bay (**31**, **33**) than it is on the NE side. Yet again, the flatways rafters on the SW side have modern extensions to them and have been set in cement above the wall plate (**31**, **32**). On the NE side, the northernmost rafters have been curtailed by the insertion of a stone gable, which is probably a 19th century addition. All of the original timbers become smoke-blackened towards Bay 5. Visibility to the upper part of the bay was restricted due to heating appliances.

5.19 In this bay, a clear example of the tie beam may be seen. This has diminished haunch joist joints with 20th century on-edge replacement joists (**33**, **34**). Where a section of the modern ceiling is missing chamfered ceiling beams have been exposed (hidden from view from below by a modern ceiling).

***Bay 5***

5.20 The majority of timbers are original and consistent with the original build phase (Fig. 2) and *in situ*. All original fabric is blackened from a roof fire, particularly Truss V, the upper purlins, upper rafters which are charred (**36**, **37**, **39**). The preservation of original fabric is better on the SW side (**37, 39**) than it is on the NE side, the latter which was disturbed by the insertion of a 19th century stone gable (**38, 40**). Protruding beams of the gable rest on the lower purlin, undoubtedly applying pressure to the original roof frame (**41**). An improvised raking strut (modern) supports the upper purlin on the NE side.

***Bay 6***

5.21 Truss VI was evidently closer to the source of the blaze, being very charred (**42**). All of the original roof fabric is either charred or smoke-blackened to a varying degree (Fig. 2). The ridge purlin and several rafter upper sections were evidently replaced as a result of fire damage. The replacements are oak and in-keeping with the original build technique (i.e. flatways rafters). They are possibly re-claimed timbers (Fig. 2; **43**, **44**, **48**). It is not known when the fire occurred, or when the repairs took place, but both events pre-date the 1970s restoration.

5.22 The lower purlin on the NE side has a notable fracture (**47**, **47a**), while the corresponding purlin on the other side has bowed, supported by an improvised strut.

5.23 In the 20th century restoration, on-edge pinewood rafters were installed on either side of the bay, raising the roof away from the original roof plane. Equally, on both sides, the bottom ends the flatways rafters have modern extensions and are set in cement above the wall plate.

5.24 The end frame (Truss VII, **45**, **46**) stands between c. 0.05 m and c. 0.08 m away from the stone-built gable wall. It was possible to determine that the collar/ principal rafter joint is

flush on the facing side, indicating that it was probably originally intended as an external wall. The collar is partially decayed.

## 6. CONCLUSIONS AND DISCUSSION

6.1 The purpose of this appraisal has been to examine, assess the character and date of the key components of the timber roof structure.

### *Phases of Construction and Repair*

6.2 It is concluded that the majority of key components are consistent with a single phase of construction, and are *in situ.* The key original components, as shown on Figure 2, are trusses (composed of cranked collar and tie beam); ridge purlin and two tiers of trenched purlins; and common rafters, orientated flatways.

6.3 The SW side of the roof is in more complete state than the NE side. Construction work in the 19th century resulted in the part-removal of rafters in two areas on the NE side: in Bay 2, where a brick stack was inserted; and in Bays 4 and 5, where a stone and brick gable was appended to the building. It appears that the gable beams have affected the purlins on this side of the bay, both of which are fractured.

6.4 In addition, the NE side of Bay 3 has suffered serious historic damage whereby the ridge purlin was fractured and the upper and lower purlins were completely severed, eventually decaying at the break. The cause of the damage is uncertain.
Remedial, repairs were carried out in the 19th century.

6.5 The two bays at the NW end of the roof (bays 5 and 6) have suffered damage from a serious blaze, charring Truss VI and other roof members, and necessitating replacement of the ridge purlin in Bay 6. It appears that the fire resulted in distortion of the original roof plane, for in Bay 6, a modern set of on-edge rafters have been inserted to raise the roof away from the original rafters.

