# All Saints, Hethel

# A Report into the Standing Archaeology

**SMR 9523 TG 17110039**

**Listed Grade 1**

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**With Documentary Research by Dr Tim Pestell**

**All Saints, Hethel**

**Repairs 2003**

Client: All Saints, Hethel PCC
Churchwardens: Prof & Mrs Wilson

Architect: Denis Tuttle RIBA
Conservation Officer: Stephen Heywood
English Heritage Conservation Architect: Colin Jeffries
Builder: John Allen Masonry
Scaffold: Attleborough Scaffold

Building Archaeologist: Phil Thomas
Documentary Research: Dr Tim Pestell
Dendrochronology: Dr Ian Tyers of Sheffield University

Surveying in advance of scaffold: June 2003
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Dendrochronology result – May 2004

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# 1 Introduction

1.1 Background:

All Saints is situated in the small hamlet of Hethel about 10 miles south of Norwich just to the south of Bracon Ash and to the east of Wymondham. Apart from the small cottages to the north of the churchyard there are no other buildings in the near vicinity; it shows all the signs of being a deserted medieval village and there are earthworks in the adjacent fields.

The church is of modest size and consists of a west tower, nave, north aisle, south porch, chancel, and mausoleum (figure 1). All exteriors, save the flint tower and brick mausoleum, have been rendered. The nave and aisle windows are simple wooden frames possibly 17th or 18th century in date and with the render gives this part of the church a secular appearance. The chancel windows are more ecclesiastical; those to the south are two light, and there's a three light Gothic window in the east wall. All are early Victorian in character.

The parapet of the chancel has been raised to meet that of the mausoleum to its north and hide the elaborate tiled roof with its numerous gutters (figure 2). The brick mausoleum has been described as being 'Vanbrughian' in character due to its rusticated quoins and blank arched windows typical of early 18th century (Pevsner). To the east end a Gothick doorway has been inserted and is dated 1819.

The south porch has a 15th century doorway but has been remodelled at a later date with a crow stepped gable, using similar coping to that on the tower parapet. Inside the porch is a stoop in the form of a Norman mortar, set in a large niche (Rose 1999, p2).

The tower is the most interesting part of the church and is the focus of this project. It is a square unbuttressed structure averaging 5.5 metres wide and just over 16 metres tall (to parapet, or 17.5 metres including iron crosses). It is constructed mainly in flint pebbles and erratics. The corners are initially formed by large blocks of limestone laid in long and short work arrangement (figure 3). Higher up the flints form the corners with some use of conglomerate and re-used Roman brick. Towards the parapet level the quoins are ashlar which is clearly a late repair. There is a blocked round headed doorway formed in brick in the west face below a Gothic three centred window. The only other openings are the bell louvers in each face. These

are formed in brick with wooden Gothick 'Y' tracery. The parapet is a two stepped battlement with brick corner turrets supporting wooden pyramid pinnacles. These in turn support iron crosses. Internally the tower connects with the nave by a tall arch with half octagonal mouldings.

The piers dividing the three bays of the North aisle from the nave are also octagonal and have double chamfered arches in the arcade. There are a number of floor ledgers to the Branthwaite family in the nave, but the most interesting internal feature is the monument in the Chancel. This is in memory of Miles Branthwaite who built Hethel Hall and died in 1612. This fine alabaster monument commemorates and depicts Miles, and his wife Mary. Miles, a lawyer, is shown in legal dress. The tomb is decorated with columns, obelisks and decorated with carved strapwork and fruit.

1.2 <u>The importance of the building:</u>

Despite the grandeur of the Branthwaite monument, Hethel is a very modest church. The declining size of the settlement has served to save many features as it has not had the wealth for extensive restorations.

The most obvious point of interest is the square tower which has characteristics to suggest a 11$^{th}$ or 12$^{th}$ century date (see below). Whilst early square towers are not unusual where good building stone is available, they are uncommon in Norfolk, not least when primarily constructed with flint. This tower has large blocks of limestone at the base forming long and short work, but much of the original tower has flint quoins which is very rare and shows faith in the mortar used. There are only six churches in Norfolk with square towers compared to 123 surviving round towers. In fact, Hethel is situated in a part of Norfolk where there is the greatest concentration of round towers (see distribution map, figure 4), so the form of this tower is most unusual (Heywood 1993 p56).

Whilst round tower churches are celebrated for their distinctive nature, All Saints is important because it is a contemporary building in an area of many round towers that breaks the mould. It serves to contradict the theory that these towers were built round because of the lack of local freestone to form the quoins. All Saints is one of a small number of Norfolk churches that successfully overcome the problem of quoins (others include Heigham in Norwich, and Weybourne). Heywood suggests that in fact round towers would have been more difficult to lay out and construct and so their

design may owe more to cultural reasons, especially as some round towers are constructed with freestone suited to quoins (Heywood 1993 p56).

Despite highlighting the contrasts to round towers, an investigation into All Saints will help determine the age of both types of tower. The Hethel church has characteristic features common to churches dating to around the Norman Conquest. These include round headed doorways, rubble dressings, double splayed windows or bell holes, narrow openings, and long and short quoins. As many of these features were quoted by Harold and Joan Taylor as Saxon characteristics, the whole tower has been declared pre-Conquest. Heywood and others have highlighted examples of these features from buildings known to be post Conquest. These include the double-splayed windows of Norwich Cathedral Hostry begun 1096.

This study will attempt to pin a date on the tower so that it can be a benchmark for comparison. In addition to the wider context, it is hoped to discover more about the original form of the tower. There are clearly many phases from the original blocked door and loop windows, to the restored parapet. By carefully recording every flint or stone by rectified photograph there is the potential for discovering the original openings and learn about the construction techniques by studying the distribution of building lifts and putlog holes. A watching brief during repointing is an excellent opportunity for doing this especially when there is a detailed elevation to plot the findings on. Again this local study can give information relevant to the construction of other contemporary towers.

1.3 Impact of the proposed repairs:

The proposed repairs include repairing and re-pointing large areas of the tower in order to stabilize it. This repointing will inevitably result in the removal of the original mortar. As a result it will hide information about building lifts, building breaks, putlogs, and inserted features until this new mortar is itself cut out in years to come. If not done carefully it could completely hide large features such as openings by masking the change in mortar types. It may also destroy some of the more subtle features.

Repointing is a necessity so it is important in instances such as this that an archaeologist is present to examine the building both before the work takes place and in the narrow window of opportunity between the picking out of the joints, and the actual repointing. This is when most finds are made and so the cooperation of the builder is crucial.

## 2 Documentary Research

### 2.1 Documentary Survey (By Dr Tim Pestell)

A search of documentary sources has been undertaken to accompany the recording of Hethel church tower's fabric. The aim was to provide a context for some of the repairs and alterations to the church tower observed during the rectified photography programme. Sadly, Hethel church has proven to have a stubbornly poor historical record relating to its physical structure. Even the extensive remodelling of the tower battlements and bell chamber windows appears to have gone unrecorded among diocesan faculties.

The site of the church itself is clearly of some antiquity and a building existed in 1066, being recorded as part of the manorial holdings of Ulf the Thane, with thirty acres of land attached.[1] That this was not the present structure is apparent from the present survey of the architectural remains. The date at which a church was first established in Hethel is unknown, although the present-day parish may once have been attached to a minster church based in nearby Wymondham. Such large Anglo-Saxon institutions frequently had a number of subordinate chapels of ease which, with thegnly ambitions, came to break away from their mother church. This process of fission came to form the parish system of the Middle Ages. Wymondham's possible origins as an Anglo-Saxon minster are supported by the large 'contact score' of adjacent parishes and the fact that the church came to have a Benedictine monastery founded within it by William d'Albini and his wife Maud *c.*1107.[2]

Curiously, of the 19 parishes surrounding Wymondham, 8 are dedicated to, or share a dedication for, All Saints (figure 5). Although Wymondham is today dedicated to the Blessed Virgin Mary, All Saints may once have been a dedication of significance to Wymondham, leading it to so dedicate its chapels. Hethel is the northernmost of five parishes (Tacolneston, Fundenhall, Ashwellthorpe, Wreningham and Hethel) that together suggest they were divided up from a previously larger land unit, presumably Wymondham's original *parochia* boundary, through their rectilinear shape running off

[1] *Little Domesday Book*, fol. 180a, for which see P. Brown (ed.), *Domesday Book Norfolk* (Chichester, 1984).
[2] T. Williamson, *The Origins of Norfolk* (Manchester, 1993), pp. 96-9; T. Pestell, *Landscapes of Monastic Foundation* (Woodbridge, forthcoming 2004). See also J. Caley, H. Ellis and B. Bandinel (eds), *Monasticon Anglicanum by Sir William Dugdale A New Edition* (London, 1817-30), iii, pp. 323-41.

the eastern boundary of Wymondham. Perhaps significantly, of the five, only Fundenhall is not dedicated to All Saints.

