

SHERIFF HUTTON CASTLE,  
SHERIFF HUTTON, NORTH YORKSHIRE

ARCHAEOLOGICAL AND ARCHITECTURAL SURVEY  
OF THE NORTH-EAST TOWER

VOLUME 1: MAIN REPORT



Ed Dennison Archaeological Services Ltd  
18 Springdale Way  
Beverley  
East Yorkshire  
HU17 8NU

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Report no: 2002/158.R01  
Version: Final  
Date: April 2008  
Author: Shaun Richardson & Ed Dennison

Ed Dennison Archaeological Services Ltd  
18 Springdale Way  
Beverley  
East Yorkshire  
HU17 8NU

On behalf of

Dr R Howarth  
Castle Farm  
Sheriff Hutton  
York YO60 6ST

English Heritage  
37 Tanner Row  
York YO1 6WP

**SHERIFF HUTTON CASTLE, SHERIFF HUTTON, NORTH YORKSHIRE**

**ARCHITECTURAL AND ARCHAEOLOGICAL RECORDING  
OF THE NORTH-EAST TOWER**

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## EXECUTIVE SUMMARY

In April 2002, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by English Heritage and Dr Richard Howarth, through Peter Gaze Pace, architect, to undertake a programme of architectural and archaeological recording on the north-east tower of Sheriff Hutton Castle, Sheriff Hutton, North Yorkshire (NGR SE653663). The work was required as part of a programme of major consolidation and repair, undertaken mainly between April 2002 and February 2003, but with subsequent lesser phases in July-August 2004 and September 2005. The architectural survey involved the production of detailed elevations and plans of the tower, drawing partly on an earlier rectified photographic survey made in 1982 and the enhancement of drawings made in 1996. The archaeological work primarily comprised the supervision of the hand-excavation of the first floor of the tower, to facilitate the repair of the ground floor vault below, with watching briefs also undertaken on several different parts of the tower and surrounding area as the consolidation works progressed.

The combined survey work on the tower, particularly of the north and east external elevations, and the excavation of the first floor, together with the wider ongoing landscape works, have revealed much new information about the castle's construction. For the first time, geological survey work has been able to identify and locate the most likely source of both major stone types used in the construction of the castle, the quarries at Mowthorpe near Terrington, some 4km to the north-east of Sheriff Hutton, confirming a statement made by John Leland in 1534. In its original form, the north-east tower would have risen to a maximum height of c.25m-26m, which is similar to the south-east tower of Bolton Castle in Wensleydale, and it measured c.18m long (north-south) by 11m wide (east-west) externally, longer than Bolton and also the probable contemporary quadrangular castle at Wressle in East Yorkshire. The tower was five storeys in height, including the cellar, with an additional level in the form of a small room set above the third floor. The cellar and ground floor were covered by stone vaults, with wooden floors above. In its original form, the north-east tower would have projected some 6m above the adjacent north range and probably rose to a similar height above the east range, although there is little or no remaining structural evidence for the relationship between the two.

The surviving structural evidence, and comparison with other late 14th century castles in the region, suggests that the north-east tower was more closely associated with the east rather than the north range of the inner court. The cellar and ground floors probably had service and administrative functions, while the first, second and third floors may have been linked by a newel staircase at their south-east corner, and perhaps formed a residential suite as is proposed for the south-east tower of Bolton Castle; the first floor chamber at Sheriff Hutton in particular retains evidence of high quality residential use, although its status appears to have been downgraded somewhat at a later date. There was a small room at the north-west corner of the tower, set above the level of the pitched leaded roof of the third floor, which probably formed a small turret with stairs rising over the top to a small platform. The structural evidence recorded by the survey supports previous assertions that the master mason of Sheriff Hutton was familiar with the design of the near contemporary Bolton Castle, although little evidence was found that might relate to the more recent suggestion that the great hall was located in the north rather than the west range.

Although there is documentary evidence for three major overhauls of the castle during the 16th century, there was little surviving structural evidence in the north-east tower that could be directly linked with these accounts. The two exceptions may be the repointing on the lower part of the north external elevation, which includes tile galleting, and some of the alterations to the first floor recorded during the excavation here, such as the insertion of a high quality ashlar wall and/or a circular oven. Documentary evidence demonstrates that the removal of fixtures and fittings from the castle was well underway by the late 16th century, whilst actual demolition commenced in the early 17th century. A hearth uncovered in the north-east corner of the first floor of the north-east tower was being used to melt down lead window cames, and could be associated with either of

these phases. There was also some evidence for the digging out of wall footings of the north range adjacent to the north-east tower, an activity that may have taken place in the early or mid 17th century.

The north-east tower continued to decay throughout the later 17th and 18th centuries. Most of the lower level of fallen material recorded on the first floor accumulated between the mid 17th century and the mid 19th century, when a pigeon cote was built here. In March 1875 the top of the first floor of the tower collapsed, with further decay and weathering depositing material above this. Subsequently, the walls of the ground floor began to spread, causing the vault above to split and creating a deep fissure exposed by the excavation of the first floor.

The earliest known repairs to the castle ruins in the modern period were undertaken in the early 19th century, and it may be that some of the repointing recorded on the lower parts of the north-east tower relate to this. It appears that attempts to repair the tower continued well into the late 19th century, including the securing of a tie-rod through the garderobe passage of the third floor (traditionally ascribed to the 1880s) and the construction of a brick buttress at the base of the west elevation. Nevertheless, the repairs to the castle did not stop the villagers putting it to more prosaic uses, and from c.1800 until the early 20th century, domestic rubbish was tipped through the part-blocked window in the north wall of the cellar/basement area.

This report provides a detailed description of the results of the archaeological and architectural survey of the north-east tower. The repair/consolidation scheme to the remains of the rest of the castle is likely to be a long-term project, perhaps carried out over the next 15 to 20 years. Research carried out for a recent publication (Dennison 2005) has uncovered a large amount of new primary material relating to the castle, and it is likely that much more will come to light over the duration of the consolidation programme. This report is therefore intended to be an interim statement, which should be combined with subsequent reports and ongoing research undertaken during other phases of repair, to produce a substantial final publication giving a detailed consideration of the castle's landscape, cultural, architectural and social contexts.



# 1 INTRODUCTION

## Circumstances of the Project

- 1.1 In April 2002, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by English Heritage and Dr Richard Howarth, through Peter Gaze Pace, architect, to undertake a programme of architectural and archaeological recording on the north-east tower of Sheriff Hutton Castle, Sheriff Hutton, North Yorkshire. The work was required as part of a programme of consolidation and repair undertaken to the tower, mainly between April 2002 and February 2003, but with subsequent smaller phases in July-August 2004 and September 2005.
- 1.2 The full scope of the works are described under each relevant section of the report. In brief, the architectural recording involved the production of detailed elevations and plans of the tower, drawing partly on an earlier rectified photographic survey made in 1982 and enhancing elevation drawings made in 1996 (Dennison 1998). The archaeological recording primarily comprised the supervision of the excavation of the first floor of the tower by the main contractors, Historic Property Restoration (HPR), to facilitate the repair of the ground floor vault below. However, archaeological watching briefs were also undertaken on several different parts of the tower and surrounding area as the consolidation works progressed.
- 1.3 Additional specialist reports were also commissioned to augment the architectural and archaeological survey work, for example on the geological make-up of the castle (Myerscough 2005), an analysis of the brick and tile in the north-east tower (Tibbles 2003), and a Scanning Electron Microscope (SEM) examination of the lead residues (Smith 2003), and an archaeomagnetic analysis of excavated hearths and lead smelting furnace (GeoQuest Associates 2003); these reports are produced as appendices in Volume 2 of this main report. There was also a programme of ecological survey work undertaken as part of the project, namely an ecological survey of the castle (EINC 2002), and surveys of the lichens and ivy on the north-east tower (Gouldsbrough 2002a & 2002b); the ecology report has been produced as a stand-alone document, but the lichen and ivy reports are included here as appendices 11 and 12 (see Volume 2). Finally, a number of specialist finds reports were produced as a result of the excavation of the first floor of the tower, and these are also produced as appendices to this document.

## Site Location and Description

- 1.4 Sheriff Hutton Castle is located on the south side of Sheriff Hutton village (at NGR SE653663), some 16km to the north-east of York, in North Yorkshire (see figure 1). The castle lies in the angle of Main Street and Finkle Street and commands an elevated position above the eastern edge of the Vale of York (see figure 2). Originally, the castle would have been at the west end of the village but subsequent development means that it now lies towards the centre.
- 1.5 Construction work on the stone castle commenced in c.1382, when a licence to crenellate was granted to John Neville, Lord of Raby (d.1388). The castle was built on an entirely new site, and replaced an earlier castle or manorial centre, still visible as an earthwork complex, located near the church at the east end of the village. After John Neville's death in 1388, it is assumed that construction of the stone castle was completed by his son Ralph Neville, Earl of Westmorland, and that the complex was probably finished by c.1402.

- 1.6 The finished castle shares many characteristics with other large late 14th century palatial residences, such as Bolton Castle in Wensleydale, North Yorkshire and Wressle Castle in East Yorkshire, and it forms part of an extensive building programme undertaken by the Nevilles at their major residences during this period. In its late medieval form, the castle complex comprised three courts or wards, containing the castle itself, service buildings and yards, ornamental gardens, orchards and other features; the court or ward areas are as defined by Wright and Richardson (2005). Within the wider landscape, there was an extensive deer park to the south of the castle, which had itself developed over a number of phases, and elements of the planned village, for example the creation of a central market place and green, were integral to the position and functioning of the castle. The castle complex appears to have undergone substantial remodelling during the early to mid 16th century when it formed the residence of first Henry Fitzroy, Duke of Richmond and then afterwards that of Thomas Howard, Duke of Norfolk. However, the castle was in decay by the late 16th century, and fixtures and fittings were already being removed. Actual demolition does not appear to have started until the early 17th century and by c.1700 the castle was an uninhabitable ruin (Wright & Richardson 2005, 96-121).
- 1.7 Today, although there are extensive earthwork and buried remains on the site, the only major structural survivals are the four c.30m high ruined rectangular corner towers of the inner court or ward (see figure 2). Castle Farm, which was converted to residential accommodation in 2003-04, now occupies most of the area of the middle ward or court, whilst the majority of the outer court is given over to pasture. The castle and surrounding earthworks were designated as a Scheduled Monument in the 1950s (SM 32704) and the castle ruins are listed by the Department of Culture, Media and Sport as being of Special Architectural or Historic Interest, Grade II\* (ref 3/36; IOE 329529).

## **Report**

- 1.8 This report provides a detailed description of the results of the archaeological and architectural recording of the north-east tower. The repair/consolidation scheme to the remaining four tower and ancillary structures of the castle is likely to be a long-term project, perhaps carried out over the next 15 to 20 years. Research carried out for a recent publication (Dennison 2005) has uncovered a large amount of new primary material relating to the castle, and it is likely that much more will come to light over the duration of the consolidation programme. This report is therefore intended to be an interim statement, which can be combined with subsequent reports and ongoing research undertaken during future phases of repair, to produce a substantial monograph at the end of the whole project, giving a detailed consideration of the castle's landscape, cultural, architectural and social contexts.

## 2 HISTORICAL SURVEY

### Introduction

- 2.1 As stated above, the research carried out for a recent publication (Dennison 2005) has uncovered a large amount of new primary and secondary material relating to the castle, and it is likely that much more will come to light over the duration of the rest of the consolidation scheme. In the following section, this new material, together with that gathered previously (see Dennison 1998), is discussed only where it relates specifically to the north-east tower. Some of the 18th and 19th century illustrations of the castle are reproduced as plates, and others are induced in Appendix 1.

### The Late Medieval Period to the 16th Century

- 2.2 The north-east tower was built as part of the inner court of the stone castle, erected between c.1382 and 1402. However, the first known indication of its purpose and use comes in December 1572, when a survey was made of the porter's lodge and its two adjoining towers, "*one at the Northe end called the Master of the Horse's lodginge, and thother at the Southe ende*" (PRO E134/MISC/2621 quoted in FAS 2003, 24). At that time, both towers required extensive repairs to their roofs, while the floors, roof and battlements of the two-storey porter's lodge needed almost complete renewal; the total cost was estimated at £69 10s (Colvin, Ransome & Summerson 1975, 294).
- 2.3 If the porter's lodge is taken to be the existing gatehouse to the inner court, then the "Master of the Horse's lodginge" would equate to the north-east tower. However, it is also possible that the porter's lodge referred to might have been within the gatehouse leading to the middle court. This was also flanked by towers, the northern of which adjoined the "Long stable" on the north side of the middle court, which is mentioned in 1537 and 1618 (Wright & Richardson 2005, 102-104) – is this a logical place for the Master of the Horse's Lodgings to be? In addition, in 1839 Samuel Sharp noted that this tower contained windows with flat double-centred brick arches of 16th century appearance (RIBA X(079)So 728.81 (42.74 SH)), perhaps supporting the view that it was this tower that was repaired in 1572, not the north-east tower of the inner court.