6.6 The roof has undergone two distinct phases of repair: in the 19th century and in the 1970s.

### *Stylist Date Estimate*

6.7 Based on key features of the original roof structure a Stylist Date Estimate has been achieved, by means of the *Building Archaeology Research Database* (BARD) feature checklist. The introduction and longevity of architectural trends vary throughout the country, it is estimated that the roof was erected in the late 16th century. The key stylistic features recorded are as follows:

| **Key Feature** | **Approx. date span** |
|---|---|
| Flatways orientated rafters | gen. up to 1560s |
| Cranked collar | gen. up to mid 1550s |
| Trestle sawn (principal rafters) | gen. up to c. 1600 |
| Former diminished haunch joist joints (on tie beams) | gen. 1550s to 1670s |

6.8 The Stylistic Date Estimate fits broadly with Toleman's hypothesised development sequence for Fawsley Hall (*ante*. 3.4 - 3.5).

***Potential for Absolute Dating*** by Andy Moir

6.9 The timber building was also assessed for its suitability to achieve an absolute date for its construction by dendrochronology (tree-ring dating). Oak timbers with more than 50 rings, traces of sapwood or bark, and accessibility were the main considerations. The majority of the roof timbers are oak and very consistent in size. The survival of original oak timbers in the roof appears very complete, with the exception of two small areas on the NE side of the roof (the area of 19th repairs between trusses II and IV and fire-damaged trusses VI and VII).

6.10 The majority of roof timbers appear to be oak and to contain more than 100 rings. Full sapwood was identified on some timbers, so the roof timbers appear very suitable for dendrochronological dating. No wall-frame timbers were observed. The majority of transverse beam timbers in the first floor and tie beams also appear to contain more than 100 rings. The heartwood/sapwood boundary could be identified on a few of these timbers, so it should be possible to identify whether these timbers are broadly co-eval with the roof.

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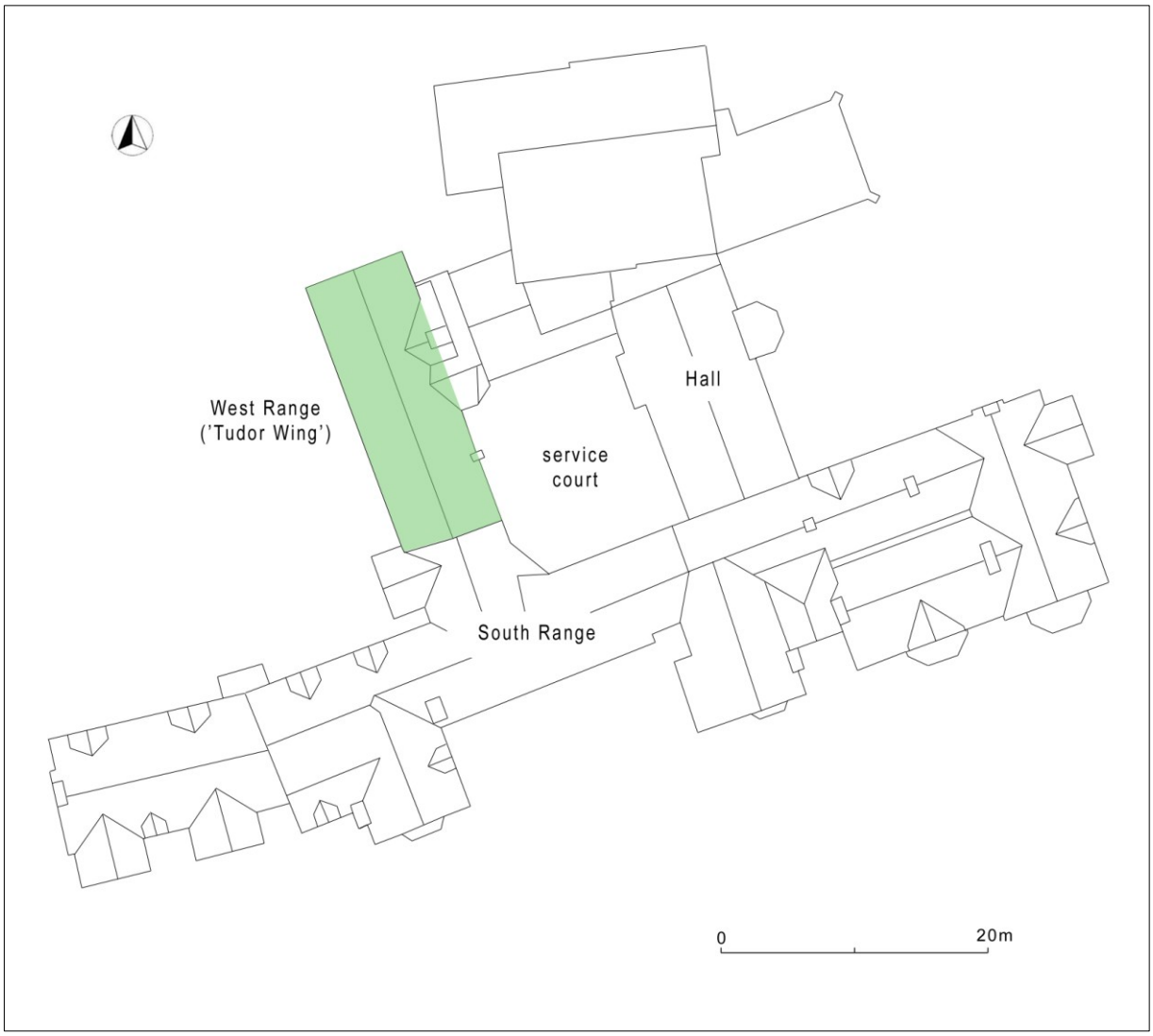