The present church building consists of a square west tower, nave with north aisle and a chancel with a north chapel, converted into a family mausoleum. The structure is small and apparently based upon minimal development of a Saxo-Norman two-cell structure plus tower. That there appears to have been limited expansion of the building is not untypical for this particular area of Norfolk that has many small parishes, each with its own church.[3] Like Hethel, many of these probably have an origin as chapels-at-ease to minsters elsewhere, with little of their own endowed wealth to draw on to pay for the elaboration of fabric or furnishings.[4] The situation at Hethel cannot have been helped by the manor being divided by its owner Hugh, third Earl Bigod (d. 1225), into a number of still smaller manors called Hethill or Curson's, Jerningham's, Penne's, Goldingham's, Ward's, Twait's, and Nevile's manors.[5] This may well have left the parish church with little direct manorial patronage and the situation can only have been exacerbated by manors such as Curson's extending also into neighbouring Carleton, Mulbarton and Swardeston, each of course with its own church. This division is the likely reason that the present-day parish now contains three moated sites, presumably each relating to a different manorial holding.[6]

The Norfolk antiquarian Francis Blomefield's *Topographical History of Norfolk* provides an adequate statement of the various manorial histories within Hethel, and he makes it clear that at various points some consolidation of the manors was undertaken by families such as the Appleyards, who bought Curson's, Penne's, Goldingham's, Jerningham's and Twait's manors in the fourteenth century.[7]

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[3] See also, for instance, nearby Wramplingham church, which consisted of only a nave and chancel with south porch and round west tower, before the nave north aisle was added in 1872. Wramplingham preserves its Saxo-Norman nave, laid out as a simple double-square, and stood in a small two-thirds of an acre churchyard before that was extended by the Victorians: T. Pestell, 'Wramplingham SS Peter and Paul' *Church Archaeology* 1 (1997), pp. 54-5.

[4] Some land in Hethel was held by Wymondham Abbey as part of the foundation endowment of William d'Albini, valued at 40*s* per annum: F. Blomefield, *An Essay Towards a Topographical History of Norfolk*, (London, 1805-10), v, p. 108 and n. 9. There need not necessarily be any significance to this given the propinquity of the two parishes.

[5] F. Blomefield, *An Essay Towards a Topographical History of Norfolk*, (London, 1805-10), v, p. 104.

[6] Most moats surround manor houses although this is not always the case, and in some parishes it seems that manorial centres may have shifted, leading also to new moats being created: A. Rogerson 'Moated sites' in P. Wade-Martins (ed) *An Historical Atlas of Norfolk* (Norwich, 1993), pp. 66-7.

[7] As might be expected, there are various notices of manorial dealings relating to Hethel, for instance Richard de Byteryng's purchase of Penne's manor in 1338, or William Appleyard's pursuit of Frankpledge in Hethel in 1391/2: A. Watkin (ed), *Archdeaconry of Norwich Inventory of Church*

Nevertheless, some of the manors subsequently passed out of their control and Nevile's manor was removed from the vagaries of secular hands as early as 1227-1232 when Albert de Nevill granted it to Alnesbourne Priory in Suffolk.[8] Indeed, it may be that the manorial focus, and thus patronage, was always directed more towards such places as Forncett, of which many of the Hethel manors were held.[9]

The next extensive reunification of Hethel manors was undertaken under Miles Branthwaite, a Norwich lawyer (d.1612). In 1601 and after, he purchased Curson's, Jerningham's, Penne's, Coldingham's and Ward's manors, and the family constructed a new manor house, Hethel Hall (demolished after the Second World War). This family's patronage is, by contrast with previous lords, easily visible in their mausoleum that occupies the north chapel attached to the chancel. Here various memorials exist to members of the family, the most important that in alabaster to Miles Branthwaite himself (portrayed in his legal attire) and to his wife Mary.

Documentary evidence for subsequent changes to the church fabric are less easy to find. Little appears to survive relating to the medieval church. For instance, no testamentary bequests for repairs or new builds to Hethel were found by Paul Cattermole and Simon Cotton in their survey of medieval Norfolk wills.[10] Bishop Redman's visitation of his diocese in 1597 can be a useful source of information for dilapidation and repairs enjoined, but within Humbleyard deanery, Hethel (along with five other parishes) does not occur.[11] Even in the 1851 census of Hethel's communicants, the officiating minister was unable to supply information on his parish's endowment.[12] This perhaps reflects a detachment from the parish suggested

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*Goods temp. Edward III* Norfolk Records Society 19 pts i and ii (Norwich, 1947-8), p. 162; *PRO* C143/411/26. Because this present documentary search was undertaken to identify evidence dating alterations to the church fabric, no detailed research was undertaken into any of the manorial histories.

[8] *SRO* (Ipswich) HD/1538/113/1/8, among the Iveagh (Phillipps) Suffolk manuscripts.

[9] For instance Jerningham's manor (an eighth of a fee), Penne's manor (one fee), Goldingham's manor (one fee), Ward's manor (a hundredth of a fee), Twait's manor (a quarter of a fee), Nevile's manor (half a fee) and Briton's manor (quarter of a fee and a twentieth of another). The advowson of the church belonged to the manor of Forncett: F. Blomefield, *An Essay Towards A Topographical History of Norfolk*, (London, 1805-10), v, pp. 105-8.

[10] P. Cattermole and S. Cotton, 'Medieval parish church building in Norfolk', *Norfolk Archaeology* 38 (1983), pp. 235-79.

[11] J. F. Williams (ed), *Diocese of Norwich Bishop Redman's Visitation 1597* Norfolk Records Society 18 (Norwich, 1946).

[12] J. Ede and N. Virgoe (eds), *Religious Worship in Norfolk The 1851 Census of Accommodation and Attendance at Worship* Norfolk Records Society 62 (Norwich, 1998), p. 157 (based on *PRO* HO/129/236.10).

also by Miles Beevor, a previous incumbent, who had twice received licences for non-residence, in 1818 and 1824.[13]

The preceding dearth of documentary evidence is balanced by only one faculty that has been traced, granted 31st July 1818.[14] This was directed at re-roofing the church:

> The roof of the said parish church of Hethel is a very ancient one and covered with lead that it has gradually decayed and is in a very ruinous state so as to be incapable of being effectively repaired that the said petitioners propose to strip off the old lead from the church, to take off the old roof and to put a new one with a proper pitch on the said church of the best fir timber and to cover the same with proper slate laid upon three quarter deal boarding, to relay the gutter with lead to cover the roof tree with lead and to fit a good lead flashing against the tower and chancel and in every respect to put the said church in a complete state of repair…

The work was estimated at costing £135 with the old lead reckoned to weigh three tons, worth £60. The known refenestration of, for example, the chancel east window raises the possibility that other repairs beyond the roof were also undertaken at this time, although the exact schedule of work is unknown.

It is clear that some work at the church had already been undertaken. According to Blomefield the chancel had been remodelled with a Venetian east window and sash windows elsewhere by John Reddington, the rector from 1737-9.[15] This Venetian window is shown by Ladbrooke in his engraving of *c.*1830. That the present east window is Victorian in a Decorated Gothic style simply underlines the frustrating lack of information surviving for Hethel. This replacement window would appear to date to the High Victorian period, but no documentary witness appears to have survived for this or any other later associated work. As a result, the present detailed survey of Hethel's church tower provides a crucial record not only of work carried out in 2003, but of major previous interventions whose date and authors are now lost to us.