### The 17th and 18th Centuries

- 2.4 The earliest known image of Sheriff Hutton Castle appears to be that produced by John Norden in 1624, when he provided a distant view positioned on the north side of the park (BL Harleian mss 6288, f27 – reproduced by Dennison 2005, plate 37; see Appendix 1). However, this depiction is not sufficiently clear or detailed enough to give an accurate impression of the north-east tower. Bernhard Dinninghof, the German glass-painter and glazier, produced some detailed plans in 1618 showing how the gatehouse and flanking towers of the middle court could be converted into a residence (WYAS Leeds WYL100/SH/A3/2/1-3), but again these provide no information on the north-east tower; it appears from related correspondence that the structures in the inner court were considered beyond renovation as a house by this time (see Richardson 2005, 212-213).
- 2.5 There is an early, but undated and un-attributed, engraving of the castle, a copy of which is held by the Tate Gallery (T11607) ([www.tate.org.uk](http://www.tate.org.uk)). This engraving may be by William Lodge (1640-1689); a catalogue of engravers compiled in 1786 states that Lodge published an engraving of the castle, and if that held by the Tate

is Lodge's work, then it must be late 17th century in date. Unfortunately, only the very edge of the north elevation of the north-east tower is shown on the engraving and, if the depiction is to be believed, it apparently survived to near full height (Wright & Richardson 2005, 116-121).

2.6 It is possible that the above undated engraving acted as the basis for a later, much better known depiction of the castle by Samuel Buck, dating to 1720-21 (reproduced in Couling 1993, 35 and Wright & Richardson 2005, plate 7/16) (see plate 5). Buck's engraving shows the castle viewed from the north, and depicts the north range running between the north-east and north-west towers as surviving to near full height. The north face of the north-east tower is shown with two narrow centrally-placed windows below the first chamfered off-set, two centrally placed three-light square windows between the first and second off-set, and no windows above the second off-set. However, there are a number of problems with the engraving. Whilst it shows the correct number of off-sets to the north-east tower, and the correct number of centrally placed windows between the off-sets (with the exception of the third floor), in many other respects it is rather inadequate. The form and distribution of the windows in both the north-east and north-west towers bears little relation to Sharp's later 1839 survey (which is generally accurate where it can be checked against the existing structure; see below) or the existing structure itself. Nevertheless, perhaps the most telling evidence is produced by Buck himself who, in a distant sketch of the castle ruins he made about three years earlier in c.1718, shows them much as they appear today, with little evidence for surviving range walls (Wakefield Historical Publications 1979, 11; see Appendix 1). A number of possibilities can be suggested. Some of the features shown in the 1720-21 engraving, particularly the flat-headed windows in the towers, are reminiscent of Bolton Castle in Wensleydale, and it may be that, recognising the similarities between the two sites, Buck filled in the missing details at Sheriff Hutton with ones from Bolton. Alternatively, Buck may have drawn upon an earlier source, perhaps the engraving held by the Tate or one similar, and elaborated upon the details shown in this.

2.7 A late 18th century engraving of the castle published in 1797 "by J Walker from an original drawing of Mr J Hornsey" (reproduced in FAS 2003, 28 but wrongly attributed to Harvey) shows the north-east tower in some detail (see plate 6). The north external elevation has a single ragged opening to ground floor level, from which a crack rises a considerable distance up the tower. A small structure, perhaps a haystack, butts the base of the east wall. On the north face, above the lower chamfered off-set, there is another ragged opening to the first floor, and a two-light window above to the second floor with two small openings at different levels to the west. Above the upper off-set, Walker shows another two-light window to the third floor with a further large ragged opening above this. The north wall of the tower is surmounted by a string-course rising vertically at either end and the engraving also hints at the remnants of possible crenellations at the top of the east wall.

### **The 19th Century**

2.8 The first detailed antiquarian description of the castle ruins was provided by Todd in 1824. He noted that the north-east tower was 74½ feet, or 24 yards 30 inches in height (22.7m) and, on the first plan of the castle "taken in November 1823" showed the north-east tower as a rectangle, c.40 feet (12.1m) long (north-south) by 25 feet (7.6m) wide (east-west), with two openings in the east wall and a spiral staircase in the north range wall to the west (Todd 1824, 7) (see figure 4). The tower was described thus:

*“In the North-east Tower, at cross angles, there is another Keep or Dungeon, but it is closed up by a wooden door and locked. It is nearly similar to the other, and has also an apartment or chamber above, with a vaulted ceiling, &c. in a perfect state. This Tower has a very massive appearance, and is the strongest of the four.”* (Todd 1824, 7-8).

2.9 In his text, Todd also included two engravings of the castle ruins, originally produced by Henry Cave in c.1809, and they provide some limited information on the north-east tower. The frontispiece depicts the ruins from the north-west, showing the north elevation of the north-east tower with a single central window on the uppermost floor, and a pair of windows (or a single two-light window) with a small opening to the west on the floor below; Cave’s original is slightly clearer (see plate 7), and this appears to show that the uppermost window is surrounded by a moulded string course. The view from the south-east depicts a tall opening at the base of the east elevation of the tower, with a single arched window on the first floor, a smaller two-light window on the second floor and a small angular projection, perhaps a turret, at the north-east corner (Todd 1824, facing title page & p7) (see plate 8).

2.10 At about the same time as Todd published his book, Nicholson produced a number of sketches of Sheriff Hutton and the surrounding area. His sketch of the castle viewed from the north-east is particularly valuable, in that it gives one of the few known views of the remnants of the middle court (York City Art Gallery PD353; see Appendix 1). In this sketch, Nicholson depicts the base of the north elevation of the north-east tower as being butted by a haystack or stack stand. Above the first chamfered off-set, there is a large central opening to the first floor, presumably caused by the collapse or removal of a window. A two-light window with a smaller window to the east is shown to the second floor, with a further smaller central opening to the third floor above the second chamfered off-set. Above this, a string course rises vertically at either end. As regards the east elevation of the tower, Nicholson drew a large ragged opening to the first floor, apparently with a smaller opening to its north. There were either one or two small openings to the second floor and a two-light window to the third floor, with the string course above appearing very similar to that on the north elevation. A watercolour of the castle ruins made a few years later in June 1827 by Bainbridge shows much the same detail to the upper part of the tower (original held by Armitage family, Park Farm, Sheriff Hutton).

2.11 The earliest measured survey of the north-east tower was produced by Samuel Sharp in 1839, as part of the work for which he was awarded the Soane Medal of the Royal Institute of British Architects. His survey covered the whole of the castle, but of the north-east tower, he noted only (regarding the ground floor):

*“Guardroom in the north east tower: this room is nearly perfect and is similarly finished to the one in the south-west tower. Both the rooms have dungeons or prisons beneath entered from the winding staircases and highlighted by the very narrow slits high up in the vaulted ceiling.”* (RIBA X(079)So 728.81 (42.74 SH)).

2.12 Fortunately, Sharp’s drawings are more informative. As his description suggests, his plans show the ground floor of the north-east tower as largely complete (see figure 5). The ground floor was lit by a single window in the north wall and a pair of deeply splayed windows in the east wall, flanking a centrally-placed fireplace. To the south of the south window there is a small intramural chamber containing a garderobe. Sharp indicates a doorway at the west end of the south wall, leading

into a narrow east-west aligned passage with a spiral staircase at east end (i.e. at the tower's south-east corner). The west face of the west wall contained a fireplace and a garderobe, both formerly serving the easternmost space of the north range running between the north-east and north-west towers. On his "principal" floor, although the remains of the tower were very much reduced in size at this level, two deeply splayed windows flanking a fireplace survived in the east wall, with a single window to the north wall and a garderobe passage contained within the north-west angle of the tower. On his "chamber" plan, only a single window survived in the east wall, there was a fireplace towards the north end of the west wall, and the window in the north wall had a garderobe passage leading off the west side. Sharp's "chamber" floor equates to the present third floor, which implies that "principal" floor relates to the present second floor although it seems more likely that it is a combination of the first and second floors.

- 2.13 Sharp's elevation drawings provide considerably more detail than the earlier sketches and engravings (see plates 9 and 10). In 1839, the windows in the north elevation of the north-east tower remained complete at each floor level. The basement/cellar was lit by a narrow square-headed window, with a single trefoil-headed light to the ground floor. A scar left by the removal of the north-east spur wall is shown apparently rising just above the lower chamfered off-set. There were similar two-light windows to the first, second and third floors, whilst above the string course the elevation appears to terminate in two small turrets; the small window on the west side of the main second floor window is however not shown. In the east elevation, a single trefoil-headed light is shown to the ground floor, with a ragged hole to the south caused by the collapse/removal of another. Two-light trefoil headed windows survived to the north end of the first, second and first floors, and were almost certainly once mirrored by similar windows to the south end. A small turret-like structure projects above the string course at the north-east corner of the tower.
- 2.14 Some of the details shown in Sharp's elevations (although not all) are confirmed by a pair of drawings made shortly afterwards and now held in York City Archives. In the later sketch by G S Allen, dating to August 1847, the castle is largely obscured by trees growing on the double canals to the south (York City Archives 100/S01/157). However, the earlier drawing, made by the Revd. S J Allen in May 1840, shows the full extent of the ruins (York City Archives 100/S01/156, reproduced in Wright & Richardson 2005, figure 7/17) (see plate 11). The arches of the windows at the south end of the first, second and third floors of the north-east tower's east elevation, hinted at by Sharp, are clearly shown by Revd. Allen, in addition to other features on the south side of the castle which have since gone. Another engraving, by W Monkhouse and Company of York and published by Thomas Gill in 1852 shows the external north elevation (Gill 1852, facing p421). This depicts virtually the same as that shown earlier by Cave in 1824, although it appears that the small window on the west side of the second floor window has now been opened out, and there are discrepancies with the windows and height of the tower as shown by Sharpe.
- 2.15 In 1855, Grainge stated that "*The north-east tower is the strongest and most massive, and contained an arched vault at the base, similar to the first mentioned; above which, is another room, now used as a pigeon cote*" (Grainge 1855, 242). Tempest, writing in 1875, largely reproduced Todd's work, but added that "*During the month of March 1875, the top of the floor room of the north-east tower of the Castle fell down*" (Tempest 1875, 41). Wheater provided no new information (Wheater 1888, 213-232).

- 2.16 Several late 19th century photographs show the effects of the collapse of the north-east tower as described by Tempest in 1875 (see Appendix 1). A photograph of the castle viewed from the south-east and possibly taken before c.1887 shows the north-east tower to be massively reduced in scale from earlier illustrations (original held by Tony Wright, reproduced in Wright & Richardson 2005, figure 8/8) (see plate 12). Another photograph taken c.1887 shows a slightly different angle. These show that the east face has disappeared completely above first floor level whilst the north face had collapsed down the centre of the trefoil-headed central windows, leaving only the western half standing. Both photographs show the upper levels being similar to those which survived in 2000.

### **The 20th century to the Present Day**

- 2.17 It appears that the 1875 collapse reduced the north-east tower to something approaching its present extent, and therefore 20th century maps and illustrations provide little in the way of additional information. The tower is included in 20th century accounts of the castle, beginning with the Victoria County History in 1923 which published a new ground plan (Calthrop 1923, 175) (see figure 4). The history of repairs and expenditure at Sheriff Hutton is covered by Colvin, Ransome and Summerson (1975, 293-94) while other authors have considered the possible role of John Lewyn in the design of the castle (e.g. Hislop 1989) and Couling (1993, 25-33) has compared Sheriff Hutton with Bolton and Middleham castles.
- 2.18 More recently, the castle has been included in an important national study of greater medieval houses (Emery 1996, 390-393) and subject to its first detailed archaeological survey (Dennison 1998). A Conservation Plan for the castle ruins was produced in 2003 (FAS 2003) and a geophysical survey of the inner court and presumed formal garden area was undertaken in 2006 (GSB Prospection Ltd 2006). Probably the most detailed attempt to date to recreate the layout of the inner court from the existing remains has been carried out by Hislop (2007).

### 3 ARCHITECTURAL RECORDING OF THE NORTH-EAST TOWER

#### Introduction

- 3.1 The standing remains of the castle survive as a number of discrete stone-built structures, which in the previous survey (Dennison 1998) were described as Areas 1, 2, 3 and 4, corresponding approximately to the south-east, north-east, north-west and south-west towers respectively. These areas represent the four corners of the inner court, which lies to the west of the middle court, of which only two spur walls remain.
- 3.2 In the following description of the north-east tower, the tower is described level by level, starting with the basement/cellar and rising to the uppermost floor. To avoid repetition, rather than treating each elevation or plan separately, the information for each level has been combined, and so reference should be made to the relevant figures when reading the text (see figures 6 to 11). Reference is made to historic prints, engravings and other depictions where relevant. The tower is aligned north-north-west/south-south-east but in the following text, for ease of description, it is considered to run north-south.
- 3.3 It should also be noted that the north-east spur wall, which formed part of Area 2 as defined in 1996 (Dennison 1998) was specifically excluded from this phase of repair to the north-east tower. It therefore does not appear in this report, but will be included in a later stage of the repair scheme and recorded accordingly. The line of footings visible in plan only between the north-east tower and the "Guard Room" to the south, was also not affected by the repairs to the north-east tower, and so is commented on only in passing below.
- 3.4 As noted in Chapter 1 above, the recording of the north-east tower was an integral part of a major programme of consolidation and repair, brought about because of the potential risk of the collapse of the structure. In particular, the vaulted roof of the ground floor room was in a precarious state, with some fracturing and flattening evident together with a large crack against the east wall which had got progressively worse between 1996 and 1997 (see plates 13 and 14). There had also been some collapse over an opening in the east elevation at some point between 1982 and 1993 (Dennison 1998, 75) (see plate 15), and there was a large structural crack in the north elevation over the ground floor window (see plate 16). Finally, there was a significant collapse of the basement vault (see plate 17).