**Figure 1. Location of the Tudor Wing at Fawsley Hall**

EXISTING COURTYARD AREA

ADDIOTIONAL MODERN RAFTERS

POST MEDIEVAL REPAIRS

APPROX. POSITION OF LOFT ACCESS HATCH

VII VI V IV III II I

BAY 6 BAY 5 BAY 4 BAY 3 BAY 2 BAY 1

ORIGINAL PURLIN (LATE C16)

ORIGINAL BEAM (LATE C16)

BLACKENED ORIGINAL RAFTER (LATE C16)

TRUSS (LATE C16)

REPLACED/ADDITIONAL PURLIN

REPLACED RIDGE PURLIN

REPLACED/ADDITIONAL RAFTER

BROKEN PURLIN

0 4M

BUILDING PLAN: BELL MUNRO CONSULTING LTD

FIGURE 2: DIAGRAMATIC PHASE PLAN OF THE ROOF STRUCTURE




BUILDING PLAN: BELL MUNRO CONSULTING LTD

FIGURE 3: DIRECTION OF PHOTOGRAPHS

## 8. Photographs of the roof structure

**BAY 1**



**1.** Overview from Bay 2. Truss II and NE side



**2.** SW side, upper view. All consistent original build, *in situ*



**3.** SW side, lower view. All consistent original build, *in situ, e*xcept C20th lower extensions to common rafters



**4.** SW side. Central overview of rafters and Truss III. All consistent original build, *in situ*



**5.** Truss III, rear side, upper. Original build, *in situ*



**6.** SW side. C 20th extensions to common rafters, cemented above wall plate. Truss III to right: principal rafter-tie beam joint

**BAY 1**



**7.** NE side, lower view. C20th additional lower tier purlin and extensions to flatways rafters cemented above wall plate. All other timbers original, *in situ*



**8.** NE side, upper view. All timbers original build *in situ.* Upper purlin with localised historic weathering



**9.** NE side, lower view. C20th additional lower purlin and extensions to flatways rafters, cemented above wall plate. All other timbers original build *in situ*

**BAY 2**



**10.** NE side. Upper view, Truss II (facing side). All timbers consistent original build, *in situ*



**11.** SW side, Truss II (facing side) All timbers consistent original build, *in situ* (except C20th rafter extensions)

**BAY 2**



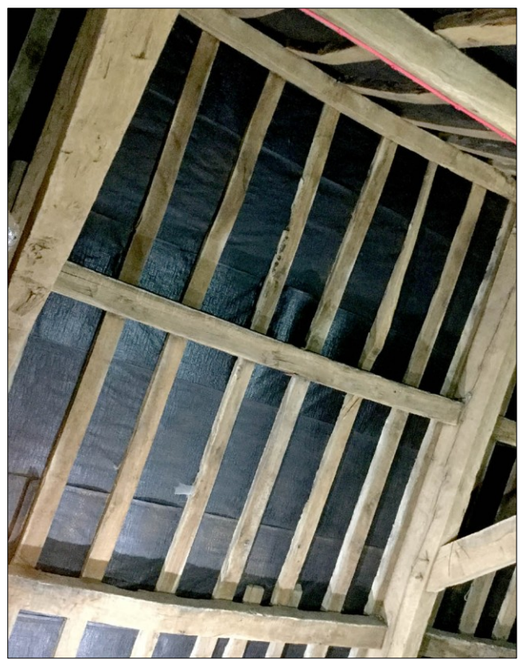
**12.** SW side, lower view. All main timbers are original *in situ*