[13] *NRO* PD/200/6
[14] *NRO* DN/FCB/5/2 fols 212v-213v.
[15] F. Blomefield, *An Essay Towards A Topographical History of Norfolk*, (London, 1805-10), v, p. 110.

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I should like to thank Sally Wilkinson for discussion about the (lack) of faculty evidence for Hethel, Dr Paul Cattermole for confirming a similar lack of information when he was investigating the church's bells, and Prof. Richard Wilson, churchwarden, who confirmed to me that there were no other parish records in the hands of its officers rather than lodged with the Norfolk Record Office.[16]

[16] Professor Wilson did point out to me that an ex-churchwarden, a local farmer, was found to have held a glebe map of Hethel, but that no other church papers appear to have been in his possession.

2.2 Pictorial Evidence

The earliest known pictorial record of All Saints is the etching produced by Ladbrooke c.1830 (figure 6). This shows the church from the southeast and shows it to be much the same as it is today. It is very detailed as so it extremely useful for studying the alterations to the fabric.

The biggest change has been the chancel windows, Ladbrooke shows these to be very domestic 18th century features, especially that in the east wall which is a Venetian or Palladian window. These have been replaced by Victorian Gothic examples (which contrary to the Pevsner entry are not the same design).

The nave window is also slightly different; that in the etching is a tall canted window, yet the present window is a shorter three light window with a low rounded head. This has clearly been remodelled, but has not had as much spent on it as the chancel examples. The nave gable also appears to have a cross at its ridge, this no longer exists. The slates on the roof appear very large on the drawing compared to the existing ones, which may suggest replacement.

The tower will be discussed in detail later, but the most obvious differences to the existing structure are; the suggestion of a stringcourse below parapet level, and bases to the pyramid pinnacles. Otherwise the etching is extremely useful for being a detailed record of the tower in c1830 and therefore a *terminus ante quem* on the insertion of the bell chamber windows and the rebuilding of the nave roof; these must have all happened prior to this.

## 3 The Recording Work

3.1 Methodology:

It was decided that the best method of recording the tower was that of rectified photography placed within a framework created by a Reflector-less Total Station Theodolite. The elevations of the tower are relatively flat and so it lends itself to this technique, also the nature of the fabric, flint, is very time-consuming (and thus expensive) to record by any other means. This will be an excellent pre-conservation record.

After creating a control network around the building to ensure accuracy, the four exterior elevations of the tower and the internal elevations of the tower parapet were surveyed using the laser of the Total Station to create an outline, pick up major features, and record a number of survey targets.

Once surveyed, photographs were taken with a Medium Format camera, and the resulting negatives scanned to very high resolution. The high-resolution nature of these images allows one to magnify the final product to examine detail.

Scanned images were scaled and rectified by a computer program that uses the coordinates of the survey targets to give a completely orthogonal photograph. This image was then attached to an AutoCAD file, positioned, and cropped to give a photo-realistic elevation. The most salient features such as window details, quoins, and putlogs were then 'traced' off these accurate images to give conventional scaled line drawings.

3.2 Time on Site:

This project started in advance of repairs in order to survey and photograph the elevations prior to restoration. These CAD elevations were completed before the scaffold was erected. Once the scaffold was up the drawings were checked on site and observations marked up.

*Disclaimer:*

This latter process of checking was scheduled to coincide with the building work in order to be a watching brief, but there was a delay before the builders commenced which meant that the archaeological element was complete before the repointing was finished. No funds were available for further watching briefs so some areas (such as the eastern elevation below bell chamber window level) were not observed.

## 4 The Results: The Stratigraphic Record

Please note that these results should be read in association with the labelled drawings.

North Elevation - Exterior

Note: This face has been heavily re-pointed.

N1 North Elevation. This is constructed in coursed unsorted flints of varying size and shape to make up over 13 metres of the 16 metre north wall of the tower. No buttresses on the corners, but there are quoins for the first 2 metres (N2). The mortar used is a distinctive orange/brown lime-mortar. There are a number of building lifts visible especially within the lower section of the wall. These occur at intervals of 0.45 metres.
N1 same as S1 E1 W1
Contains features N2 N3 N5 N7 N9 N11 N13
It is cut by N27 N15 N18 N19 N23
The relationship with the N aisle is not clear but as this is later it must abut the tower

N2 Quoins. The quoins on the corners extend to a height of around 2 metres. The lowest are huge limestone (Barnack) blocks set on end. Above this the stone alternates with Roman tile. At a higher level the only quoins are flint which is very unusual.
Same as S2 W2

N3 Norman loop window. This loop is 25 cm wide and 105 cm high. It is narrow externally but judging by the blocking internally it once splayed to a metre wide and 1.7 metres high (see NINT 2).
Same as loop windows S3 W16 E3 on the other elevations.
Blocked by N4 (externally) NINT 9 (internally)

N4 Fill. Blocking to loop window N3. Externally this is blocked by flints and heavily re-pointed with grey mortar. Internally the fill is composed of flints and post medieval brick using cream lime-mortar.
Same as S4 W17 E5

N5 Putlog Hole. This hole is only partially blocked allowing the void behind to be glimpsed. This is 55cm deep and angled to allow post to come out towards the corner diagonally. Mirrored on the south side by N7.

N6 Fill. Blocking to Putlog N5. Filled by flints and a very hard cream/beige mortar with chalk inclusions up to 5mm.

N7 Putlog Hole. Putlog on west side of North wall. Blocked by N8.

N8 Fill. Blocking to Putlog N7. This is blocked by flints and a mortar much whiter than that of N6.

N9 Bell-hole. Eastern of two such features. Diameter of 0.66 metres. This is mirrored on the west by N11 and these features occur in pairs on each face.
Same as S11 W33 E13 E17

N10 Fill. Blocking to Bell-hole N9. Filled by flints set in cream lime-mortar with chalk inclusions.

N11 Bell-hole. Western Bell-hole. Diameter of 0.9 metres.
Same as N9 S11 W33 E13 E17

N12 Fill to Bell-hole N11. Flints set in cream/light brown lime-mortar containing chalk inclusions.

N13 Original bell chamber window. Width 0.6 metres, height unclear. This would have been the original bell chamber opening in the first build; it would have been flanked by the two round bell holes. This is a remarkable survival as internally the evidence has been destroyed by earlier attempts to construct bell chamber window N16. Now blocked by N14.
Same as E15 S13

N14 Fill. Blocking to bell chamber window N13. Filled by flint with cream/beige mortar with stone inclusions similar to the render.

N15 Cut. This is the cut for window N16. This is the construction cut for the current bell chamber window N16. This cuts through N1 and original window N13. It also cuts what appears to be an earlier cut (N34) associated with the lower east tie bar which may have also been intended to insert a window.

N16 Present bell chamber Window. This North window and its southern equivalent are very pointed openings in contrast to the east and west examples. They are all 'church warden Gothic' style windows formed with brick arches. This particular window is formed in Costessey white brick similar to that of the quoins N24, with some use of red brick near the sill. These are set in hard grey cement. The sill itself is concrete. The 'Y' shaped tracery is constructed in timber, silvered oak 9cm wide with chamfered nosing of 50-55mm around the edge and 20mm on the central mullion. Behind the tracery is a frame of containing a timber grill, each timber 4 ½ cm wide running horizontally and vertically. The other elevations have only horizontal louvers.
Internally there is the eastern half of a larger rounder window arch formed in brick just above the present window arch (see photo). Other complete arches can be seen to the west and south; the east appears untouched. These may represent an earlier abortive attempt at the current windows, it is curious that this does not seem to have affected the fabric of the exterior, hence the survival of N13.
This current window appears to be the same as that shown by Ladbrooke c. 1830.
Same as E12 W25 S10.

N17 Tie Bar Plates. These plates are 12 inches in diameter and have square nuts of 7 cm square. These square nuts are believed to be relatively early as they hand made, they certainly existed in 1830 as are shown by Ladbrooke. The parapet level plates have hexagonal nuts (machine made) and are not on the etching. These lower tie bars do not go right through the tower as those on the parapet do. Instead, they connect with the internal bell chamber timbers which then serve as ties.
Same as E10 S7 W22.