#### Methodology

- 3.5 In late 1982, a rectified photographic survey of the majority of the castle's upstanding wall faces was carried out by the then Photogrammetric Unit of the Department of the Environment. Although this work did not cover all the elevations, particularly the external and internal elevations of the Guard Room and the internal elevations of the basement and first floors of the south-west tower, the resulting plots and photographs provided a useful base-point from which any subsequent collapse or erosion could be measured.
- 3.6 In 1996, a new but limited programme of rectified photography was carried out, to cover those areas which had been omitted in 1982, or where significant changes had occurred since 1982, or where the existing coverage was inadequate. This and the previous rectified photographic data, augmented by some hand and EDM survey, were then used as the base for the elevations accompanying the



archaeological and architectural survey. It was accepted that there were some errors in this data, particularly at the higher levels (Dennison 1998, 27).

- 3.7 For the current phase of works, the plans and elevations were revised and redrawn. Prior to the scaffolding of the north-east tower, several hundred points were taken on each elevation of the north-east tower using reflectorless EDM total station equipment, typically the tops and bottoms of quoins, window jambs, doorway heads etc. The locations of all the points taken were marked on the 1996 elevation drawings, so they could be accurately located when the tower was scaffolded. The new elevations were then produced by traditional hand measurement techniques which used the EDM points as a base in order to ensure accuracy. The scaffolding of the tower also allowed the close inspection of all parts of the various elevations, allowing many more details to be seen and added to the drawings.
- 3.8 In 1996, a system was devised in which certain features on all towers were allocated unique numbers to allow cross-referencing, e.g. C3/2 or W2/10. In this system, the letter refers to the type of feature (C = latrine/garderobe chute; D = doorway; L = latrine/garderobe; W = window); the first number indicates the area of the castle, and the second number is the feature number within the area. Thus C3/2 is a latrine/garderobe chute within Area 3 (the north-west area), and W2/10 is a window in Area 2 (the north-east area). Only features which had been positively identified as one of these types were given numbers - where the interpretation was ambiguous, for example where no dressings survived around an opening, no number was allocated. In order to create continuity with the previous report, this numbering system has been retained and added to where appropriate in the following text and on the survey drawings accompanying this report.
- 3.9 All new elevations and plans of the north-east tower were produced at a scale of 1:50. As in 1996, given the characteristics of the castle fabric, it was decided that full stone-by-stone drawings were not required. Instead, all significant features, such as dressings, openings, blocked openings, corework, and areas of repair or other interventions, etc would be shown.
- 3.10 In addition to the detailed architectural survey, a general photographic survey of the tower for recording and illustrative purposes was carried out, together with detailed photography of significant features. This was achieved using a medium format camera with perspective control and black and white film, with a 35mm camera used for colour transparencies and also colour prints. Digital photographs were also taken. Subject to access, all photographs contained a graduated scale, and artificial lighting was used where necessary, in the form of electronic flash and flood lighting. Each photograph has been catalogued and indexed, and a number are reproduced as plates to accompany the following text. The negatives, contact sheets and photographic prints have been included with the project archive, which will be deposited with the Yorkshire Museum in due course.

### **Location and Plan Form**

- 3.11 The north-east tower stands at the north-east corner of the former inner court or ward, which effectively forms a quadrangle measuring 52.2m in length along the north side and 66.0m along the west side (see figure 2). As has been previously noted, all but the south-east part of the inner ward is laid out to a regular plan, with the north-west tower repeating the change of axis seen at Bolton Castle (Emery 1996, 390-391). The irregularity of planning at the south-east corner is not discussed at length here, but has been partly ascribed variously to either a hiatus

in building following the death of John Neville in 1388 (Dr Jonathan Clarke, FAS, *pers. comm.*) or perhaps to a change in plan undertaken to achieve a more speedy completion (Emery 1996, 391).

- 3.12 The north-east tower is bounded to the north by the remnants of the north-east spur wall and to the west by the linear depression which marks the former cellars of the north range. To the east, there is a narrow area of grass between the tower and the west range of the Castle Farm complex, and to the south, another grassed area within which angled footings are visible towards the gate tower/guard room. In their existing form, the remains of the north-east tower measure a maximum of 15.80m north-south by 11m east-west, with walls averaging 2.50m in width (see figure 6); comparison with the south-west tower and Sharp's 1839 plans (see figure 5) suggest that the tower had an original external north-south length of c.18m.
- 3.13 Sharp also shows the remains of a newel staircase at the south-east ground floor corner of the tower, reached via an east-west passageway (RIBA X(079)So 728.81 (42.74 SH)), as did Calthrop in 1923 (Calthrop 1923, 175) (see figures 4 and 5). This corner location mirrors that of the staircases in the north-west and south-west towers, and therefore seems likely to be accurate. The staircase shown to the west of the north-east tower (within the north wall of the north range) by Todd in 1824 was therefore not the main staircase (Todd 1824, 7); it is not certain if this staircase actually existed, as although Sharp shows a staircase here in 1839, he did not base his reconstruction on existing structural evidence.

### **Structure and Materials**

- 3.14 The north-east tower is five storeys in height, including the cellar, with an additional small room forming the uppermost level above the third floor; it rises a maximum of 24.2m above the existing ground level. Although the remains of the tower are severely curtailed in plan above first floor level (see plate 3), it appears that, with the exception of the uppermost level, there was originally a single large space or room to each floor level, measuring c.12.20m north-south by 5.80m east-west. However, the excavation of the first floor (see Excavation Area D in Chapter 4 below) revealed evidence for possible stone and wooden partitions, and it is possible that some of the other rooms were sub-divided in a similar fashion, although evidence is conflicting.
- 3.15 In addition to the main room/space, each floor, except the cellar and uppermost level, were provided with garderobes; the distribution of garderobe chutes on the east side of the first floor indicates that some of the upper storeys may have been equipped with more than one garderobe, again suggesting sub-division. The ground and first floors were heated by large fireplaces in the centre of the east wall, and this arrangement may have been replicated on second and third floors, perhaps with separate flues rising to a chimney stack on the east side of the tower's roof. The ground, first, second and third floors were lit by a single two-light window in the north elevation, and a pair of similar windows in the east elevation (although see below for the second floor). The third floor was covered by a shallowly pitched leaded roof, with the ridge running north-south.
- 3.16 A great deal more geological work has been undertaken on the types and sources of the stone used in the castle (Myerscough 2003; Myerscough 2005; see Appendix 2) since the earlier architectural and archaeological survey (Dennison 1998), and further research is ongoing (Wright & Richardson 2005).

- 3.17 The castle is predominantly a rubble structure, built from individual flat pieces of an iron-rich red-brown oolitic limestone, roughly coursed and averaging 0.02m to 0.03m thick and 0.20m long (see plate 16). The limestone has a rich bivalve, bryozoa and echinoid fauna and it appears to have been subject to very little dressing, due to the stone splitting easily into rubble form. The stone has been identified as being a localised form of the “Dogger”, a resistant iron-rich limestone of the Middle Jurassic sequence (182 to 160 million years ago) which outcrops at Terrington Bank, some two miles (c.4km) to the north and north-east of Sheriff Hutton (Myerscough 2005, 3; Rayner & Hemingway 1974, 364).
- 3.18 It is likely that the Mowthorpe quarries supplied the stone for the castle, concurring with the statement made by John Leland in 1534 that “*the Stone that the Castel was buildid with was fetchid from a Quarre at Terington a 2. miles of*” (Brayshaw 1889, 325; Wright & Richardson 2005, 98). The quarries at Mowthorpe cover an area at least 1km long, 0.5km wide and over 10m deep, and are therefore of sufficient size to have supplied the considerable quantities of stone needed to build the castle. However, the quarries may have continued to be worked well into the 19th century for the Castle Howard Estate and were still producing road material in 1892. The Dogger was also quarried at High Stittenham, but the quarries here are much smaller and may only have been supplying local needs (Myerscough 2005). There are various theories as to how the stone may have been brought to the castle from the quarries, but at least one local tradition maintains that it was transported across the former flooded flat-bottomed valley running between Mowthorpe and Sheriff Hutton using boats or rafts. Further ongoing research may be able to support this theory, although possible overland routes are also being considered (Wright & Richardson 2005, 98-99).
- 3.19 The second main building stone used at the castle, for the quoins and window and door jambs, is a grey-brown medium-grained sandstone, frequently iron-rich, giving it a rusty appearance; a spot-test with 10% hydrochloric acid showed that calcium carbonate was absent, which means that it is a siliceous sandstone (see plate 16). This stone has been identified as a fine-grained channel sandstone of the Ravenscar Group (Middle Jurassic) laid down along an advancing sub tropical shoreline, in contrast to the marine shelly limestones of the Dogger. These sandstones are poorly cemented and easily eroded, as can be seen, for example, on many of the window and door jambs. It is difficult to identify the stone’s source quarries with any certainty, but the iron-rich sandstones appear to very similar to those seen below the limestones in Mowthorpe, i.e. the Dogger, whilst those with little or no observed iron content seem to be more typical of channel sandstones observed across the North York Moors and along the coast (Myerscough 2005, 3).
- 3.20 In addition to these two main types of stone, other stone has been noted within the castle structure. An ashlar wall excavated on the first floor of the north-east tower (see Chapter 4 below) was built of a finely dressed limestone, probably Birdsall calcareous grit of the Upper Jurassic period. Wider geological survey in North Yorkshire has identified a number of building stones which occur in high status buildings and which therefore might have been expected to have been used within the castle. These include Brandsby Roadstone (Middle Jurassic) and Hildenley Limestone (Upper Jurassic) (Myerscough 2005, 4). Only very small amounts (or none) of these various stones are as yet known from the castle, although it is likely that the Brandsby Roadstone was used for roofing slates; given that these stones were highly prized, they were re-used over a wide area and so may have been some of the first structural materials to be removed when the castle fell into disrepair in the early 17th century.

- 3.21 Brick and tile are also used to a limited extent throughout the castle, particularly as a lining in fireplaces, and small amounts have been incorporated into the fabric, apparently both in early post-medieval alterations and also later repairs (Tibbles 2003; see Appendix 3). The brick and tile within the north-east tower is discussed where relevant in the circulation description below.

### **Evidence for Construction and Repair**

- 3.22 The survey of the north-east tower revealed several different types of evidence relating to its original construction and possibly to early repairs, as well as evidence for 19th century repair.
- 3.23 As stated above, the majority of the castle is built from thin pieces of roughly coursed limestone rubble. The north-east tower is faced with the same material, set with a lime mortar, varying in colour from cream to light-brown (see plate 20). Analysis of this mortar showed it to be formed from a mix of moderately hydraulic lime and sand, in proportions of 1:2.5 by weight and 1:1 by volume (Sandberg 2002; see Appendix 4). Where the facing of the tower has fallen away or been removed, a core made of similar limestone rubble and mortar was revealed. The rubble within the core again tended to be roughly coursed or at least laid flat, rather than tipped in *en masse* between the facing stones. In several places, for example the lower parts of the west external elevation, the exposed core appears to contain “faceting” or changes of angle, but this is probably due to collapse rather than any original constructional technique. Whilst recording the south-facing section of excavation on the first floor (Excavation Area D - see figure 19), the remains of a step or inset was noted in the core/wall section on the west side; this may have been used to support the formwork for the ceiling vault over the ground floor.
- 3.24 Building breaks are clearly visible on the north and west external elevations of the tower (see figure 9). At a lower level, they are most clearly discerned by a change in the colour of the sandstone used for the corner quoins, and it may be significant that a similar change can be seen at a similar height on the south-east tower. At a higher level, the building breaks are spaced at vertical intervals of about 2.5m to 3m; they are stepped across the elevation, rather than running level, and in some cases they appear to coincide with dark brown sandstone quoins at the tower’s north-west corner. These darker quoins might have been used to mark the seasonal progress of the works, perhaps to demonstrate to either John and Ralph Neville or the master mason how much had been achieved over a period of time.
- 3.25 In addition, a series of regularly spaced putlog holes were recorded on the north and west external elevations. These are spaced at vertical intervals of 1.75m and at 1.50m centres, and were neatly infilled with a dark grey mortar when they were no longer required. In the north elevation, the putlog holes rise to 13m above ground level and then stop; by contrast, in the east elevation, they start at 13m and the rise for a further 3.7m before again stopping. This suggests that they form part of the same sequence of building, relating to the original construction of the tower, although it possible that some might relate to later repairs (see below). In the west elevation, a rectangular area of blocking, 0.50m high and 0.30m wide, situated immediately above the lowest visible putlog and at the same height as a building break, may mark a former beam position, perhaps to support a crane or a larger scaffolding platform.
- 3.26 The earliest evidence for repairs noted on the north-east tower is an area of repointing to the lower part of the north external elevation (see figure 9 and plate 16). The repointing rises to c.8.2m above ground level and is largely confined to

the west of the ground floor window (W2/3), although there is an isolated patch further east. This repointing is characterised by the use of a light grey sandy mortar incorporating a high proportion of small round stones and red brick/tile galleting. The brick/tile fragments used in the galleting decrease in size as the repointing rises up the elevation, the upper area incorporating flat roof tile fragments. At a lower level, misshapen flat roof tile, probably purchased as “seconds” for direct use as infilling, were visible, along with part bricks; no pantile fragments were identified (Tibbles 2003). The tiles were provisionally ascribed a late medieval or early post-medieval date and this, together with the lack of pantile fragments, suggests that the repointing might date to one of the documented 16th century refurbishments of the castle. However, it is acknowledged that the material could have been re-used from elsewhere on site at a later date. It is possible, although probably unlikely, that the putlog holes within this area of repointing relate to it, rather than the original construction.