**13.** SW side, upper view. All timbers consistent with original build, *in situ*



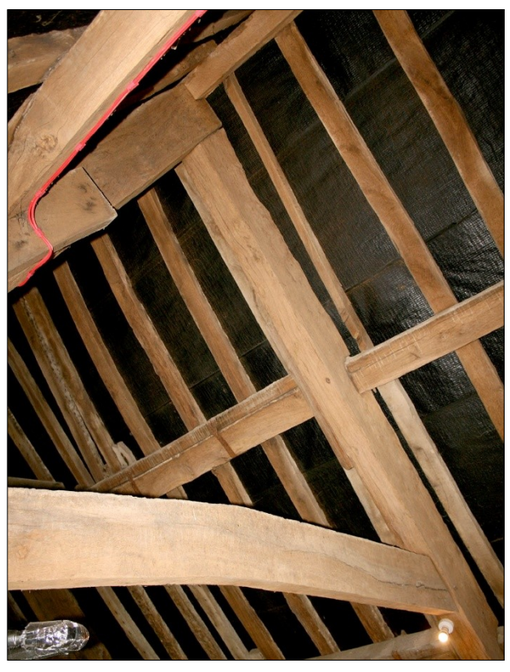
**14.** NE side, lower view. Main timbers original, *in situ.* Three flatways rafters sawn off to insert C19th brick stack. Additional (C20th) lower tier nailed purlin



**15.** NE side, upper view. All original build *in situ*



**16.** NE side. Lower purlin, showing typical weathered of outer side of purlin between flatways rafters. All original build *in situ*



**17.** Truss III. View of NE side of roof from Bay 2



**18.** Truss III, SW side. Broken upper purlin (original) with C 19th pine block repair



**19.** NE side. Truss III (facing side), overview



**22.** NE side, overview. C19th splint repairs to upper and lower (original) purlins



**21.** Truss IV (rear side), overview of roof. Modern collar and post supports broken ridge purlin



**20.** Truss III (facing side). Severed upper purlin on NE side(L) with C19th repair (splint-purlin fastened by iron bands and pine blocks nailed to principal rafters)

**BAY 3**



**23.** NE side. C19th repairs to decayed roof section. Severed lower purlin with splint repair. Additional lower tier purlin in two sections, fastened with iron bands. Only four original flatways rafters *in situ*



**24a.** Detail of broken ridge purlin

**BAY 3**



**24.** Vertical view of NE side. Ridge purlin broken at scarf joint, supported by C20th collar and post nailed to upper purlins



**25.** NE side. Truss III (facing side). C19th splint repair to upper purlin



**26.** NE side. Truss IV (rear). C19th splint repair to broken lower purlin. Additional C19th lower tier purlin to right

**BAY 4**



**27.** NE side. Truss VI (facing side) and purlins *in situ*



**28.** NE side. Truss V (rear side). Original lower purlin *in situ* with improvised C19th/ C20th props



**29.** NE side. Broken upper purlin. Flatways rafters depleted lengths below lower purlin



**29a.** NE side. Detail of fracture in upper purlin.



**30.** NE side. Lower purlin (original) with fractures. Truss V to left. Original flatways rafters curtailed by gable insertion. C19th/ C20th props