N18 Repair. Repair around bottom right tie bar plate N17.

N19 Cut. This marks the end of N1 and start of N20. This is just above the level of bell holes N10 and N12.

N20 Rebuild. North elevation above N19. Coursed flintwork containing one of the tie bar plates N17 and waterspout N21 and reused stone N22. Has reused

magnesium limestone quoins on east side and a horizontal strip of the same stone N31.
Cut by N25.

N21 Waterspout. This one of two (the other being on the south face) which drains the parapet floor. This is formed with white bricks 22 ½ x 6 ½ x 11 ½ cm. A spout is seen on the south face on the Ladbrooke etching.

N22 Masonry. Piece of masonry used as a quoin but having chamfers from a previous function. Part of N20.

N23 Cut. Cut through N1 for new brick quoins N24.

N24 Brick quoins. These bricks are used in side alternate fashion; 4 headers then 4 stretchers. They are Costessey whites (22 x 10 ½ x 6 1/2 cm) and the colour and build method suggest an imitation of stonework.
Possibly contemporary with N16 & N26.

N25 Cut. Cut through N20 for rebuild of battlement N26.

N26 Battlements & Parapet. Rebuild of battlement using Costessey white bricks (same size as those in N24) with panels of coursed flint-work in between. Hard cream mortar used for both. The battlements are capped with large terracotta coping stones (0.64 x 0.36m). These are the same copings as on Ladbrooke. Brick corner turrets topped with wooden pyramidal pinnacles holding ironwork cross. The ironwork for these crosses run through the pinnacles and are set into the brick turrets to a level below the copings where it has an 'L' shaped base to secure it under the bricks. To further secure these the centre of the brick turrets is filled with concrete. The interior of these battlements are formed using red brick rather than the white. It is possible that the white brick was scarcer or more expensive and was reserved for the exterior as it was more in keeping.

N27 Cut. Cut through N1 for repair N28.

N28 Repair. Fill to cut N27 in order to repair area at base of tower. This is filled with stone, flint and red brick headers (8 x 5 cm). The mortar that is used is a light orange/brown and has small stone and chalk inclusions.

N29 Tie bar plate. This has the same 12 inch diameter as the lower plates (N17), but has the horizontal nut showing it was machine made. It is also not shown on Ladbrooke. This bar links to S8 on the south side by a long iron rod which runs along the west wall of the parapet.

N30 North aisle. This aisle wall is heavily rendered so the relationship to N1 is not obvious, but internal evidence suggests that the aisle is later so must abut the tower.

N31 Strip of Magnesium limestone. This stone could possibly be part of a former stringcourse , or just be a leveller to mark the beginning of a new build N20. Also seen on south S31, west W40, and east E27.

N32 Render/Re-pointing. Very hard cream/beige lime-mortar with stone inclusions ranging from 2-10mm. Similar to blocking of N14.

N33 Roman tile. This tile used as a leveller possibly before building lift. Used at same height on all corners of the tower (figure 7).

N34 Cut. Cut for lower left tie bar and continues under window N16. This is itself cut by construction cut N15. Could represent construction cut for earlier aborted window.

North elevation – interior

Note: There was no requirement to record the interior of the tower but it was judged to be important to the interpretation of the exterior so it was carried out. While every attempt was made to make the drawings accurate, the confined space of the bell chamber meant they could only be measured by hand. The analysis is less detailed as the original fabric will remain unaltered.

Please refer to figures 11-13.

NINT1 Interior elevation of North wall of tower. Coursed flints of varying size with orange/brown lime-mortar.
Same as N1

NINT2 Blocked window. Internal (blocked) splay of window N3.

NINT3 Putlog Holes. Pair of Putlogs at height of 2.3 metres above parapet floor. These flank blocked window NINT2

NINT4 Fill. Blocking to putlogs.

NINT5 Putlog holes. Pair of putlogs on east side of window 1.4 metres up from floor.

NINT6 Fill. Blocking to putlogs NINT5.

NINT7 Putlog holes. Pair of putlogs 45 cm up beneath putlogs NINT3.

NINT8 Fill. Blocking to putlogs NINT7.

NINT9 Fill. Blocking to NINT2
Same as N4, but interior also incorporates post-medieval brick in the fill.

South Elevation – Exterior

Note: South face has been re-pointed with hard grey mortar (possibly cement based) with large stone inclusions up to 30mm. This mortar hides many features and building lifts known from other elevations.

S1 South elevation of tower, same construction and mortar as N1, W1, and E1. This incorporates quoins (S2), loop window (S3), and features S11, S13, and S28. It is cut by S9, S19, S21, S25 and S31.

S2 Quoins. Corner quoining. Same as N2 and W2.

S3 Original loop window. Same as N3, W16, and E3. This window is blocked by S4 and cut by a putlog hole (S5).

S4 Fill. Blocking to S3 loop. Filled by flints, mortar unclear as heavily re-pointed. Cut by putlog S5. Same as W17, N4 and E5.

S5 Putlog. Putlog hole cut into S3 and S4 so must post-date. Blocked by S6.

S6 Fill. Blocking to putlog S5. Blocked with hand-made brick using cream/beige lime-mortar.

S9 Cut. Cut through south elevation (S1) for window S10. This cuts S13 and S14. It is heavily re-pointed above the window so the top of this cut is largely speculation. Joints cleaned out in absence of archaeologist.

S10 Current bell chamber Window. Pointed bell chamber opening 1.3 x 2.3 metres. Opening formed in red bricks 50mm high (of varying lengths). Arch formed in headers 120 x 50mm. Sill built in black brick (220 x 75 mm) with a chamfer at 20mm up. Timbers 90 mm wide with nosing of 55mm and 20mm for central timbers. Internally there is an arch visible above the current opening. Either this was only half built or it's only the eastern section that survives. Either way it is now an incomplete arch constructed in similar red brick to the present opening (see photo).

S11 Bell Hole Opening. This blocked opening is 0.76 metres in diameter. The bottom of this is unclear due to re-pointing. This is the same as W33, N9, N11, E13, E17. The western equivalent is missing due to re-building S22. This feature is filled by S12.

S12 Fill. Blocking to bell-hole S11. Flint fill with cream/beige lime-mortar with chalk and stone inclusions up to 10mm.

S13 Edge of Feature. Possible side to original bell chamber opening as seen on east elevation (E15) or north (N13). Joints cleared and re-pointed in absence of archaeologist.

S14 Fill. Blocking to feature S13.

S15 Cut. Cut to south elevation S1 just above bell-hole (S11) for rebuild S16. This cuts S1 and is filled by S16.

S16 Rebuild. Coursed flint rebuild at parapet level. Contains tie S7 and stone strips S31.

S17 Cut. Cut through S16 for rebuilt battlements S18.

S18 Rebuild. Rebuilt battlements. Same as N26, and possibly contemporary with S22 as similar grey cement.

S19 Cut. Cut for quoins S20. Cuts S1.

S20 Brickwork Quoins. Costessey white bricks (220 x 110 x 65mm) laid in side alternate manner to imitate stone. Same as N24.

S21 Cut. Cut through S1 for rebuilt SW corner S22.

S22 Rebuild. Rebuilt SW corner. This rebuilding goes right through core to the interior and can be seen inside bell chamber (see photo). This is the same a s the rebuilding on the west face W32. This is likely to be contemporary with S18 as similar grey cement mortar. This rebuild contains waterspout S23.

S23 Waterspout. This is the equivalent of that on the north side (N21). A spout in a very similar position is shown on the Ladbrooke etching. This is constructed in red brick (225 x 110 x 60mm).

S24 Re-pointed area. Re-pointed area using hard cream/white mortar similar to that used in S29 blocking of putlog. Only repointed as original mortar appears underneath so all bricks still *in-situ*.

S25 Cut. Cut into S1 for rebuild S26.

S26 Rebuild. Area rebuilt using red bricks (235 x 55 x 80mm) and Costessey white bricks similar to those used on parapet (so either contemporary or re-used). The mortar used is a very light brown mortar with small stone and chalk inclusions.