- 3.27 Other smaller areas of repointing and repair were identified around the north-east tower. On the north external elevation, a horizontal spread of white lime mortar with no galleting survived above and to the east of the ground floor window (W2/3), with an area of limewash at the base of the tower below. A similar horizontal spread of repointing is visible at the north end of the west elevation. At the base of the west external elevation, some of the surviving wall face had been repointed in a thickly applied grey lime mortar, possibly at the same time as the adjacent large brick buttress was constructed. The buttress is built from red handmade bricks and is assumed to be of either 19th or early 20th century date. Above, some of the exposed core of the east elevation also appeared to have been repointed prior to the current scheme of works. It is difficult to date any of these repairs closely. Some may have formed part of the work described by Todd in 1824, who noted:

*“About four or five years ago, Mr Plows, jun. a builder in York, was employed nearly three months in repairs, at an expense to the Noble Proprietor of £80 or £90. All the loose stones on the tops of the towers, &c. were carefully taken off, and re-fastened, and pointed with Roman cement; as they were becoming dangerous to persons passing underneath, and to the cattle grazing in the pastures below.”* (Todd 1824, 30).

- 3.28 It appears that attempts to repair the north-east tower continued well into the late 19th century. It is thought that the tie-rod running through the uppermost garderobe passage of the tower (emerging through doorway D2/2 on the third floor) was put into place by Noah Banks of Lilling, who then carved the letters “N B L” on the adjacent door jamb (Robin Wardell, *pers. comm.*). This work is traditionally ascribed to the 1880s, and if so could have formed part of an attempt to prevent further decay following the major collapse of 1875.

### **Circulation Description**

- 3.29 A circulation description of the north-east tower is given below, starting with the basement/cellar level and rising through all four storeys above to include the uppermost level. Rather than describing the external elevations separately, the relevant structural information from them is included in the circulation description. It should be noted that the following text uses as its basis the architectural description given in the previous survey report (Dennison 1998, 40-45), although the enhanced access provided by the scaffolding has allowed this to be significantly expanded, with a consequent improved understanding and interpretation.

### *The basement/cellar*

- 3.30 Following clearance of the interior (see Excavation Area B in Chapter 4 below), the basement could be seen to be formed by a single space aligned north-south, measuring 12.00m long and 5.40m wide, and covered by a wide barrel vault (see figures 6, 10 and 11). Although the test pits excavated within the basement (see Excavation Area B in Chapter 4 below) revealed no remains of a solid floor, the wall footings of the basement's west wall were exposed, indicating that originally the height from the floor to the top of the vault was c.4.50m. The vault sprang from c.1.50m above the original floor level on either side of the basement. On the east side, a 1m high section above the springing line is built in much more thinly coursed limestone than the rest of the wall, whilst on the west side there are two vertical cracks to the north of centre. The area of masonry between these cracks appears disturbed by structural movement or possibly to have even been rebuilt, although the former is perhaps more likely. A large part of the vault over the south end of the cellar had collapsed, leaving a substantial hole (see plate 17).
- 3.31 With the exception of the hole in the vault, the only access to the basement from the late 19th century onwards appears to have been through the remains of the window (W2/2) in the north wall (see plate 16). Externally, the window had all but collapsed but internally the east jamb remains intact. Here, the window was 1.10m wide; the sides ran parallel for 1.70m but then narrowed considerably towards the exterior. The base of the window was stepped up from south to north, whilst the head rose very steeply; the top of the rear arch was formerly level with the apex of the vault but the top of the external arch was set c.2.5m higher. Given that the window was the only natural light source for the basement, its height and extremely steep profile in section would have maximised the amount of light it allowed in. Surviving quoins to the west side of the window's exterior show that it was originally fitted with horizontal iron bars, as might be expected as it formerly faced into part of the outer court and so would have needed to be secure. Internally, to the west of the window's base, a small section of the face of the basement's north wall was recessed slightly from the general line.
- 3.32 The window in the north wall would of course not provided any original access into the basement. The only original access point was through a doorway in the south wall (D2/3), which was revealed by the clearance of the basement (see Excavation Area B in Chapter 4 below) (see figure 10 and plate 19). When first uncovered, the head of the doorway was formed by a rotten wooden lintel, supported on equally rotten posts. The lintel was set only 0.40m above the ground surface at this end of the basement, and it had a large area of rebuilding set above it. Shortly after being uncovered, the lintel broke and the area of rebuilding above collapsed, exposing the original doorway. The doorway was recessed 0.60m from the face of the south wall and rebated to the north side. Both jambs were quoined and the head appears to have been either arched or perhaps semi-circular; the doorway had a total height of c.2.00m.
- 3.33 The doorway (D2/3) was infilled with soil and rubble, which could not be investigated or removed for safety reasons, and so it is not clear where it led. However, in 1839 Sharp stated of the north-east tower and the gate tower/guard room that "*the remains of cellars or vaults are still visible on the side of the court so there was a range of buildings between these two towers*" (RIBA X(079)So 728.81 (42.74 SH)). Assuming that Sharp was correct, the doorway may have lead into a cellar located to the south. Alternatively, given that a newel staircase appears to have been located in a passage at the south-east corner of the tower (see below),

perhaps this sank to basement level, with a similar passage connecting it with the doorway (see Discussion and Conclusions).

### *The ground floor*

- 3.34 The majority of the ground floor, like the basement, was originally formed by a single space aligned virtually north-south, c.12.00m long and 5.70m wide and covered by a wide barrel vault (see figures 6, 10 and 11). Documentary sources show that it survived largely intact in the early 19th century; the vaulted area may have been reduced to its existing length of 5.20m following the collapse of 1875, although Calthrop's plan suggests that substantially more of the south end of the east wall was standing as late as the 1920s (Calthrop 1923, 175). The clearance undertaken at ground floor level (see Excavation Area C in Chapter 4 below) revealed no evidence for a flagstone floor surface, and the majority of the existing surface within the vaulted area comprises a thin covering of sandy soil overlying the rubble core of the basement vault. The ground floor vault springs from c.3.00m above floor level and, at 5.50m, is considerably higher than that of the basement; it is also less semi-circular in section, rising to a flattened apex.
- 3.35 There are few surviving internal features on the ground floor. A large fireplace (FP2/1) was formerly located in the centre of the east wall. This fireplace, which is 2.00m wide and 2.90m high, does not have quoined jambs but sides which taper gently inwards towards the apex. It is 0.70m deep although the back has partly collapsed or been removed, but at the base it is lined with bricks laid in alternate layers of headers and stretchers, giving a herringbone effect (as has also been observed in surviving fireplaces in the north-west tower). The fireplace was served by a small square sloping flue which rose up within the thickness of the east wall and was recorded at first floor level as part of Excavation Area D.
- 3.36 To the south of the fireplace, there is a large area of collapse running through the east wall and, on either side, the remains of a former mural passage with a corbelled ceiling. This passage appears to have turned through a right angle at its north end, and then run south for 4.3m before ending at a wall face. It is not clear to where this passage led or what purpose it served. As has been previously noted (Dennison 1998, 43-44), the length, plan and ceiling construction of the passage closely resembles that of surviving garderobe passages seen elsewhere in the tower and the rest of the castle, and Sharp does indeed show a garderobe here in 1839, on the north side of a small chamber, which itself is south of a window (RIBA X(079)So 728.81 (42.74 SH)) (see figure 5). However, there is no visible evidence for a garderobe chute exit externally (although it could now be buried) and the location may also be problematic, as it would have vented into the area of the middle court. It was further suggested in 1998 that access into the main space was from another passage running parallel to the south wall of the tower (Dennison 1998, 44) and again Sharp shows the remains of just such a feature in 1839, with a doorway at the west end leading to the main space (RIBA X(079)So 728.81 (42.74 SH)). There is a hint of a former window or opening in the wall core at the very south end of the surviving east wall, possibly lighting the newel staircase that appears to have been located here.
- 3.37 The main space of the ground floor was originally lit by a single window in the north wall (W2/3) and a pair of windows in the east wall, flanking the fireplace here (see plates 4 and 16). Where visible, all three windows were of similar two-light trefoil headed form externally but with minor variations internally. The base of the window in the north wall (W2/3) is set 1.5m above floor level and rises to just beneath the vault apex, where there are traces of a segmental rear arch. The

window is 1.70m wide internally, with sides running parallel for a short distance before tapering inwards to a minimum width of 0.60m. The base of the window is stepped steeply upwards from south to north; by contrast, the head sloped gently downwards towards the exterior of the tower and tapers inwards. One of the few surviving external quoins retains a small square recess on the inner face, perhaps formerly housing a pintle block for window shutters. The windows in the east wall are even more poorly preserved than that in the north wall and only the north example (W2/1) survives in any recognisable form. Although it had a lower base and was not quite as tall as the window in the north wall, it was essentially of a similar form. The southern window has completely gone and therefore its structural relationship to the adjacent garderobe chamber is unclear; Sharp depicts the two as separate features but does not indicate how they were related (RIBA X(079)So 728.81 (42.74 SH)) (see figure 5).

- 3.38 The external elevations of the ground floor provide some structural evidence to supplement that which survives internally. The north elevation (see figure 9) has the exit to a garderobe chute (C2/1) at the base of the west side, serving the garderobe located on the second floor (see plate 16). The chute itself measures 0.40m by 0.35m in horizontal section, and it emerges as an opening 0.5m high, from beneath a lintel some 0.2m deep; there is a slope at the base as the chute passes out from the wall core to the exterior. The position of this chute exit in relation to the present ground level suggests that external ground level has not changed significantly since the castle's construction. The north-east spur wall clearly butts the north elevation but there is no indication that it ever rose much higher, contrasting with Sharp's 1839 elevation which appears to show a scar rising above the first chamfered offset (RIBA X(079)So 728.81 (42.74 SH)) (see plate 9). A number of small decayed wrought-iron objects are set into the tower's wall face above the spur wall, but their age and purpose is unknown. There is a chamfered offset at 8.20m above the external ground level (approximately the same height as the first floor) which once ran the full width of the elevation and then continued around the east elevation. The east elevation (see figure 8) now survives only to the former height of the offset, although prior to 1875 it stood almost to full height (for example see the drawing by Allen, plate 11). This elevation also has a number of small wrought-iron fittings projecting from the wall face.
- 3.39 The chamfered offset is also partly carried around the west external elevation of the tower (see figure 9), to the point where it returned to the west to form the north wall of the north range. At ground floor level and below, the base of the elevation comprises a series of fragments of wall face set amongst a wider area of core. These fragments are the remains of the lower level spaces at the east end of the north range; it is as yet unclear whether the floor levels within the range corresponded exactly with those within the north-east tower. A single piece of sandstone to the south of the brick buttress may mark the position of a former opening, whilst at the base of the north end of the elevation two garderobe chutes exit from an area of collapsed face. The north chute (C2/2) served the garderobe on the tower's third floor, some 18m above, and is of similar dimensions to that described above in the north elevation (C2/1), although the exit has a flat rather than sloping base (see plate 18).
- 3.40 By contrast, the adjacent chute exit to the south (C2/3) has a sloping base and served the mural garderobe (L2/1) immediately above, i.e. at ground floor level (see plate 18). The garderobe was lit by a small (0.2m wide by 0.4m high) window opening (W2/7), of which the right side was clearly situated within the angle of the north wall of the north range. Its surround is chamfered, but otherwise it is plain in



form. The garderobe is located within the west wall of the tower and is reached from a passage 3.6m long by 0.7m wide, with a corbelled ceiling. This passage runs north-south, and then turns to the west, i.e. into the former north range; it was not accessible from the north-east tower.

#### *The first floor*

- 3.41 Prior to the large-scale collapse of 1875, the north and east walls of the first floor of the tower survived largely complete. There was a single trefoil-headed two-light window in the north wall; Sharp shows this as being complete in 1839, although in 1797 and 1824 both Hornsey and Nicholson drew it as a gaping hole (see plates 6 and 9). There were a pair of similar two-light windows to the east wall, although the southern window here had largely collapsed by 1840 (see plates 10 and 11). At the time of the previous archaeological/architectural survey, the remaining portion of the first floor was overlain by a substantial depth of rubble and fallen material. This was removed during the current scheme of works (see Excavation Area D in Chapter 4 below) and a detailed description of the structural remains that were uncovered is given there; only those structures bearing on the overall form of the floor are described here (see figures 6, 10 and 11).
- 3.42 Following excavation, the surviving portion of the first floor measured c.5.2m long (north-south) by 6.0m wide (east-west). It is assumed that, like the basement and ground floors, the first floor was largely formed by a single space, although unlike the lower levels, it was not vaulted. It had a timber ceiling structure, almost certainly with east-west aligned spine beams supporting north-south lodged joists. The north end of the northernmost run of joists may have rested on a ledge in the north internal wall of the tower, above which the wall face is setback 0.15m (see figure 11); the ledge is positioned 5.10m above the excavated internal flagstone floor, giving an approximate height for the first floor.
- 3.43 Little remained of the internal walls of the first floor. The small surviving section of the west internal elevation contained a small shallow recess or socket towards its north end, with a spread of limewash above; the limewash was applied around a rectangular feature fixed to the wall which has since been removed or decayed. The north internal elevation is largely formed by the remains of the west side of the window (W2/4) in the north wall. The base of this window is set 0.15m above the internal floor level; the quoined west jamb rises to the remains of a segmental rear arch. Midway along the embrasure between the window's interior and exterior faces, the remains of a chamfered sandstone rib are visible. This was the only such example noted in the north-east tower, and is indeed the only such feature known to survive in the whole castle, although future survey may uncover further examples not presently visible. The quoins to the window's outer jamb preserve evidence for pintles formerly supporting shutters and also horizontal bars to the window opening. Externally, only the sunken spandrel of one of the window's trefoil-headed lights survives (see figure 9).
- 3.44 Previous survey had suggested that it was most likely that any fireplace on the first floor would have been situated in the east wall, in a similar position to that seen on the ground floor (FP2/1) (Dennison 1998, 44). This appears to be confirmed by Sharp's 1839 survey, which marks the curved back of a fireplace here (see figure 5), and more definitely by the excavation of the first floor (Area D – see below) which uncovered the remains of this fireplace (context 019) (see figure 6). The flue rising from the ground floor fireplace (FP2/1) emerges from the wall core just to the east of the first floor fireplace, but it is not known whether the two flues joined at a higher level or if they rose separately through the full height of the north-east tower.