**30a.** NE side. Detail of fractures in lower purlin

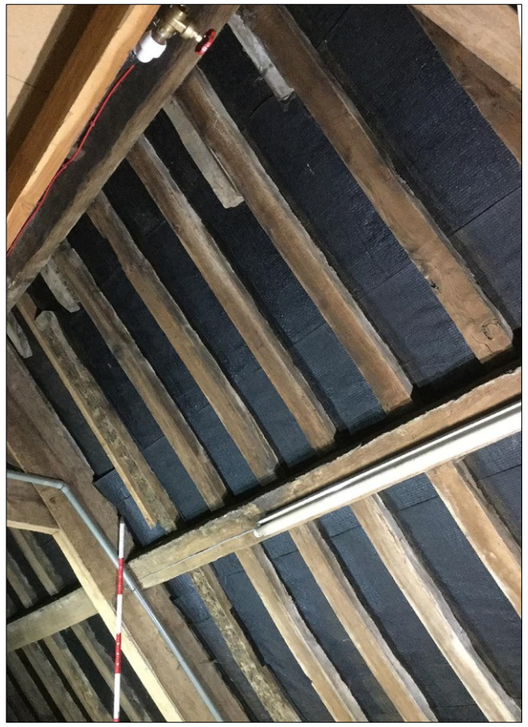


**31.** SW side, lower view. Original lower purlin and flatways rafters *in situ*. C20th extensions to rafters set in cement, raising eaves above wall plate

## BAY 4



**32.** SW side, lower view. C20th extensions to flatways rafters (all members set in cement). Tie beam / principal rafter (Truss V) joint



**33.** SW side, upper view. Original upper purlin and flatways rafters *in situ*. C20th strengthening repairs (?extensions) to upper ends of at least four rafters (restricted visibility)



**34.** Tie beam with diminished haunch joint joist mortices. C20th on-edge replacement joists



**35.** Diminished haunch joint joist mortices. C20th on-edge replacement joists Chamfered beams concealed by C20th ceiling

## BAY 5

**37.** Truss V, facing side. Overview of SW side of roof frame





**36.** Truss V, facing side. Overview of NE side of roof frame

**BAY 5**



**38.** NE side. Original purlins, *in situ*; lower purlin bowed. Original flatways rafters *in situ,* but mostly severed at or below level of lower purlin. C20th on-edge rafters behind flatways rafters



**39.** SW side, upper view. Ridge purlin, upper purlin and flatways rafters *in situ.* Smoke-blackened from a roof fire. Top left: C20th on-edge rafters lap-jointed to ridge purlin



**40.** NE side. Truss VI (rear side). C20th improvised strut



**41.** NE side. C19th gable beams rest on bowed lower purlin (*in situ*)

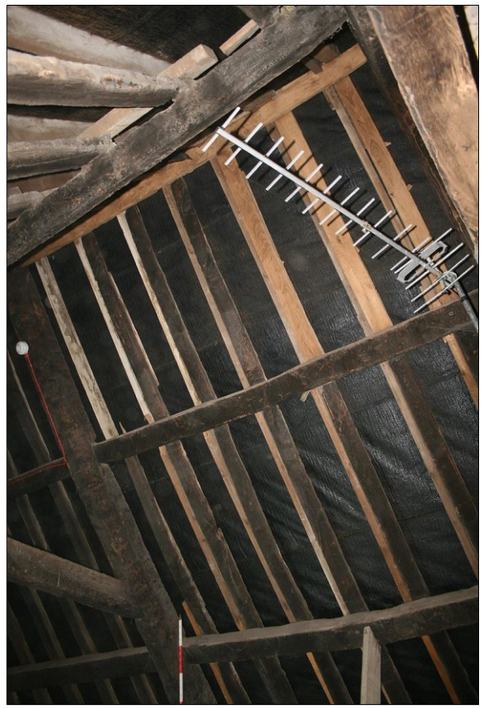
**BAY 6**



**42.** SW side. Truss VI (facing side), charred and blackened. C20th on-edge pinewood rafters raise roof away from flatways rafters.