S27 Repairs. Modern cement repairs on S1.

S28 Putlog. Putlog hole within S1.

S29 Fill. Blocking of putlog S28. Filled with hard cream mortar with lots of large stone inclusions and fragments of red brick (50mm high).

S30 Nave. Relationship between tower and nave uncertain due to render on nave walls. The render obviously abuts, but whether tied-in below in unknown. Presumably it is.

S31 Roman tile. Tile used for levelling courses, also used on other corners to keep constant level for lift.

South Elevation – Interior

Please refer to figures 14 & 15.

SINT1 Interior elevation of S elevation. Same as S1.

SINT2 Blocked window. Internal splay of window S3.

SINT3 Fill. Blocking to SINT2. Same as S4.

SINT4 Putlogs. Pair of putlogs holes approximately 2.3 metres above parapet floor.

SINT5 Fill. Blocking to putlogs.

SINT6 Putlogs. Pair of putlog holes 0.4 metres up from parapet floor. These flank windows SINT3.

SINT7 Fill. Blocking to SINT6.

SINT8 Sockets. Pair of blocked sockets at parapet floor level.

SINT9 Blocking to SINT8.

East Elevation – Exterior

E1 East elevation. Eastern wall of tower where visible above nave roof. Coursed flint with orange/brown lime-mortar. Numerous building lifts are visible.
Same as N1, S1 and W1
Contains E3, E6, E8, E10, E13, E15, E17
Cut by E11 and E24

E2 Scar. Scar of former roof. Steep pitch suggests that it may have been a thatched roof. The pitch just gives clearance for window loop E3. The scar is seen on Ladbrooke etching.

E3 Window Loop. Original window loop which splays to give a larger opening internally. Externally it measures 0.23 x 1.04 metres, internally 1 x 1.7 metres. This is the same as S3, N3 and W16. This opening retains the original render E4.

E4 Render. Render around window loop is clearly earlier than the blocking as it returns into the opening and behind blocking material E5. This render is thinly spread and may well be from the original build.

E5 Fill. Blocking fill to window loop E3. Blocking material includes hand-made medieval brick, pieces of ashlar, and flint. The mortar used is a white chalky lime-mortar with chalk and stone inclusions (the latter being up to 5mm). This feature is the same as W17, S4 and N4.

E6 Putlog. Putlog hole on south side of elevation. Filled by E7.

E7 Fill. Blocking fill to putlog E6. Blocked with pieces of red brick using cream/beige lime-mortar with small chalk inclusions. Same as E9.

E8 Putlog. Northern equivalent to E6. Blocked by E9.

E9 Fill. Blocking same as E7.

E10 Tie-bar plates. See N17. Same as N17, S7 and W22.

E11 Cut. Cut through E1 for insertion of window E12.

E12 Current bell chamber Window. Round headed bell chamber window formed with a red brick arch (headers 115 x 55mm). Dimensions are 1.28 x 2.15 metres. Sides of the window are formed in flint which is unusual as the other three are formed in brick. The sill is very eroded red brick. The window has 'Y' shaped tracery executed in timber. The timbers used around the side are 90mm with 50mm nosing, the central timbers are 80mm with 20mm nosing. The window surrounds internally have a wide sill and brick splays. This is the only window not to have a brick arch over the interior of the window.
Similar windows on other elevations; N16, S10, and W25.

E13 Bell-Hole. Bell-hole of 64cm diameter. Southern of two such features flanking original bell chamber opening E15. This bell-hole now blocked by E14.
Other bell-holes are E17, N9, N11, S11, and W33.

E14 Fill to Bell-hole. This is the blocking to bell-hole E13. Blocked with flints set in a creamy lime-mortar with chalk inclusions which clearly contrasts with

orange/brown mortar of E1. There is either render or a layer of re-pointing which masks this change on the surface.

E15 Norman bell chamber Opening. Best surviving example of original central bell chamber opening on this church. At a width of 60cm this is twice the width of the lower loop window (E3) but is the same as the diameter of the bell-holes. Its height is unknown due to the insertion of the later window (E17). This feature is now blocked by E16. There is a hint of this feature internally on this elevation but the other faces have been damaged by brick arches.
This feature is the same as N13.

E16 Fill. Blocking to E15. Flints of varying size with some stone. The mortar is a cream lime-mortar with small chalk inclusions.
Similar to blocking N14.

E17 Bell-Hole. Northern of the two bell-holes on this elevation. This bell-hole was already partially open so was it was carefully excavated to a depth of 0.55M out of a total depth of probably 0.85M (see figures 16 & 17). The hole was a diameter of 0.6 metres and was splayed inwards to a narrow opening of 0.28M at a depth of 0.35 M. Unfortunately, no evidence of the basketwork which must have been used to form it; the blocking mortar met the orange/brown mortar of the surround without any voids. This blocking is visible on the interior.

E18 Fill. Blocking to bell-hole E17. Blocking was composed of flints and small fragments of brick. The mortar was a creamy lime-mortar with chalk inclusions.

E19 Cut. Cut to east elevation (E1) for rebuild E20.

E20 Rebuilt Parapet. Rebuilt parapet level in coursed flint. The cream lime-mortar used for this is not dissimilar to that used to block the bell-holes on this face and those to the west. Possible that these were blocked during this rebuilding as they lie just underneath the work and may have been seen as a potential weakness. Within E20 is a strip of stone (E27) and E10 the tie-bar plate.

E21 Cut. Cut through E20 for rebuilding of parapet E22.

E22 Rebuild. Rebuilding of parapet battlements and turrets in white brickwork (210 x 105 x 65 mm) with flint panels between. The mortar used is grey but is not a hard cement. The battlements are capped with large terracotta coping stones, and the turrets by wooden pyramidal pinnacles. See N26.

E23 Tie-Bar Plate. Tie-bar with square nut.
Same as W22, N17, and S7.

E24 Cut. Cut for new brick quoins. Cuts E1 and E20.

E25 Brickwork Quoins. White brickwork used in imitation of side-alternate quoining in stone. Four headers then four headers, alternating.
Probably contemporary with E22.
E26 Not used.

E27 Strip of Stone. Strip of stone within E20, possibly part of a string-course.
Same as W40, N31, and S31.

E28 Present roofline. This roofline replaces former roofline E2, this current one has a lower ridge and a shallower pitch more suitable for tile.

E29 Putlog Holes. These were discovered during re-pointing. Also found were E29, E31, E33, E35, E37, and E39.

E30 Fill. Blocking to putlog E29 with flint and lava-stone with a beige mortar.

E31 Putlog. Northern equivalent of E29.

E32 Fill. Blocking to putlog in brick.

E33 Putlog. This is 0.4 x 0.36 metres. Large void behind 0.5 metres deep.

E34 Fill. Blocking to putlog filled with flint with cream lime-mortar.

E35 Putlog. Putlog hole 0.1 x 0.1 metres. The top of this hole was formed using a piece of timber 0.14 x 0.25 x 0.025 metres. This was still in situ when found, but since removed for analysis.

E36 Fill. Blocking to putlog E35. Filled by flints with cream/brown lime-mortar with chalk inclusions.

E37 Putlog. Putlog hole 0.18 x 0.18 metres in size.

E38 Fill. Blocking to putlog E37. Filled by flints with cream lime-mortar.

E39 Putlog. Northern equivalent of E37. Hole is 0.2 x 0.27 metres in size and 0.4 metres deep void behind the fill.

E40 Fill. Blocking to putlog, large flints with cream/beige lime-mortar with stone and chalk inclusions.

East Elevation – Interior

Please refer to figures 18 & 19.

EINT1 Internal elevation of E1

EINT2 Blocked window. Internal splay of window (E3)

EINT3 Fill. Blocking to EINT 2. Post medieval brick, flint and same as E5

EINT4 Putlog holes. Pair of putlogs 2.3 m up from bell chamber floor flanking blocked window

EINT5 Fill. Blocking to EINT4.

EINT6 Sockets. Series of 4 sockets 20 x 22 cm. Possibly former joist sockets – mirrored in west wall. These are 1.22 m up from present bell chamber floor.