- 3.45 The excavation of the first floor also exposed the apparent remains of three garderobe chutes on the north and east sides of the tower (see figure 9). That on the north side (C2/4) may have been served by a possible exit at the base of the east side of the tower's north elevation, now visible only as a sandstone lintel(?) set just above ground level. The two chutes on the east side (C2/5 and C2/6) are placed approximately equidistant to the north and south of the fireplace remains (019), but no exit points are now visible at the base of the external elevation. It seems most likely that the southern chute served a first floor garderobe and therefore the other two must have served garderobes on the second or third floors. Given that one garderobe already exists on each of these levels, this suggests that the floors could have been divided into two or more chambers, rather than the single space of the basement and ground floors.

*The second floor*

- 3.46 Only the north-west corner of the second floor survives (see figure 7 and plate 20) and it is therefore difficult to envisage the original layout of this level. Unfortunately, the documentary evidence is contradictory. Both Nicholson in 1824 and Allen in 1840 (see plate 11) show only two small windows to the north end of the east elevation, whilst Sharp depicts a two-light window in both plan and elevation (see plate 10 and figure 5). The small windows shown by Nicholson and Allen are reminiscent of the garderobe windows seen elsewhere in tower, and such a function would appear to be confirmed by the presence of chutes recorded at the north end of the first floor's east side (see above). This suggests both that Sharp's elevations may not be entirely reliable and provides further evidence that the second floor was divided into two or more spaces, each with its own garderobe. A line of joist sockets in the north internal elevation (see figure 11) shows that the second floor had an approximate height of 4.50m.
- 3.47 Like the first floor, the second floor was lit by a window of two trefoil-headed lights in the north wall (W2/5), although only the west side now survives (see plate 20). It also had an internal base that was quite low but appears to have stepped up at least once to the exterior; the remains of a segmental rear arch can be seen above. The remaining external jamb was formerly fitted with shutters and horizontal bars. To the west of the window, the north internal elevation retains a small area of blocking at setback level and a shallow recess above, both of which are associated with short horizontal breaks in the wall face; it is possible that this feature is shown on the external face in the 1797 illustration (see plate 6).
- 3.48 The main surviving feature of interest on the second floor is the mural garderobe passage (see figure 7). The passage is contained within the west wall of the tower and is 2.80m long with a corbelled ceiling (see figure 8 for profile). The seat of the garderobe (L2/2) has been removed (see plate 21) but the chute (C2/1) remains visible, emerging on the ground floor below. The passage was lit by a window in the north wall (W2/9); this was formerly quite small but has subsequently been enlarged; the smaller opening to the external elevation appears to be depicted on 18th and 19th century illustrations (see for example plate 6). It is not certain whether the garderobe passage was accessed from the second floor of the tower or the east end of the north range. Sharpe's plan also shows that the garderobe passage turns east from the window (see figure 5), which it does not.
- 3.49 The top of the second floor is marked externally by a second chamfered offset. Below the chamfer on the west side of the tower, a remnant of the north range's north wall projects 0.75m from the wall face. A narrow opening c.0.40m high and 0.20m wide with a projecting sill is placed within the angle of the north-east tower

and the north range wall just below the level of the chamfered offset. The internal form of the opening suggests that it is a water spout and that it drained the water running down this side of the north range's roof (see plate 22). However, above the opening in the north internal elevation, there is a similar but less well preserved opening which has a line of lead sheeting set into the wall face adjacent to it and with a shallow groove over; this combination of features is also suggestive of a drainage function. These two possible drains indicate that the base of the north range's roof was set at approximately the same level as the ceiling of the tower's second floor. It is assumed that the north range was equipped with a shallowly pitched leaded roof similar to that over the third floor of the north-east tower (see below). It was presumably partly hidden by a low parapet on the north side, and the surviving structural evidence suggests that this parapet was c.1.50m high (see also below).

### *The third floor*

- 3.50 Like the second floor, only the north-west corner of the castle's third floor survives (see figure 7 and plate 20); all the mid 19th century illustrations of the tower cited above agree that there was a single two-light window to the north wall and two to the east wall. As also stated above, the arrangement of chutes around the north, east and west sides of the tower's first floor may suggest that the third floor was divided into two or more spaces, each with its own garderobe. The height from the floor, as indicated by a line of joist sockets in the north internal elevation (see figure 11) to the approximate apex of the pitched roof of the tower (see below), is c.5.00m. However, a ledge or setback positioned 4.00m above the floor may mark the actual ceiling level.
- 3.51 As with the first and second floors, the third floor was lit by a window of two trefoil-headed lights in the north wall (W2/6), although only the west side now survives. Its base appears to have been set at the same level as the floor and the remains of a segmental rear arch survive above. The remaining external jamb preserves no evidence for either shutters or bars, although these must surely have been present. To the west of the window, the north internal elevation has a pair of recesses or sockets set 2.10m above floor level. Above these, there is a small blocked feature resembling a putlog hole and two slightly sloping breaks in the masonry of the wall face. Higher up still, there is the rather ragged set-back c.0.30m deep, over which rise the pitched masonry courses marking the tower's roof. The roof was aligned north-south and set at a shallow pitch of c.15 degrees. It was evidently leaded, as fragments of lead sheeting survive along the pitched masonry courses of the roof line; in 1996, a probable purlin socket was identified beneath the roof line (Dennison 1998, figure 12) but this could not be seen during the current survey work. Sharp depicts a further large two-light window in the east wall, on the north side of a central division (see figure 5), for which no evidence now remains.
- 3.52 The west side of the window (W2/6) in the north wall contains a well preserved shouldered doorway (D2/2) (see plate 23) which leads into a mural garderobe passage. At the beginning of the repair/consolidation scheme, this passage was filled to a substantial depth with dried pigeon guano, which was subsequently cleared out. The passage is aligned east-west and is 3.80m long with a corbelled ceiling (see figure 8 for profile); the floor was formed by rubble set with a lime mortar. The passage returns to the south at its west end, and part of the raised slab forming the seat (L2/3) still survives. The wardrobe chute (C2/2) itself was offset to the south but unfortunately the seat proper had been removed (see plate 24). The chute emerges from the wall face on the ground floor. The garderobe

itself is lit by a small window opening in the west wall (W2/8) and in the later 19th century a wrought-iron tie-rod with tie-plates at either end was inserted through the passage.

- 3.53 The west internal wall of the third floor (see figure 11 and plate 20) contains the north side of a shouldered doorway (D2/1), rebated to the north side. To the north of the doorway, there are a pair of vertically aligned sockets or recesses, presumably for one of the spine beams of the floor. There are several much shallower recesses running up the doorway's north jamb, perhaps representing the remnants of an internal partition here. Above the doorway, there is a 0.30m deep setback which may have supported the former wall plate of the north-east tower's roof. The doorway leads through the width of the west wall and out onto what was presumably the east end of the north range's roof; c.1.50m above the head of the doorway in the west external elevation, the remains of an external string-course are visible. It is quite possible that the doorway gave access to a wall walk along the north side of the north range's roof. This was shielded by a low parapet wall c.1.50m tall, incorporating a feature at the east end that may be either the remains of a small window or perhaps a crenellation.
- 3.54 Building recording undertaken at Bolton Castle in Wensleydale, North Yorkshire, a structure in many ways comparable to Sheriff Hutton, revealed that the chamfer angle to arches, windows and doorways were all produced from a template former that was slightly off the intended 45 degrees, and it seems that this same former remained in use throughout different phases of construction (Lancaster University Archaeology Unit 1992b, 24). In contrast, a number of profiles (P1 to P4 – see figure 20) taken across chamfered openings on the third floor at Sheriff Hutton produced differing angles of both more and less than 45 degrees, suggesting that the masons were not working from the same template former. This implies that each chamfered opening was produced by the same mason or team of masons, otherwise the chamfer profiles would not have matched up.

#### *The upper level*

- 3.55 The uppermost level of the tower was partially excavated during the current scheme of works (see Excavation Area D in Chapter 4 below). Following excavation, it was revealed as a very small single room or space, measuring only 2.20m long (north-south) by 1.30m wide (east-west), entered by the remains of a narrow doorway (D2/4) in the south wall (see figure 7 and plate 25). It is assumed that there was some kind of access to the doorway from the third floor of the tower, or from the parapet level walkways around the north range, but all evidence for these has now disappeared. The room had a mortar floor and was equipped with a fireplace in the west wall and a spout or sink in the north wall (see plate 26). The fireplace (FP2/2) was lined with red handmade bricks laid stretcher face to stretcher face and set with a grey-white sandy mortar (Tibbles 2003, 5) but they displayed little evidence of burning. The spout/sink was positioned 0.70m above the internal mortar floor; its height and relatively small size might suggest that it functioned as a urinal. To the immediate west of the sink, there was a large piece of sandstone set into the wall face that may have formed the base of a window.
- 3.56 There was fragmentary structural evidence to suggest that a flight of steps once rose from east to west over the small room. Very little of the tower top now survives, although documentary sources and comparison with other sites provide some clues as to its original form (see Chapter 7 below).

- 3.57 Externally, the north external elevation has a moulded string course set 3.70m above the tower's second chamfered offset. This string course, although very worn, has a shallow "ribbed" or fin-shaped profile and rises vertically at its west end (see plate 27). The vertical section appears to define one side of a small turret at the north-east corner of the tower, containing the small room described above and rising some 4m higher than the parapet of the north range, perhaps as shown by Cave and Sharp in the mid 19th century (see plates 8 and 10).

## 4 ARCHAEOLOGICAL INVESTIGATIONS AND RECORDING

### Introduction

4.1 As stated above in the introductory chapter, the archaeological survey work carried out at the castle comprised the supervision of hand-excavation by the main contractors (HRP), detailed hand excavation by archaeologists, and the monitoring of other work through archaeological watching briefs. For ease of description, each discrete area of archaeological work was assigned a unique letter code, as follows:

- *Area A*: Watching brief by EDAS during the creation of the site access road/track off the north-east corner of Castle Farm by HPR in 2002;
- *Area B*: Clearance of the basement/cellar vault in the north-east tower by HPR in 2002, and the excavation of two test pits by EDAS in 2005;
- *Area C1*: Watching brief by EDAS during limited ground clearance work on the south side of the ground floor of the north-east tower to allow clearance of the basement/cellar vault (Area B) by HPR in 2002;
- *Area C2*: Excavation of a test pit to the west of the ground floor of the north-east tower on the former line of the connecting range by EDAS to ascertain ground conditions in 2002;
- *Area D*: Supervision by EDAS of the excavation and hand clearance of fallen material on the first floor of the north-east tower by HPR in 2002. Subsequent detailed recording of exposed archaeological features by EDAS in 2002-03;
- *Area E*: Excavation of the small room on the uppermost surviving level of the north-east tower by EDAS in 2002.

### Methodology

4.2 Following standard archaeological procedure, each discrete stratigraphic entity (e.g. a cut, fill or layer) was assigned an individual context number and detailed information was recorded on *pro forma* context sheets. A total of 56 archaeological contexts were recorded in the five main areas of archaeological work described above, and these are all described in the following text as three digit numbers (e.g. 005) (see Appendix 5). In-house recording and quality control procedures ensured that all recorded information was cross-referenced as appropriate. General plans, context/feature specific plans and sections, generally at either 1:50 or 1:20, were made of each area as necessary. Drawings were also made of a number of the architectural fragments uncovered during the clearance work. The EDAS site code for the investigations was SH 02.

4.3 The photographic record was achieved using a medium format camera with perspective control and black and white film, with a 35mm camera used for colour transparencies and colour prints. Digital photographs were also taken. Subject to access, all photographs contained a graduated scale, and artificial lighting was used where necessary, in the form of electronic flash and flood lighting. Each photograph has been catalogued and indexed, and a number are reproduced as plates to accompany the following text. The negatives and photographic prints have been included with the project archive, which will be deposited with the Yorkshire Museum in due course.

- 4.4 A number of archaeological deposits were sampled for palaeoenvironmental material (Hall, Kenward, Carrott & Johnson 2008; see Appendix 6). The relevant details are contained in the text below, but the samples largely consisted of wood charcoal. Other ancient plant remains were confined to a very few charred bread/club wheat grains and a single charred hazelnut shell fragment (all from context 010), on the basis of which very little may be said about the nature of the deposits. Trace quantities of invertebrate and vertebrate remains were also recovered, but these were largely unidentified and some were clearly of modern origin.