**43.** SW side. Lower view. Smoke blackened flatways rafters with C20$^{th}$ on-edge rafters behind



**44.** SW side. Upper view. Reclaimed oak ridge purlin and replaced (clean) sections of flatways rafters

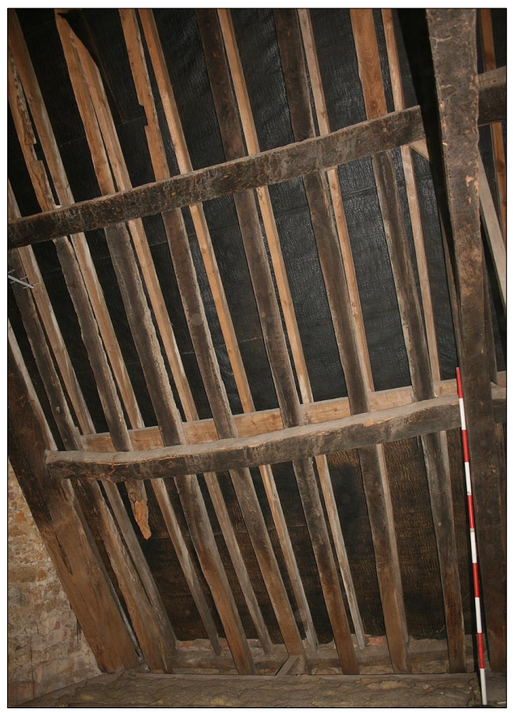


**45.** Truss VII. Stone-built gable end with brick dressings



**46.** Truss VII. Upper view

**BAY 6**



**47.** NE side. lower view. Smoke-blackened purlins and flatways rafters **in situ**. Lower purlin broken



**47a.** NE side. Detail of fractured lower purlin



**48.** NE side. upper view Smoke-blackened flatways rafters with replaced upper sections. C20$^{th}$ on-edge rafters behind. Reclaimed oak ridge purlin