EINT7 Fill. Blocking to EINT 6 – just blocked by flint not brick so difficult to date.

West Elevation – Exterior

W1 West elevation of the tower. Varying sizes of coursed flint-work cemented by an orange/brown lime mortar.
Same as E1, N1 and S1
Incorporated W2 quoins, W3 Herringbone, window W9, loops W13, W16 W25 window, W22 tie-bars. W33 bell hole.
Cut by W31, W35, W36

W2 Quoins. See N2 S2.

W3 Herringbone work. This area of construction is within flint-work W1.

W4 Doorway. Round headed doorway central within west elevation. Doorway formed using Roman brick and tile as well as flint, and some quern stones. 1.02 metres wide and 2.09 metres high. Doorway blocked by W5 and has some later repairs W6.

W5 Fill. Blocking to doorway W4 – unsorted flints and medieval brick (15 x 5 cm) using a very light brown lime mortar with chalk inclusions up to 50mm.

W6 Repair. Repairs to doorway W4. Cream/white lime mortar repair.

W7 Repair. Modern cement repairs on door (20th century) and to south.

W8 Cut. Cut into W1 elevation in order to insert Gothic window W9. This cut associated with putlog holes W10.

W9 Tracery window. Two light, three centred Gothic traceried window of early perpendicular date. 1.31 metres wide and 2.6 metres high. This has been inserted at a later date to W1 and has a pair of putlogs W10. Constructed mainly with Clunch but some Caen and Ancaster too. Repairs include cut pieces of brick and flint in the hood mould.

W10 Putlog Holes. Putlogs associated with window W9.

W11 Putlog holes. Putlog holes in W1. This is probably an angled putlog but is difficult to tell as now blocked by W12.

W12 Fill. Blocking to putlog W11. Blocked with two red bricks, both 5 cm thick, top one 12cm long, bottom one 14cm log. Set in hard cream lime mortar with stone inclusions. No doubt contemporary with S28 putlog in S face as same height.

W13 Original window loop. This is within original build W1. Dimensions: 0.28 metres wide, but height unknown, perhaps 0.95 metres. This has both been filled (by W14) and also cut by later window W9. No sign of this internally as wall plastered at this height below bell chamber floor level. Similar to window W16, so probably same dimensions.

W14 Fill. Blocking to loop W14. Filled by flints and some small pieces of tracery most probably off-cuts from window W9. Mortar creamy/white with stone and chalk inclusions.

W15 Scar. Filled crack running vertically from loop W16 down to loop W13 probably due to weakness by these. Also seen internally (see photo).

W16 Window loop. Dimensions: 0.28m wide and 0.95m high. Same height and size as those to N, S and E and like these also seen internally as much larger blocked splayed opening. Brick used at impost level on both sides, similar on North loop.

W17 Fill. Blocking to loop W16. Same mortar as that used to fill crack (W15); very hard cement mortar with stones up to 25 mm. This mortar is at least 6 cm deep. Similar to that used on sill of window W25.

W18 Putlog hole. This is located just below a building lift which is a common arrangement. Mirrored to S by W20.

W19 Fill. Blocking to W18.

W20 Putlog hole. This is the southern equivalent of W18 filled by W21.

W21 Fill. Blocking to W20.

W22 Tie bar plate. This plate has square nut (see photo of internal connection).

W23 Tie bar plate with hexagonal nut – for tie bar above parapet floor level running along south wall.

W24 Cut. Cut for inserting bell chamber window W25.

W25 Window. Round headed, brick formed, opening (2.2 m wide and 2.2 m high) containing Y shaped timber tracery. Internally another arch can be seen above this current one and this has removed all evidence of a previous bell chamber opening – externally there is also no sign. Bricks 185 x 55 x 95mm.

W26 Putlog holes. These putlogs are associated with window W25 and insertion cut W24. Both use Roman tile (24 x 12 x 4 cm).These are now filled.

W27 Putlog hole. Putlog to N of window W25. This is unfilled and 47 cm deep.

W28 Not assigned.

W29 Putlog hole. Putlog south of window W25. This socket is 60 cm deep.

W30 Not assigned.

W31 Cut. Cut through W1 for rebuilt SW corner (W32). See south equivalent.

W32 Rebuild. Rebuilt SW corner using coursed flint and ashlar quoins (see south elevation). Very hard cream cement mortar with small stone inclusions up to 5 mm. See photos of brickwork interior. This rebuild destroys the southern bell hole.
Same as W39.

W33 Bell hole. Dimensions: 0.66m diameter.
Same as southern equivalent destroyed by rebuilding W32.

W34 Fill. Blocking to W33. Light brown lime mortar used to cement flint blocking. This is similar mortar to W37.

W35 Cut. Probable cut to W1, possibly caused re-facing.

W36 Cut. Cut to W1 for rebuilding of parapet W37. Incorporates long strips of stone W40 and a tie bar plate.

W37 Rebuild. Rebuilding of parapet in coursed flint, mortar used is a light brown lime mortar with small chalk and stone inclusions similar to that used to block bell hole W33.
Same as N20,S16 and E20?

W38 Cut. Cut in W37 for rebuilding of battlements and turrets by W39 brickwork.

W39 Rebuilt battlements. Bricks: 205 x 105 x 65mm. Mortar: grey.
Same as N26, S18, E22 and W32.

W40 Masonry. Two horizontal strips of stone, possible remains of string-course. This is within W37.

W41 Roman tile. Tile used to level course; used on all corners at same height.

W42 Ironwork. Piece of ironwork on wall (15 cm long strip, 2 cm wide with 4 nails).

W43 Lead-work. Piece of lead-work with iron nail associated with W42. Clips for cables/climber?

West Elevation - Interior

Please refer to figures 20 - 23.

WINT1 West internal elevation. Same as W1.

WINT2 Blocked Window. Internal splay of window loop W16.

WINT3 Fill. Blocking to window 2 same as W17 contains brick headers 11 x 8 cm and flint and same mortar as exterior.

WINT4 Putlog holes. Pair of putlogs flanking window at height of 2.3 m.

WINT5 Fill. Blocking to putlog WINT4. Same fill as WINT3.

WINT6 Putlog hole. Putlog to south of blocked window directly beneath southern of putlogs WINT4. Height of this putlog is 1.78 metres above present bell chamber floor.

WINT7 Fill. Same fill as WINT5 and WINT3.

WINT8 Joist holes. Series of 4 joist holes 20 x 22 cm. Same as those seen in east elevation EINT6.

WINT9 Fill. Blocking to joist holes. Slightly greyer lime mortar to that of WINT3, WINT5 and WINT7, but could be contemporary.

WINT10 Scar. Crack filled with soft white lime mortar same as W15. Crack no doubt caused by weakness produced by having the two loops W13 and W16 above one another.

## 5) Interpretation

This is clearly a building of many phases. It has not been extensively restored or rebuilt, but has undergone a number of modifications since first being constructed.

The first build:

The original tower was at least 13 metres high judging by the original features and use of mortar, and its construction materials have remained unaltered with the exception of the brick repairs. The flints would have been local and the Barnack stone and Roman brick may well have been salvaged from a site such as Caister St Edmund. It seems these reused materials must have been in short supply as the stone is only used for the bottom couple of metres of quoins and the brick just for the west doorway and as the occasional leveller to keep the flint coursing constant around the corners (figure 7). For the higher quoins the builders have resorted to flint and erratics, which has proved adequate but was not usually the material of choice.

The mortar used for the original build is a very distinctive orange/brown lime mortar and despite the different lifts, building campaigns, and repointing, it can be traced right up to just above the bell-holes. This colour was a clear contrast to any later inserted features. There was evidence on areas of the tower for the original render too. The blocked loop window on the east face (E3) had a thin spread of render around it which followed into the blocked opening. This had clearly been applied before the window had been blocked. This suggests that it is either original or later in the medieval period. The likelihood is that the first construction was completely rendered in lime-mortar in the same way as the Romanesque White Tower at the Tower Of London (hence its name).