#### **Archaeological Results: Area A (North-east Corner of Castle Farm)**

- 4.5 In order to allow construction of a temporary site access road along the north side of Castle Farm, a small area to the east of the north-east corner of the farm (Area A) was cleared and excavated by hand by HPR under archaeological supervision. The excavated area had overall dimensions of 9.0m wide (north-south) by 9.5m long (east-west), and was located to the north and south of a concrete path (see figure 12).
- 4.6 Following the removal of the 0.10m thick turf and topsoil (001) from the area to the north of the path, a dump of compacted concrete, limestone rubble and brick fragments (002) was exposed adjacent to a gateway in the fence on its north side. This dump had disturbed a dark brown sandy silt (003) containing a high proportion of angular gravel which formed the majority of the exposed ground surface beneath the turf and topsoil. At its eastern end, the sandy silt/gravel overlay the remains of a surface, comprising a spread of hard packed angular limestone pieces (004) set at c.68.00m AOD (see plate 28). The spread measured at least c.1.80m long (north-south) by 1.0m wide (east-west), and may have formed part of a larger north-east/south-west aligned surface, although disturbance to the western edge made it difficult to be certain. At the south-east corner of the spread, there was a sub-circular area of larger pieces of limestone, c.0.30m across, laid flat and with a concentration of pantile fragments in the centre. The latter had the appearance of an infilled post-hole but it could equally have been a post-pad.
- 4.7 To the south of the concrete path, there was a strip of patched concrete surface and hardcore (005), with turf and topsoil (001) on its south side. When the topsoil was removed, the same sandy silt/gravel (003) as recorded to the north of the footpath was exposed.

#### **Archaeological Results: Area B (Basement/Cellar of North-East Tower)**

##### *Clearance of basement/cellar*

- 4.8 At the start of the repair/consolidation programme, the basement/cellar area of the north-east tower was filled with a significant depth of farm debris and other material which had accumulated over many years. In order to stabilise the vault above, this material had to be removed by hand and the vault propped with scaffolding. Due to the dangerous structural condition of the vault, and the potentially hazardous nature of some of the infill, the work was carried out under strict Health and Safety procedures, and no archaeological access was possible during this time. However, the progress of the work was monitored by EDAS on a regular basis, and any items of interest were removed from the vault for inspection prior to being taken away from site.

- 4.9 The debris was removed by one of two routes. Initially, it was taken out via the hole in the vault roof and a slight reduction in ground level was made to the south of this hole (see Area C1 below) to enable preparatory works to begin. The material that had been tipped into the vault through the hole comprised a compacted mixture of soil, rubbish, gritty red ash, wood, wire, animal bone and other farm waste and debris (001), all of which appeared to be 20th century in date. Directly beneath the hole in the vault, the material had accumulated to a depth of over 4m but this sloped sharply away to the north within the vault; a total of c.150 cubic metres was removed in all.
- 4.10 Once a sufficient depth of material had been removed through the hole in the vault, a blocked window (W2/2) in the north elevation of the tower was opened out to create an access into the north end of the basement/cellar (see plate 16). Only the lower part of the window was blocked; the blocking was formed by a mixture of handmade red bricks and stone rubble, and as such was probably 19th century in date. However, it also contained a single fragment of carved masonry (stone S10 on figure 20). This fragment was 0.35m long, 0.30m wide, with a deeply chamfered profile and the remnants of a sub-circular piece of carved decoration. Its original form and location are not clear, but it may have formed part of a sunken window spandrel. If so, it differed markedly from the other sunken window spandrels recorded on the tower, which were all quite plain, and was the only such piece of carving recovered during the works.
- 4.11 When the window blocking was removed, clearance continued by hand from the north end of the vault. Here, the dumped material, comprising a brown silt loam/soil (002), was quite different from that seen at the south end of the basement/cellar, and it formed a fan-shaped tip several metres in depth directly below the part-blocked window. The infill became much shallower towards the south but clearance showed that it formed the majority of the ground surface within the basement/cellar area. It contained substantial quantities of pottery, all of which dated to either the 19th or early 20th centuries, and included creamware, transfer-printed ware, stoneware storage jars, a stoneware water filter, and also much glass of similar date.
- 4.12 Following the removal of all the dumped material (001/002), the ground level within the cellar/basement was reduced slightly to between c.64.00m to 65.50m AOD. No further works to the cellar/basement vault were then undertaken until 2004, after the ground floor vault above had been stabilised.

#### *Test pits*

- 4.13 Once works to the cellar/basement vault were complete, and the structure had been made structurally sound, two test pits were hand excavated in October 2005 to investigate a doorway in the south wall which had exposed during the repair works (see Chapter 3 above), and to ascertain if a solid floor survived beneath the dumped material (002) (see figure 13).
- 4.14 Test Pit 1 was excavated adjacent to the doorway (D2/3) in the south wall of the cellar/basement, around the base of the west jamb. The pit measured c.1.20m square and was excavated to a maximum depth of 0.70m below the new ground level (63.65m AOD). Following the removal of a thin layer of dumped material (002), a section of crude footing (009) was exposed, comprising two thin limestone slabs set on a layer of limestone rubble; the exposed footings measured 0.70m long by 0.30m wide and c.0.20m deep overall. These footings partly overlay the remains of the original west jamb of the doorway, and may have been a crude



repair, designed to support a prop for the doorway arch. The footings overlay a compacted dark brown/purplish ashy silty sand (005), 0.24m thick and containing a high proportion of pottery, animal bone, glass, leather and including some plastic in the uppermost parts. The ashy silt (005) overlay a 0.14m thick layer of a mid brown sand (003), relatively clean and containing only a few pieces of animal bone and some limestone rubble. Beneath this, a stiff dark brown clay with frequent inclusions of limestone rubble (004) was visible in the base of the test pit.

- 4.15 Test Pit 2 was excavated adjacent to west wall of the cellar/basement, and measured 2.0m east-west by 1.0m north-south with a maximum depth of 0.60m below the new ground level (64.05m AOD). A thin layer of dumped material (002) was removed, revealing a clean firm gritty mid brown sand (006), 0.10m thick, which overlay a 0.24m thick deposit of very similar material (007). Beneath this was a stiff dark brown clay (008), containing frequent limestone rubble and very similar to deposit 004 noted in Test Pit 1. The projecting footings of the west wall of the cellar/basement were visible in the base of the test pit, but no remains of slabs, mortar or another hard floor surface were encountered.

### **Archaeological Results: Area C (around Ground Floor of the North-east Tower)**

#### *Area C1: Ground clearance works on south side of ground floor of north-east tower*

- 4.16 At the start of the repair/consolidation scheme, the area inside and around the ground floor of the north-east tower was either overgrown with scrub or formed by bare soil. In order to facilitate the erection of scaffolding access to the hole in the ceiling vault of the basement/cellar level (see Area B above), an area measuring c.6.0m long (east-west) by 4.0m wide (north-south) was cleared using a JCB equipped with a ditching bucket (see figure 14).
- 4.17 A depth of c.0.30m of black sandy silt loam topsoil (001) was removed across the entire area, exposing the very top of the centre of the vault structure. Within the southern part of the cleared area, it had previously been noted that a JCB pad had sunk into a sub-circular depression (Dr R Howarth, *pers. comm.*), and during the erection of the scaffolding around the tower, HPR staff described the top of a similar feature being visible here. Resembling a "stone-lined well", attempts were made to fill the feature with sand, but most of this appeared to run away into a cavity in the ground and it was eventually re-buried (HPR staff, *pers. comm.*). It is possible that the "well" may actually be the remains of a newel staircase serving the doorway newly exposed in the south elevation of the basement/cellar (D2/3) (see Chapter 3 above).

#### *Area C2: Test pit on west side of north-east tower*

- 4.18 A small test pit was hand-excavated a short distance to the west of the west face of the tower base, on the projected line of the north side of the former connecting north range, in order to ascertain the ground conditions for future scaffolding (see figure 14). The pit was excavated from c.67.15m AOD and reached a maximum depth of 1.1m below ground level (c.66.05m AOD).
- 4.19 Beneath the 0.30m depth of black sandy silt loam topsoil (001), a firm dark brown gritty silt sand (002) was exposed. The dark brown silt sand (002) was exposed for a depth of 0.7m and it contained a high proportion of animal bone, 14th and 15th century pottery, and ceramic building material; the deposit continued below the base of the trench. It in fact formed the fill of an east-west vertical cut (003), which

was aligned on the former north side of the connecting range. The cut had disturbed a large piece of limestone rubble 0.3m long by 0.5m wide with further rubble beneath (004), which was visible at the north end of the test pit. These may have formed the remains of the connecting range's footings.

#### **Archaeological Results: Area D (First Floor of North-east Tower)**

- 4.20 By 2002, the ceiling vault of the ground floor was in a perilous structural condition, with significant slippage either side of a large crack in the exposed south face (see plate 14). In order to reduce the strain on the vault, and to effect repairs, hand clearance and excavation of the considerable amount of fallen material on the first floor of the tower was undertaken by HPR under EDAS's supervision. In total, fallen material with an average depth of 2.10m over an area measuring 6.0m long (east-west) by 5.0m wide (north-south) was removed, representing c.63 cubic metres in total. The fallen material was barrowed by hand to a chute on the east side of the tower and then tipped into a dumper truck below, from where it was stored adjacent to the tower's east elevation. Any architectural fragments or large pieces of masonry were stored on the scaffolding adjacent to the excavation area. The architectural fragments were recorded and then, along with the other masonry, re-used in the repairs to the first floor.
- 4.21 Once the fallen material had been removed, it was discovered that the floor level beneath survived to a far greater degree than had been expected. As a result, the conservation strategy for the ground floor vault, which was to have involved pinning the vault structure into a new concrete slab which was to be inserted into the floor above, was changed to allow the exposed first floor surfaces to remain largely undisturbed (see Chapter 6). After detailed excavation and recording, the first floor was then reburied (see also Chapter 6), and some of the stored fallen material was taken back up to form a base on which the recovered plants could be re-established. The remainder of the stored fallen material was re-distributed around the base of the tower when the scaffolding had been removed.
- 4.22 At the beginning of the clearance/removal works, the fallen rubble formed a thickly grassed mound, rising to a maximum height of 78.03m AOD in the north-west corner but falling away to 75.0m AOD on the north and east edges (see figure 15 and plate 3). Following the removal of the vegetation, a shallow layer of very dry black/dark brown silt loam (001), 0.10m thick, was exposed. This overlay a deposit of fallen material (002) up to 0.95m in depth in the north-east corner but generally much shallower, comprising a loose grey-brown silty loam containing frequent pieces of angular limestone rubble; the deposit spread across the whole of the excavation area (see plate 29).
- 4.23 Beneath this was the main layer of fallen material (003), up to 1.20m thick and comprising densely packed limestone rubble pieces within a matrix of loose light orange sand. Amongst the finds retrieved from this material were two pieces of stone roof tile, several complete handmade bricks, and pieces of pantile. A number of sandstone architectural fragments were also recovered from within the rubble (003) (see figure 20). Some of the rubble had been roughly squared/dressed, and typically bore prominent diagonal tooling marks. A fragment of chamfered and rebated jamb was noted (stone S1 on figure 20), as well as a sub-rectangular piece with fine near parallel tooling marks (stone S2), possibly once part of a fireplace lintel. At a lower level, part of a chamfered arch (stone S3), probably from a window head, was revealed, as well as another piece (stone S9) with a chamfered profile. Several other fragments were also recovered from context 003, but these were recorded photographically rather than drawn: they

comprised an angled piece (stone S6) similar in profile to stone S2, and two curved fragments (stones S7 and S8) which may have formed the head of small semi-circular opening or perhaps more likely the upper parts of a chimney flue.