## Carpentry Marks



**49. Truss II** (facing side).. Numeral Inscribed across principal rafter and collar beam



**50. Truss II** (facing side, SW). 'Flagged' numeral, inscribed across principal rafter and collar beam



**51. Truss III** (facing side). Numeral Inscribed across principal rafter and collar beam joint



**52. Truss IIII** (facing side, SW). 'Flagged' Numerals inscribed on principal rafter and collar beam



**53. Truss IIII** (facing side). Numerals inscribed across principal rafter and collar beam



**54. Truss V** (facing side). Numerals inscribed on principal rafter and collar beam



**55. Truss VI** (facing side). Numeral inscribed on principal rafter



**56. Truss IV** (rear, SW side). Setting out marks inscribed on rear of collar beam



**57. Truss V** (rear, SW side). Typical example of trestle saw marks on principal rafter



**58. Truss II** (rear, SW side). Adze tooling marks and setting out mark



**59. Truss IV,** NE side. Setting out and tooling marks on under side of principal rafter on NE side



**60.** View of SE gable from the service court yard (NE side) . 19th century stack to right



**61.** Close-up of SE gable) showing Truss I. The gable may have been timber-framed



**62.** SE end of the Tudor Wing from the service courtyard

## APPENDIX 1. PHOTOGRAPHIC INDEX

### Digital Photographs (Archive: CD)

| No. (report) | Image No. | Direction (facing) | Description |
|---|---|---|---|
| 1 | IMG_5985 | SE | **BAY 1**. Overview from Bay 2. Truss II and NE side |
| 2 | IMG_5964 | SW | **BAY 1**. SW side, upper view. All consistent original build, *in situ* |
| 3 | IMG_5965 | SW | **BAY 1**. SW side, lower view. All consistent original build, *in situ, e*xcept C20th lower extensions to common rafters |
| 4 | IMG_5969 | NW | **BAY 1**. SW side. Central overview of rafters and Truss III. All consistent original build, *in situ* |
| 5 | IMG_5967 | NW | **BAY 1**. Truss III, rear side, upper. Original build, *in situ* |
| 6 | IMG_2312 | NW | **BAY 1**. SW side. C 20th extensions to common rafters, cemented above wall plate. Truss III to right: principal rafter-tie beam joint |
| 7 | IMG_2320 | SE | **BAY 1**. NE side, lower view. C20th additional lower tier purlin and extensions to flatways rafters cemented above wall plate. All other timbers original, *in situ* |
| 8 | IMG_2322 | SE | **BAY 1**. NE side, upper view. All timbers, original build, *in situ.* Upper purlin with localised historic weathering |
| 9 | IMG_5973 | NE | **BAY 1**. NE side, lower view. C20th additional lower purlin and extensions to flatways rafters, cemented above wall plate. All other timbers original build *in situ* |
| 10 | IMG_2326 | SE | **BAY 2**. NE side. Upper view, Truss II (facing side). All timbers consistent original build, *in situ* |
| 11 | IMG_5990 | S | **BAY 2** SW side, Truss II (facing side) All timbers consistent original build, *in situ* (except C20th rafter extensions) |
| 12 | IMG_5996 | SW | **BAY 2**. SW side, lower view. All main timbers are original *in situ* |
| 13 | IMG_2335 | SW | **BAY 2**. SW side, upper view. All timbers consistent with original build, *in situ* |
| 14 | IMG_2342 IMG_5983 | SE | **BAY 2**. NE side, lower view. Main timbers original, *in situ.* Three flatways rafters sawn off to insert C19th brick stack. Additional (C20th) lower tier nailed purlin |
| 15 | IMG_5978 | SE | NE side, upper view. All original build *in situ* |
| 16 | IMG_2339 | N | **BAY 2**. NE side. Lower purlin, showing typical weathered of outer side of purlin between flatways rafters. All original build *in situ* |
| 17 | IMG_2369 | N | **BAY 2**. Truss III. View of NE side of roof |
| 18 | IMG_2366 | NW | **BAY 2**. Truss III**,** SW side. Broken upper purlin (original) with C 19th pine block repair |
| 19 | IMG_2371 | SE | **BAY 3**. NE side. Truss III (facing side), overview |
| 20 | IMG_2373 | SE | **BAY 3**. Truss III (facing side). Severed upper purlin on NE side(L) with C19th repair (splint-purlin fastened by iron bands and pine blocks nailed to principal rafters) |
| 21 | IMG_6017 | NW | **BAY 3**. Truss IV (rear side), overview of roof. Modern collar and post supports broken ridge purlin |
| 22 | IMG_2348 | NE | **BAY 3.** NE side, overview. C19th splint repairs to upper and lower (original) purlins |
| 23 | IMG_6030 | E | **BAY 3**. NE side. C19th repairs to decayed roof section. Severed lower purlin with splint repair. Additional lower tier purlin in two sections, fastened with iron bands. Only four original flatways rafters *in situ* |
| 24 | IMG_6028 | E/Vt. | **BAY 3**. Vertical view of NE side. Ridge purlin broken at scarf joint, supported by C20th collar and post nailed to upper purlins |
| 24a | - | E/Vt. | **BAY 3.** Detail of broken ridge purlin |
| 25 | IMG_2354 | SE | **BAY 3**. NE side. Truss III (facing side). C19th splint repair to upper purlin |
| 26 | IMG_2357 | NE | **BAY 3**. NE side. Truss IV (rear). C19th splint repair to broken lower purlin. Additional C19th lower tier purlin to right |