The tower is constructed in flint pebbles and erratics of various shapes and sizes laid in courses. There must have been some selection of the flints in order to regulate the courses, but otherwise the effect is rather rough. One exception is an area of herringbone work to the north of the blocked west door. Here elongated flints have been set at an angle alternating with each course. This is decorative and very characteristic of early work (Hart 2000 p7-8).

Without surveying the interior it is difficult to get absolute measurements, but based on the bell chamber openings, the thickness of the tower walls appear to be around 1 metre thick, with the east wall 1.1 metres. To construct any flint building a large

amount of mortar is needed to secure the flints in place and fill gaps. When constructing a tower with walls this thick, a huge amount of mortar would be required and as a result only a short height of walling could be built at once or there was a risk of bulging and collapse. Mortar takes time to go off, before it is strong enough to support the weight of material above it. Each session of construction is known as a 'building lift' and these are commonly around 0.3 metres. At Hethel these lifts can be clearly be seen on a number of places on the tower, especially the bottom of the west face where they occur at intervals of around 0.45 metres to allow the coursing to meet the joints of the quoins. Lifts can be identified by a subtle horizontal line in the mortar between courses or a slight change in the mix of the mortar.

The lime mortar also limited the seasons in which the building could be built; work would have to be stopped over winter because the mortar would not go off and there was a risk of frost damage. The season's work would be capped off and thatched to protect it. This is not obvious at Hethel but research at other flint buildings suggest that these seasonal breaks can sometimes be seen and average at 3 metres (Hart 2000 p5). Based on this, if the Hethel tower was at least 13 metres, it would have taken over 4 years to build.

As the tower was slowly built up scaffold would also go up in order to provide the working platform. In order to support the cross members, holes were left in the fabric to accommodate the timbers. These are known as Putlog holes and a form of this is still used in the construction of modern buildings; now the horizontal scaffold poles are tapered so as to fit between bricks so the ends can be slipped in. Then, and now, these holes are filled in leaving little trace. Putlogs can be identified by the use of a slightly different mortar in the fill or the blocking itself may be out of place with the rest of the surrounding fabric. On flint buildings stone or longer flints (and later brick stretchers) are often used for the bridge over the former hole. On occasions short timber planks are used for this job and one such example was found here at Hethel on the east face (see below). The usual pattern for putlogs is for them to be 2 metres apart horizontally and positioned one above the other vertically at around 1 ½ metres (Hart 2000 p6). On this tower the horizontal spacing is between 2.14 – 2.8 metres and 1 – 1.2 metres vertically. It would seem that various factors must come into this equation. Firstly, putlogs are usually located at the top of a lift immediately below the next stage so the height of the lift is a factor, although there would be a limit to how high the builders could reach from a platform. Secondly, the horizontal arrangement obviously depends on the length of the building and some holes, such

as N5 on the north face, are actually angled diagonally to accommodate a timber that would extend out from the corner of the building and allow circulation at this level. Finally, not all holes are contemporary, there are putlogs flanking the west window which are formed with brick and are therefore likely to be associated with the construction of this late medieval window.

The quoining at the base of the tower is in a style known as 'long and short work' due to the use of alternating flat and upright stones. This has been quoted as an example of Anglo-Saxon architecture, but does occur in buildings dating to just after the Conquest too (e.g. Great Dunham where it exists alongside Norman details). This quoining only extends for the first 2 metres of the tower, above there is use of erratic material and Roman tile to form the corners and regulate the flint coursing. Eventually, it is the flints which form the corners which suggests that other materials ran out. Flints are not as successful for forming and tying in the corners of a building as large stones but there are other examples in Norfolk where it has worked satisfactorily (Wramplingham, Thorpe Abbotts, and Framlingham Earl) (Hart 2000 p10-11).

It is this question of flint quoining which is often quoted as the reason for round towered churches. It is said that the absence of decent building stone in East Anglia resulted in a lack of quoins and so it was easier to build in the round. Hethel is one of a small number of towers which prove that it is in fact possible. Heywood has pointed out that not only are there *square* towers constructed flint, but there are examples of *round* towers in ashlar and other materials more usually associated with a right angled building (Heywood 1988 p170). He suggests that there may be a cultural reason for round towers, an aesthetic choice made after seeing examples on the Baltic. There is fierce debate over whether round towers are actually easier to build than square ones; Heywood says that they are difficult to lay out and it is impossible to shutter them for the required lifts. Hart says that all you need to lay them out is a stake in the ground and string to produce the diameter, and that shuttering probably was not used as it would have given angles to the round sides (Hart 2003 p12). Whatever the reason for round towers, had there been stone available for more quoins at Hethel, no doubt there would have been quoins right up to the top of the tower as at Great Dunham (figures 29 & 30).

The tower would have had two doorways, one external in the west elevation, and one to the nave internally. The internal tower arch has been remodelled taking any evidence of the first archway with it, but the external doorway is still visible albeit blocked. This rounded headed doorway was formed using Roman brick and flint. It would have been the main entrance to the building and one would have filed in through the tower possibly passing the font, which was commonly placed in the most western section of the building.

The tower was lit by a series of loop windows, one in each elevation at a height of around 8 metres. There is also evidence for another in the west elevation at a height of around 5 metres, but this has been partially cut by the later medieval tracery window. There may well have been another to the east overlooking the nave, but no evidence survives to support or reject this due to the large remodelled arch. These windows are narrow to the exterior (0.28 x 0.95 metres) but the internal blockings show that they splayed into much larger features (1 m wide by 1.7M high).

At a higher level there are another series of former openings within the original construction (as shown by the mortar). These are round features positioned either side of the top of the (current) bell chamber windows. These are difficult to discern now as they are blocked and the only distinction between the blocking and the surrounding flint is the use of flints as voussoirs to form the arch, and the change in mortar. From their distribution it is clear that there should be two in each elevation, but now two are missing; those around the southwest corner were destroyed during a rebuild. These are approximately 0.6 metres in diameter, and the partial unblocking of the example in the east elevation (E17) shows them to be double splayed. These features are believed to be bell holes; their primary function is to let the sound of the bells penetrate the building. Similar features can be found at other Norfolk churches including Great Dunham, although unlike Hethel, this has only bell holes to the east and west (figure 31)

The east face displays evidence for another type of opening. Just above the apex of the current bell chamber window is a series of flint voussoirs and blocking to a narrow form of central opening. The width (0.6m) is similar to the bell holes but it has the straight sides of a loop window, yet it is twice the width of any of the windows below. This would appear to be the original bell chamber window, just surviving despite the insertion of the later example which cuts it. There is further evidence in the north wall which suggest that each face would have had one. Unfortunately, the

surviving evidence is too incomplete to judge anything other than their approximate width.

The heights of these openings suggest that there would have been 4 storeys of floors or platforms originally, each lit by either a doorway or a window. There are joist holes within the bell chamber from former floors such as EINT 7 in the east with corresponding holes in west wall. These may be original but would mean the window sill was very close to floor level. They could well be later medieval. The roof scar on the east exterior lies immediately beneath one of these windows. This scar represents the former pitch of the nave roof from when it was leaded. Whether it had always been at this height is uncertain, it is very close to the loop. However, scars can be misleading as they show where the lead flashing was cut into the wall which may be slightly higher than the roofline itself.

The full height of the original tower is unclear as the original mortar terminates just above the bell holes at around 13 metres above the ground. This is true on all sides, which either means the tower finished here before being topped by a feature of some kind, or that before rebuilding the current parapet the fabric was reduced to this level. It is possible there was a parapet originally, but there could well have been a Sompting style pyramidal spire rising above a corbel table. A Norfolk example of this type of roof can be found at Newton, but while it allows one to visualise how Hethel may have looked, the date of this feature has been disputed (figure 33). It is unlikely that the exact form of the Romanesque roof at Hethel will ever be resolved as the evidence has gone.

As the nave and north aisle are all rendered both externally and internally it is very difficult to analyse the relationship between the tower and the rest of the church. The nave does hug the tower but it is not known whether they are bonded or not. Although the interior of the bell chamber was not surveyed, it does appear that the east wall was around 0.1 metres thicker than the others judging by the positioning of the internal blockings. This suggest that the nave always met the tower in this way and the perhaps the wall was thicker to allow for the tower arch.