- 4.24 In addition to the stonework, the entire fittings from a wooden door were recovered from 003, and the upper parts of 004 below); these iron fittings comprised two strap hinges and accompanying hinge pivots, a pair of strengthening strips (which had become bent after use), a padlock, a figure of 8-shaped hasp, and a U-shaped staple used to attach the hasp or as the padlock attachment (Wastling 2008; see Appendix 7). The form of these fittings suggest a wooden door of planked construction some 46mm-47mm thick. It was likely to have been constructed during the 16th century at the earliest, and may have been a replacement for an earlier door. The padlock is a late 18th to 19th century example, which post-dates the other fittings and must relate to the final period in which the door was in use and secured on a regular basis. Following this final use, the no-longer needed padlock was left unlocked and open. The fact that nails and fittings display minerally-preserved wood suggests that the door decayed in situ, rather than being burnt for example.
- 4.25 As the fallen material (003) was removed in shallow spits, a number of structures started to emerge (see figure 15). Uppermost amongst these was an L-shaped section of wall (006), with arms c.3.0m long (east-west) and 0.7m long (north-south) standing to a maximum height of 0.5m. The wall was c.0.5m wide and was built of roughly coursed limestone rubble, and contained several regularly spaced-recesses in its east face (see plate 30). These were in fact crude nesting-boxes, and the wall formed part of a dove or pigeon cote built in the mid 19th century (Grainge 1855, 242). Upon further excavation, the pigeon cote was seen to rest on the lower of the two main levels of fallen material (004 – see below) (see figure 19). In addition to the pigeon cote, the upper surviving part of another wall (005) was observed; this is discussed in more detail below. The upper level of fallen material (003) overlay the lower level (004), a densely packed layer of angular limestone rubble up to 0.75m in depth and containing noticeably fewer sandstone fragments than the material above.
- 4.26 The lower level of fallen material (004) overlay a 0.20m thick deposit of fine loose ashy sand (007), which contained frequent flecks of charcoal as well as fragments of glass and lead, 15th to 17th century pottery and quantities of animal bone. In addition, this deposit (007) also contained two pieces of well foot-worn undecorated late medieval glazed tile and one curious glazed brick, possibly from the base of a kiln, but which had been reused.
- 4.27 The ashy sand (007) lay immediately above the former floor surfaces of the first floor room and its associated structures. These surfaces and structures were excavated in two separate phases; the overlying deposits above the western half of the area were removed by mid October 2002 but the pigeon cote and deposits beneath were left in place (see figure 16) until the repair scheme for the vault below had been finalised. Both the pigeon cote and the deposits beneath were then removed in February 2003, and the whole exposed area cleaned and re-drawn at a scale of 1:20 (see figure 17). It should be noted that the 1:20 plans include some overhanging/slipped masonry on the east side of the first floor which was subsequently removed, and so differ slightly from the 1:50 floor plans in this area.
- 4.28 Two main areas of floor surface were exposed at first floor level. The northern half of the floor was formed by two areas of limestone flagstones (012 and 013),

containing individual pieces up to 1.40m long and a small fragment of a mill stone on its south side (see plate 31). Some of the flagstones made a hollow sound when tapped with a trowel, as if there was a void beneath, but when a broken section was lifted, only further stone could be seen. The flooring sagged towards its centre, where there was a substantial crater apparently caused by the impact of a large piece of masonry falling from above. The floor was also traversed by a deep fissure which ran north-west/south-east across the full width of the first floor. At its west end, the floor surface (012/013) had been disturbed by the construction of a later hearth (009 - see below), whilst at the east end it was overlain by a block of stone (023), c.0.45m square and reddened by burning. This block sat on a bed of cream lime mortar and was located almost opposite an ashlar wall (005). When the limestone block (023) was removed as part of the second phase of excavation, the area to the immediate east was seen to be a confused mass of fallen stone and brickwork.

- 4.29 The southern edge of the flagstone floor (013) was delineated by thin pieces of limestone, running south-east from the east end of the ashlar wall (005) and with a narrow shallow groove along the north side (see plate 30). These stones separated the flagstones to the north from an area of smaller flagstones, edge-laid rubble and cobbles (017) to the south. The surface of all parts of this area of flooring was noticeably more worn than the larger flagstones to the north, and they incorporated a possible post-pad (018) towards the south edge; a concentration of animal bone was recovered from the surface of cobbles (017) around the possible post-pad (018).
- 4.30 The two floor surfaces (012 and 013) had a number of features set around their edges. At its west end, the joint between the two was overlain by an ashlar wall (005). The wall, which was not tied into the adjacent internal east face of the tower, rested directly upon the flagstones (013). It measured 1.68m long (east-west) by 0.62m wide (north-south) and survived up to 0.92m in height (see plates 32 and 33). It was built of blocks of very finely dressed cream/brown limestone ashlar; the stone resembled magnesian limestone but it has been identified as being Birdsall Calcareous grit (R Myerscough, *pers. comm.*). The internal faces of the blocks, hidden within the wall, were either recessed or projecting, with each fitting into the other quite tightly. The wall was by far the best quality masonry recorded within the north-east tower, and indeed (to date) is the only such piece noted within the castle. The east end of the wall was chamfered on both sides and, by plotting the fallen masonry above as the overlying deposits were removed, it was revealed that the wall had once stood to at least 1.60m in height and that it had incorporated a chamfered opening of unknown width (see figure 18). One of the fallen stones forming part of the opening (stone S5) bore a mason's mark represented by three conjoined triangles, the only such example noted in the north-east tower and one of the very few masons' marks recorded throughout the castle as a whole (Wright & Richardson 2005, 100). It has been suggested elsewhere that the ashlar wall together with the limestone block (023) to the east formed part of a diaphragm arch (FAS 2003, 52), although this is considered unlikely for a number of reasons (see below).
- 4.31 Both the north and south faces of the ashlar wall were marked by distinctive burning patterns (see figure 18). The north face was far more extensively marked than the south, and this may have been caused by the operation of a small sub-circular brick-built hearth (009) located just to the north of the wall. This hearth had been inserted into the flagstone floor (012/013), causing extensive disturbance which had been partly repaired using smaller flags and brick paving (011) (see figure 17). When initially uncovered, the hearth was partly obscured by a sub-

circular spread of loose dark grey ashy sand (008) which contained a very high proportion of charcoal and many fragments of animal bone. This sand/charcoal mix was heaped over reddened angular stones and brick fragments. When these were removed, they were seen to overlies the uppermost fill of the hearth, an ashy sand/charcoal mix (010), which spread some distance to the east of the hearth itself. This sand/charcoal mix (010) was very shallow, only 0.10m thick but contained several large fragments of melted lead, including a ball of lead came, and within the hearth itself it overlies a substantial accumulation/accretion of slag/residue (032) up to 0.30m thick. All the slag/residue (032) was of the same type, i.e. light grey in colour with yellow mottling and a hard gritty consistency; it contained pieces of partly melted lead window came. Analysis of the residue by scanning electron microscope (SEM) discovered that its main constituent was lead oxide, probably litharge introduced by the oxidation of molten lead. Its yellow granular form is typical of a low temperature softening or casting dross, rather than the dense brown slags produced during silver refining or high temperature lead softening (Smith 2003; see Appendix 8). The slag/residue (032) overlies two very shallow layers of gritty red sand in the base of the hearth (026 and 027); beneath the lower layer of sand, there was a very thin sheet of lead covering the base of the hearth.

- 4.32 Palaeoenvironmental analysis of samples from the sand/charcoal mix (010) showed that the charcoal comprised oak, willow/poplar/aspens, ash and possibly maple/sycamore, together with traces of charred bread/club wheat grains, some small vertebrate bones and a few modern uncharred seeds and other plant debris. Modern beetle sclerites were also present and there were two molluscs, an unidentified snail and a freshwater bivalve. A spot sample from the base of the hearth (026) identified angular charcoal (oak), a single amphibian bone and a few scraps of insect cuticle (Hall, Kenward, Carrott & Johnson 2008; see Appendix 6).
- 4.33 When fully excavated, the hearth (009) was seen to be sub-circular in plan, c.0.90m in diameter and with a maximum depth of 0.46m. The sides sloped steeply downwards at an angle of more than 45 degrees and the west or rear side was set higher than the east (see figure 17 and plate 34). The base was sub-triangular in plan and it sloped very gently downwards from west to east. The hearth was constructed entirely in brick; the bricks were red and hand-moulded, with average dimensions of 260mm by 140mm by 50mm. Those on the west or rear side of the hearth were mortared to the adjacent stone wall of the tower. Unfortunately, the bricks proved to be unsuitable for archaeomagnetic dating (GeoQuest Associates 2003; see Appendix 9).
- 4.34 The possible operation of the hearth is discussed in more detail in Chapter 7 below, but on the removal of the ashy sand/charcoal mix (010), a small area of limestone flagstones (033) was exposed immediately adjacent to the east side of the hearth; these could possibly have been used as a surface to scrape off any residue or slag when the window lead was being melted. The flagstones (033) overlies a spread of ashy orange mortar with black mottling (034); a very small area of this was removed, and it was found to be only 0.05m thick. Beneath this, a deposit of alternating shallow bands of firm orange sand/ashy charcoal (035) was observed, very similar in appearance to context 036 noted in the south-facing section of the first floor (see below).
- 4.35 As stated above, the south face of ashlar wall (005) also bore some evidence of burning, but to a much lesser degree than the north side (see plate 33). To the south of the wall, there was an area of cracked and reddened limestone flagstones and brick fragments (015) bedded on a reddish brown sandy silt. Tibbles

speculates that the burning here is not intense enough to have been caused by, for example, an industrial hearth associated with demolition activity, and it may have resulted from the use of a brazier (Tibbles 2003, 6; Appendix 3). This area was reached via two brick steps (016) on the east side, which appear to be contemporary with the adjacent worn slab and cobble floor surface (017) (See plate 32). At the north end of the steps, a low wall stub of Birdsall grit (014), 0.44m long (north-south) by 0.40m wide and 0.30m high, butted the ashlar wall (005), but the stone within it is not of comparative quality to the latter and may well be re-used here. Archaeomagnetic dating of the main cracked/reddened flagstone surface (015) produced an estimated date range for last firing of 1290-1340 AD (GeoQuest Associates 2003 - see Appendix 9).

- 4.36 The removal of the overlying deposits on the north side of the first floor exposed the remains of the splayed window embrasure (W2/4), through which the fissure ran. Adjacent to the east side of the window, the well-preserved base of a small circular oven survived (025) (see plate 35). The sub-circular base had an average circumference of 1.40m, with a slight projecting section on the south side, probably the remains of the entrance. The base was made entirely of handmade bricks and part bricks, varying from pinkish-red to blue/black in colour, and of two differing sizes, 280mm by 140mm by 50mm and 254mm by 140mm by 50mm. The bricks displayed the general characteristics of near-wasters or at least inferior "seconds" (Tibbles 2003, 5; see Appendix 3); the choice of brick quality may have been deliberate as "over-burnt" bricks are generally fired to a stone-like quality that increases their heat tolerance. Archaeomagnetic dating established an estimated date range for the last firing of either 1230-1270 AD or 1350-1420 AD, with the earlier date being favoured (GeoQuest Associates 2003; see Appendix 9).
- 4.37 The oven base (025) was obviously once part of a larger structure, and was probably provided with a beehive-domed roof. All traces of this had unfortunately disappeared, but the remains of the outer wall/surround (024), 1.80m in diameter and comprising very hard burnt mortar/limestone spread, were still visible. Both the oven base and its surround appeared to stand on and be cut into the core of the north wall of the tower; their juxtaposition with the window in the north wall also suggests that they are later insertions, although this is not certain. A spread of brown/orange mortar with frequent inclusions of charcoal (022), less than 0.10m thick, obscured some of the flagstone flooring (013) to the south-east of the oven.
- 4.38 Another hearth, or more likely a fireplace (019), was revealed in the south-east corner of the excavated area (see plate 36). This had been badly damaged by the fissure running across the first floor but it was originally at least 1.70m long (north-south) by 1.40m wide (east-west). It was edged with handmade reddish-brown bricks (average dimensions 260mm by 130mm by 50mm) and had a base of edge-laid tiles/brick fragments. Immediately to the east of the hearth, the core of the adjacent wall was very reddened, and on the north side, there may be the remains of another smaller, c.1m square cruder hearth (020) filled with a compacted silt/charcoal deposit (021), although the residual elements were disorganised; one of the bricks bore a possible 14th century tilers' tallymark (Tibbles 2003, 10; see Appendix 3). Archaeomagnetic dating of the main hearth (019) produced estimated last firing date ranges of 1170-1280 AD or 1390-1450 AD, with the earlier date being favoured (GeoQuest Associates 2003). Documentary evidence suggests that this hearth is either contemporary with the north-east tower's construction or is in the same position as an original fireplace (see figure 5).

- 4.39 When the south-facing section of the excavated area was cleaned, it was possible to record the contexts beneath the base of the hearth (019) (see figure 19). Immediately beneath the bricks of the base, there were a series of very shallow deposits. The uppermost comprised a firm reddened sand (028), overlying a clean buff sand (029) and then a pink sand (030). These sands overlay a thin layer of mixed ash, charcoal and sand (031), 0.08m thick, which appeared to rest directly on the core of the vault below. The mixed charcoal/sand (031) ran west for a short distance as far as a large hawthorn stump which occupied the centre of the south-facing section. To the west of the stump, beneath floor surface (017), the section was made up of alternating shallow bands of charcoal/ash and orange sand (036), very compacted and overlying the vault core. Further west, these alternating bands gradually merged into a thicker deposit of charcoal and ash (037), 0.37m thick overall, which eventually faded out amongst the vault core.

#### **Archaeological Results: Area E**

- 4.40 The small, uppermost surviving room of the north-east tower was excavated purely for research purposes, in order to expose the internal structure (see plate 25). The structure of the room is described in Chapter 3 above, and only the archaeological deposits are dealt with here.
- 4.41 The majority of the infill of the room was formed by fallen limestone rubble, mixed with dark brown sandy silt and mortar (001) up to 0.70m thick. The fallen rubble overlay a 0.30m thick layer of loose dark brown silt/sand soil (002), containing infrequent inclusions of animal bone, especially in the vicinity of the fireplace in the west wall. Few finds were recovered from this deposit, although there was some assorted animal bone and a small rumbler bell which would have been used as an animal's dress accessory; it could date from the medieval period onwards (Wastling 2008, 2; see Appendix 7). When the silt/sand (002) was removed, a compacted light brown mortar floor (003) was exposed. The floor had some stones/rubble set into the surface and contained frequent flecks of charcoal.

## 5 SUMMARY OF ECOLOGICAL SURVEY WORK

- 5.1 As noted in Chapter 1, a programme of ecological survey work was also undertaken as part of the project. This work comprised an ecological and lichen survey of the castle as a whole (EINC 2002; Gouldsborough 2003); these reports have been produced as stand-alone documents, but the details relating to the north-east tower are summarised here for completeness. Separate surveys of the lichens and ivy present on the north-east tower (Gouldsborough 2002a & 2002b) were also produced, and are summarised below; the full reports appear as Appendices 11 and 12 (Volume 2).