| No. (report) | Image No. | Direction (facing) | Description |
|---|---|---|---|
| 27 | IMG_2388 | SE | **BAY 4**. NE side. Truss VI (facing side) and purlins *in situ* |
| 28 | IMG_6032 | N | **BAY 4**. NE side. Truss V (rear side). Original lower purlin *in situ* with improvised C19th/ C20th props |
| 29 | IMG_2391 | NW | **BAY 4**. NE side. Broken upper purlin. Flatways rafters depleted lengths below lower purlin |
| 29a | IMG_2391 | NW | **BAY 4**. NE side. Detail of fracture in upper purlin. |
| 30 | IMG_6035 | E | **BAY 4**. NE side. Lower purlin (original) with fractures. Truss V to left. Original flatways rafters curtailed by gable insertion. C19th/ C20th props |
| 30a | IMG_6035 | E | **BAY 4**. NE side. Detail of fractures in lower purlin |
| 31 | IMG_6044 | SW | **BAY 4**. SW side, lower view. Original lower purlin and flatways rafters *in situ*. C20th extensions to rafters set in cement, raising eaves above wall plate |
| 32 | IMG_2423 | NW | **BAY 4**. SW side, lower view. C20th extensions to flatways rafters (all members set in cement). Tie beam / principal rafter (Truss V) joint |
| 33 | IMG_6049 | S | **BAY 4** SW side, upper view. Original upper purlin and flatways rafters *in situ*. C20th strengthening repairs (?extensions) to upper ends of at least four rafters (restricted visibility) |
| 34 | IMG_2431 | SW | **BAY 4**. Tie beam with diminished haunch joint joist mortices. C20th on-edge replacement joists |
| 35 | IMG_2424 | SE | **BAY 4**. **.** Diminished haunch joint joist mortices. C20th on-edge replacement joists Chamfered beams concealed by C20th ceiling |
| 36 | IMG_6056 | SE | **BAY 5**. Truss V, facing side. Overview of NE side of roof frame |
| 37 | IMG_6076 | SW | **BAY 5**. Truss V, facing side. Overview of SW side of roof frame |
| 38 | IMG_2438 | E | **BAY 5**. NE side. Original purlins, *in situ*; lower purlin bowed. Original flatways rafters *in situ,* but mostly severed at or below level of lower purlin. C20th on-edge rafters behind flatways rafters |
| 39 | IMG_2420 | SW | **BAY 5**. SW side, upper view. Ridge purlin, upper purlin and flatways rafters *in situ.* Smoke-blackened from a roof fire. Top left: C20th on-edge rafters lap-jointed to ridge purlin |
| 40 | IMG_2453 | NE | **BAY 5**. NE side. Truss VI (rear side). C20th improvised strut |
| 41 | IMG_2445 | SE | **BAY 5**. NE side. C19th gable beams rest on bowed lower purlin (*in situ*) |
| 42 | IMG_2481 | S | **BAY 6**. SW side. Truss VI (facing side), charred and blackened. C20th on-edge pinewood rafters raise roof away from flatways rafters |
| 43 | IMG_2477 | SW | **BAY 6**. SW side. Lower view. Smoke blackened flatways rafters with C20th on-edge rafters behind |
| 44 | IMG_2479 | SW | **BAY 6**. SW side. Upper view. Reclaimed oak ridge purlin and replaced (clean) sections of flatways rafters |
| 45 | IMG_2460 | NE | **BAY 6**. Truss VII. Stone-built gable end with brick dressings |
| 46 | IMG_2456 | N | **BAY 6**. Truss VII. Upper view |
| 47 | IMG_2472 | NE | **BAY 6**. NE side. lower view. Smoke-blackened purlins and flatways rafters **in situ**. Lower purlin broken |
| 48 | IMG_2472 | NE | **BAY 6.** NE side. Detail of fractured lower purlin |
| 48a | IMG_6095 | NE | **BAY 6**. NE side. upper view Smoke-blackened flatways rafters with replaced upper sections. C20th on-edge rafters behind. Reclaimed oak ridge purlin |
| **Carpenter's marks** | | | |
| 49 | IMG_6153 | SE | **Truss II** (facing side). Numeral Inscribed across principal rafter and collar beam |
| 50 | IMG_6175 | SE | Truss II (facing side, SW). 'Flagged' numeral, inscribed across principal rafter and collar beam |
| 51 | IMG_6145 | SE | **Truss III** (facing side). Numeral Inscribed across principal rafter and collar beam joint |
| 52 | IMG_6180 | SE | **Truss IIII** (facing side, SW). 'Flagged' Numerals inscribed on principal rafter and collar beam |
| 53 | IMG_6137 | SE | **Truss IIII** (facing side). Numerals inscribed across principal rafter and collar beam |
| 54 | IMG_6127 | SE | **Truss V** (facing side). Numerals inscribed on principal rafter and collar beam |

| No. (report) | Image No. | Direction (facing) | Description |
|---|---|---|---|
| 55 | IMG_2487 | SE | **Truss VI** (facing side). Numeral inscribed on principal rafter |
| 56 | IMG_6133 | SE | **Truss IV** (rear), SW side. Setting out marks inscribed on rear of collar beam |
| 57 | IMG_6120 | NW | **Truss V** (rear), SW side. Typical example of trestle saw marks on principal rafter |
| 58 | IMG_6161 | NW | **Truss II** (rear, SW side). Adze tooling marks and setting out mark |
| 59 | IMG_6143 | NE | **Truss IV**, NE side, setting out and tooling marks on under side of principal rafter |
| 60 | IMG_6195 | NW | View of SE gable from the service court yard (NE side) . 19th century stack to R |
| 61 | IMG_6197 | NW | Close-up of SE gable) showing Truss I. The gable may have been timber-framed |
| 62 | IMG_6192 | SW | SE end of the Tudor Wing from the service courtyard |