Although the relationship at the junction cannot be assessed, building work in 1999 did give a glimpse as to the age of the rest of the building. Areas of render were stripped from the exterior walls of the nave and chancel to reveal the southern wall of the nave, and the south and east walls of the chancel to be constructed in courses of

large flints up to a height of at least four feet. These exposed walls were very similar to those of the tower and could well be contemporary (information from Stephen Heywood).

Having discussed the features and described the extent of the original build it is time to discuss the date. The tower incorporates many features which could well be Anglo-Saxon in date, such as the long-and-short work, and round headed doorway. These are features that have a long tradition and carry on after the Conquest. There are no features which conclusively give a Romanesque date, as there is very little stonework there is no opportunity for zigzag ornament or the like. Fortunately, one find on the tower narrows down the date on this first build.

After the pointing on the east face had been picked out another putlog hole came to light just to the north of the current bell chamber window (E35). This was carefully opened up as a piece of timber was just visible at the top. On inspection it was noted that this timber formed the bridge of the opening and so was integral to the build. With the approval of the conservation officer this was removed and sent for dendro-chronological dating. Due to the absence of sapwood an absolute date could not be given for the felling, but has been estimated to be in the region of 1104-1140 (see appendix 1). Although this timber may have been lying around for a few years before it was used, and there is a small possibility that it has been reused, the likelihood is that the tower was under construction in the first decade of the twelfth century.

Medieval alterations:

At some date the tower arch was remodelled, this has similar mouldings to the north arcade so is no doubt contemporary with the construction of the north aisle. This new large tower arch would have cut through the Norman fabric of the east wall and would have required a new floor arrangement similar to the current lower bell chamber or that represented by joist holes EINT 7.

After the initial build, the next major intervention to the tower would appear to be the insertion of the western window. This process necessitated the cutting of a large hole into which the tracery was built. This cut involved cutting through the lower loop window and blocking the remaining upper section. To assemble the stone tracery scaffold was required and so two new putlogs were cut in for the supporting timbers (W10).

The Perpendicular style of this window makes it contemporary with the south porch which was being constructed in the fifteenth century. Both are fine features and no doubt made the west doorway look very humble and unfashionable. With the new southern entrance the west door would have become redundant and blocked up. The actual fill of the blocking uses medieval brick so could well have occurred at this time.

Post Medieval alterations:

The parapet has clearly been rebuilt and as the present arrangement is shown on the Ladbrooke etching, it must have been pre 1830. As the oak obelisks which (until recently) stood on the corner turrets show similarities to those on the Branthwaite monument, it is possible that they were contemporary. This would make them early 17th century. The terracotta coping stones could also be of this date; similar coping can be found on the Norwich Deanery and these are c 1660. Mortar repairs would suggest that although the parapet may have kept its design, there have been subsequent repairs and rebuilding.

In contrast to the more sophisticated features of the west window and porch, the bell chamber openings are much more modest. These are most probably 18th century and are in a 'Churchwarden Gothick' style. The openings are all formed in brick, but there are two types; those to the north and south are pointed, whereas the east and west are round headed. Within each opening is an oak frame of 'Y' tracery with simple chamfering (figures 24–28). This frame holds louver slats at 45 degrees, all apart from the north opening which has horizontal and vertical elements forming a grill. Inside the tower there is evidence for large round headed windows which appear to have been started but never finished judging by the half-built arch in the north interior elevation. The present windows must reflect a revision in design during construction.

These windows may have been contemporary with both the late 18th century Venetian window which Ladbrooke shows in the chancel, and the pointed windows in the south wall. There may have been a building campaign to modernise the whole church.

Tie bars with square nuts are believed to be relatively early. They have been used on the tower to strengthen it by connecting to the internal timbers to brace the walls.

These may be 18th century; they are shown on Ladbrooke, so were definitely in place by 1830.

Victorian Changes:

The limited documentary evidence does at least reveal that the nave roof was rebuilt in 1818 and that it had been previously been lead. The scar from this earlier roof is one of a number of features which appear on Ladbrooke's etching of c1830. This drawing is extremely useful for seeing the state of the building in the Victorian period and tracing all subsequent alterations.

There do not appear to be any obvious major changes to the tower since this was drawn. The tie-bars in the parapet do not appear whereas Ladbrooke has shown the lower ones, and he does show a stringcourse at this level for which there is very little evidence. However, since this was drawn there could have been major repairs and rebuilding. These are very difficult to date.

## 6) Conclusion

The remarkable survival of the tower at All Saints seems to owe much to the fact that the parish was never a rich one. The documentary research suggests that originally it may have been a chapel of ease with little or no endowed wealth. Throughout the medieval period the only major change was the construction of a north aisle and south porch, there was little further embellishment other than the west window. This is possibly due to a decline of the parish.

Patronage from the Branthwaites may have left a fine monument and mausoleum, and perhaps a new window or two, but otherwise there was little change. All Saints seems to have been largely overlooked, only ever appearing in the Faculty Books the once.

Despite the lack of documentary evidence, the forgotten nature of All Saints is very fortunate for an archaeological study. It means that the church has escaped over enthusiastic Victorian restoration and the tower still retains the evidence from its original construction. This has been a very important opportunity to glimpse the evidence in the narrow window between the cleaning out of the joints and repointing. Not only has there been a watching brief but observations have been marked up onto elevations showing rectified photographs. This has allowed detailed research and some valuable finds.

This study has identified all the original openings, found putlog holes, and discovered building lifts. Now, not only can the original design of the tower now be demonstrated, but this recording work proves an important case study for other contemporary flint buildings.

The discovery of the timber bridge in the putlog hole is a fantastic find and allows an approximate date to be placed on the building. Even if the tree from which this came was felled in 1104, then this stage in the construction obviously cannot be any early. As this was found at a height of over 10 ½ metres, and flint buildings were built 3 metres a year, this may have been the fourth year of the campaign. The tower is therefore unlikely to have been started any earlier than 1100, and it may in fact be much later depending how long the timber lay about, or whether it was reused.

As the tower incorporates many features said to be characteristic of an Anglo-Saxon date such as Long and Short Work and double splayed windows, it is most likely that tower was built the first decade of the twelfth century where these techniques were still in the repertoire of the builders.

Having a firm Post-Conquest date to a tower with such features has a knock-on effect for other churches. Many round towers are dated using these characteristics alone. In the light of this evidence from Hethel, W J Goode's theory that the vast majority of round towers are Saxon is even more dubious.

Round towers are unusual and are rightly celebrated as part of the heritage of East Anglia, but Hethel is in many ways more special as it is an even rarer form of building. There may be over hundred round towers in Norfolk, but there is only half a dozen west towers built in flint. This has been a most valuable opportunity to discover more about it.

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Appendix 1- Correspondence regarding dendrochronology.

There was not a budget for this work so it was done informally as a favour by Dr Ian Tyers of Sheffield University Laboratory.

From: Ian Tyers [mailto:i.tyers@sheffield.ac.uk]
Sent: 26 May 2004 14:25
To: Heywood, Stephen
Subject: Hethel putlog

Hi Stephen

Since you've now promised to keep supplying us with work(!) Hethel is as follows;

It contained only 61 annual rings, which is a very short sequence for dendrochronology, it is a single sample, and we like to get replicated results, nevertheless it looks pretty promising (otherwise I wouldn't have told you about it in the first place). The last ring in the sequence is AD1094, but this is still in the heartwood though probably at the edge of the sapwood, if this is the case we would argue that the missing sapwood would take us to at least AD1104, but probably not further than AD1140 so that provides a felling date for the tree used in the putlog to AD1104-1140 inclusive, whether this dates anything helpful of course depends on whether it was freshly felled for use as a putlog.

Regionally there is a paucity of East Anglian and/or East Midlands data for this period but it matches well with what little contemporaneous material we have from Norwich, Essex, Herts, Beds and particularly London (this latter is where the strongest group of contemporary data is from) so we would assume local sourced material, and we would really rather have more putlogs off it but do recognise that there aren't any more to have.

Ian