### The Ecology of the North-east Tower

#### *Methodology*

- 5.2 Botanical fieldwork of the north-east tower was undertaken on 25th July 2002 by Dr Madeline Holloway of EINC. The method of data collection was designed to facilitate analysis using the National Vegetation Classification (NVC) which has become the standard tool for detailed vegetation recording (Rodwell 2000). At the time of the fieldwork, the north-east tower was scaffolded as part of the programme of repairs and consolidation, and each of the twelve scaffold levels was assessed and the vegetation inspected. Plant nomenclature follows that used by Stace (1997).
- 5.3 A cursory inspection of the ground floor vault of the north-east tower for bats was also undertaken on 25th March 2002. At that time, the instability of the tower prevented a full bat inspection, and so this was followed by a systematic daytime inspection of the whole tower on 25th July 2002. July and August are the months (together with May and June) that bats are most active and when they are most likely to be detected. The inspection searched for bat droppings beneath potential bat roost sites, such as any small spaces between the stonework of the walls and under the timber beams of the roof spaces.
- 5.4 In addition to providing a base-line of ecological information for the north-east tower, the ecological survey also produced recommendations for the restoration of the plant communities on the north-east tower after the consolidation was complete. These recommendations were followed wherever possible, and are discussed in Chapter 6 below.

#### *Vegetation of the north-east tower*

- 5.5 The plant communities that have developed on the exposed walls of the north-east tower are illustrated in the plan diagrams of scaffolding platforms 1 to 12 (see Appendix 10). These diagrams show that pellitory-of-the-wall *Parietaria judaica* is a relatively common plant at each level on the exposed tower walls, especially on the east- and south-facing walls, although there is also some on the north elevation (see plate 16). Other frequent plants recorded throughout included common mallow *Malva sylvestris*, and hemlock *Conium maculatum*. Occasional plants were hedge mustard *Sisymbrium officinale* and smooth sow-thistle *Sonchus oleraceus*. Common mallow and barren brome *Anisantha sterilis* are frequent inhabitants of the cracks between the crumbling stonework at the top of the tower (see plate 37).
- 5.6 Most of the vegetation of the north-east tower can be classified as an OV 41 *Parietaria judaica* community using the National Vegetation Classification (NVC). This classification refers to the vegetation of open habitats in which pellitory-of-the-



wall *Parietaria judaica* is the only consistent feature throughout. Pellitory-of-the-wall is a locally rare plant of old walls and rocks in Yorkshire and it was retained on the tower wherever possible, provided this was compatible with the consolidation and rebuilding requirements. Another locally rare plant occurring in association with pellitory-of-the-wall, and recorded at platform levels 2 to 6 and 12, was great lettuce *Lactuca virosa*. This plant is more commonly associated with wayside, waste and rough grounds and, once again, was retained wherever possible.

- 5.7 Platform levels 5 and 6 illustrate the plant communities that have developed above the ground floor vault. At the time of survey the vault supported a considerable load of fallen rubble and soil over which a species-poor plant community dominated by competitive grasses, such as abundant common couch *Elytrigia repens* and frequent cock's-foot *Dactylis glomerata*, had developed (see plate 3). This species-poor community reflects local enrichment of the soil and only occasional herbs such as spear thistle *C. vulgaris*, marsh thistle *C. palustris*, nettles *Urtica dioica* and hemlock *Conium maculatum* are scattered within it. In general, it can be said that where soil has accumulated and become locally enriched, i.e. over much of the area above the ground floor vault, the existing vegetation is not of particular botanical interest. Much of this material was subsequently removed as part of the tower's consolidation programme.
- 5.8 Nevertheless, there was substantial botanical interest in the plant communities that occurred between the crumbling portions of the stonework that are also located above the ground floor vault. In these areas the soil layer is minimal and the angle of slope ensures that the soil layer remains thin. The vegetation here is classified as an OV 41 *Parietaria judaica* community.
- 5.9 The most distinct and relatively species-rich OV 41 communities that occur on the stonework of the north-east tower are located along the narrow wall which juts out from the south-eastern edge of the tower in a southerly direction (platforms 7 - 10). Amidst the crumbling stonework of this wall are several more plants typically found in an OV 41 Pellitory-of-the-wall community. These include thyme-leaved sandwort *Arenaria serpyllifolia*, cock's-foot *Dactylis glomerata*, red fescue *Festuca rubra*, barren brome *Anisantha sterilis*, ribwort plantain *Plantago lanceolata*, ivy *Hedera helix*, nettles *Urtica dioica*, black medick *Medicago lupulina* and prickly sow-thistle *Sonchus asper*.
- 5.10 Finally the old brick wall that extends northwards from the north-east tower (Platforms 11 and 12) also supports a relatively species-rich OV 41 Pellitory-of-the-wall community.

#### *Roosting bats*

- 5.11 There was no evidence of bats using the ground floor vault of the north-east tower as either a summer or winter bat roost. No droppings were found in this vicinity and the open nature of the structure ensured that it was constantly draughty – a factor which would dissuade bats from using it as a roosting site. In addition, no bat droppings were recorded on or in any of the exposed stonework of the north-east tower, which were accessible from platforms 1 to 12. The results indicate that bats are not using any part of the north-east tower for either summer or winter roosting purposes.

## The Lichens of the North-east Tower

### Methodology

- 5.12 The scaffolded north-east tower was inspected for lichens on 19th August 2002 by Dr Peter Gouldsbrough, to record the visible lichen species and to identify significant areas of lichen which should be preserved during the consolidation works. Where identification confirmation was required, chemical spot tests involving potassium hydroxide, calcium hypochlorite and paraphenylenediamine were used. For the sake of simplicity, only the genus and species names of the recorded lichens are given, rather than the full taxonomic authority, e.g. *Acarospora* Massal. *Fuscata* (Shrader) Th. Fr. is shortened to *Acarospora fuscata*.

### Results

- 5.13 The following species of lichens were recorded on the north-east tower (for further details see Gouldsbrough 2002a, table 1; Appendix 11):

Species	Characteristic appearance
<i>Caloplaca citrina</i>	Yellow; powdery; orange fruits
<i>Caloplaca decipiens</i>	Lemon yellow; lobed margin; 'bitty' centre
<i>Caloplaca flavescens</i>	Orange with white inner zone; often, as here, only an outer arc remains
<i>Diploicia canescens</i>	Matt-grey; lobed margin; granular centre
<i>Haematomma ochroleucum</i> var. <i>porphyrium</i>	Grey; cracked crust; paler outer margin
<i>Lecanora dispersa</i>	Isolated grey fruits; white rim
<i>Lecanora sulphurea</i>	Dark green; cracked; grey fruits
<i>Leproloma vouauxii</i>	Blue-green; powdery
<i>Opegrapha saxatilis</i>	Immersed; elongated black fruits
<i>Phaeophyscaï orbicularis</i>	Orbicular; grey; long narrow lobes divided at the tip
<i>Physcia adscendens</i>	Pale-grey; lobes raised and hood-shaped at the tips
<i>Verrucaria muralis</i>	Immersed; tiny black fruits
<i>Xanthoria calcicola</i>	as <i>X. parietina</i> but darker; contorted lobes; granular centre
<i>Xanthoria parietina</i>	Orange; conspicuous; lobed margin; large orange fruits

- 5.14 Figures showing the locations of the various species identified on the tower's elevations are given in Appendix 11, while plates 38 to 41 show a few of the recorded lichens.

### Discussion

- 5.15 The significance of the lichen flora of the north-east tower can be considered from two distinct points of view. The first is in relation to their regional context, i.e. their regional distribution and their pollution tolerance, while the second is in relation to their distribution on the tower, the local reasons for that distribution and the significance of that for the monument.
- 5.16 In the regional context, three of the species found are relatively scarce, *Caloplaca decipiens* and *Leproloma vouauxii*, which are both found on the lower levels of the east elevation, and *Opegrapha saxatilis* found as isolated specimens on the quoin stones of the north and east elevations. The remaining eleven species are relatively common. The average tolerance of the species to atmospheric sulphur dioxide pollution was calculated to be Zone 3 on the Hawksworth and Rose scale, which represents a mean winter sulphur dioxide level of 125 µg/m<sup>3</sup> (Hawksworth & Rose 1976, 48). This level of sulphur dioxide pollution may represent a significant factor in the weathering of the limestone of which much of the tower is built. It should be noted that, without a record of the species for the whole site, it is not

possible at this stage to provide a detailed analysis of the likely stability of the species recorded, or to confirm the level of air pollution at this site. However, it is also worth noting that, in the absence of local atmospheric pollution monitoring, analysis of the pollution tolerance of lichen species is the only way in which an indication of pollution levels can be obtained in rural areas remote from the DEFRA automatic monitoring stations. High levels of sulphur dioxide result in high levels of weathering of calcareous stones (Cooke & Gibbs 1993).

- 5.17 At the local level there have been three principal influences on the distribution of the species recorded, the type of stone, the low-level nitrification of surfaces, and the influences of the wildlife. The Dogger limestone, from which much of the castle is built, attracts its own peculiar lichen flora. The quoin stones of the castle are made from a siliceous sandstone, although in the string courses and drip mouldings its properties have invariably been modified by centuries of rainwater run-off from the limestone above; the lichen flora on the quoins reflects its siliceous nature by the presence of *Haemotomma ochroleucum* and *Opegrapha saxatilis*, both species being peculiar to acidic substrata.
- 5.18 *Diploicia Canescens* is the dominant species at the lower levels of the east elevation of the tower, and for a large part it is present as a conspicuous monoculture. This species is generally associated with basic and very nutrient-enriched rocks and walls, such as farmyard buildings, and there is no doubt that the presence of this species represents a record of past farming activity at this site. In addition, the two species of *Xanthoria* which are dominant at the upper levels of all the surfaces of the walls have been noted as being common on nutrient-enriched rocks and walls especially under bird-perching sites, as well as being associated with farm buildings. These two species are therefore an indication of the importance of this tower for bird-life, but there is one further factor. Many of the lichen species showed evidence of being grazed by gastropods and these animals are, in turn, a significant link in the food chain, being prey to birds, most notably members of the Turdidae family.
- 5.19 The final factor in this discussion is that the lichens of the tower, some by their distinctive appearance, have a significant effect on the appearance of the ruin. This is something which many writers have commented on as a desirable quality in a ruin (e.g. Stanford 2000; Macaulay 1977). This does though raise the question of whether the lichens on the tower have, or will have, a significant effect on the weathering of the masonry. Recent research has shown that on hard calcareous stones, like the Dogger, even with the extensive lichen cover on some parts of the masonry, the lichens are unlikely to have any significant influence on weathering due to frost, salts or acid rain, and any direct weathering due to the lichens themselves is likely to be negligible (Gouldsbrough 2002c). It is beyond the scope of this report to carry out an analysis of the physical properties and weathering characteristics of the stones of Sheriff Hutton Castle, but only after analysis of such data will it be possible to confirm that the lichen species recorded pose no weathering risk.

## **The Ivy of the North-east Tower**

### *Methodology*

- 5.20 The scaffolded north-east tower was inspected for ivy on 12th August 2002 by Dr Peter Gouldsbrough, with the following aims and objectives:
- to record the position of the primary growth stems of the ivy;

- to identify the principle mechanisms by which any past weathering or damage to the masonry has occurred;
- to identify areas where the ivy may safely be removed to facilitate masonry consolidation;
- to identify any areas in which, for reasons of stability, the ivy should remain;
- to identify areas where the historic integrity of the masonry could be compromised by the removal of ivy;
- to assess the historical and ecological importance of the ivy.

### *Results*

- 5.21 The ivy on the north-east tower was identified as *Hedera helix*, or common ivy. Its extent is limited to the south-west corner, where the growth extends from ground level to c.9.3m high (see plate 3). Above this height, i.e. the upper level of vaulted masonry, the lack of any supporting masonry has prevented further vertical growth. Although the walls of the castle are massive, being some 3m thick at ground level, the ivy relies for support throughout its height on wall-core rubble which is a maximum of 0.9m back from the face of adjacent facework to the north. There is no evidence of any facework or quoins in the area of the ivy.
- 5.22 At scaffold level 0 (i.e. 0.6m above ground level), the main growth stems are visible. There are two adjacent stems on the west elevation and one on the east. The stems on the west elevation are 90mm and 70mm in diameter, and the stem on the east elevation is 70mm diameter and soon branches, but has been severed below the branch at some time in the past. The resulting four stems immediately disappear into the brickwork buttressing which underpins this corner of the ruin.
- 5.23 At scaffold level 1 (2.1m above ground level), several of the aerial stems have been cut back to facilitate the erection of the scaffolding. The main stems at this level are 30 to 40mm in diameter on the west elevation and 40 to 50mm diameter on the east elevation. The secondary stems form a contiguous, intertwined lattice over the surface of the masonry and within the deeply eroded mortar joints (see plate 42).
- 5.24 At scaffold level 2 (4.2m above ground level), the ivy is at its most luxuriant, with an average depth of cover of 400mm, and a maximum of 900mm. The main growth stems on the west elevation are 30mm diameter, and those on the east are 30mm to 40mm diameter. The same contiguous mass of intertwined secondary stems are evident here as at the lower level.
- 5.25 At scaffold level 3 (6.3m above ground level and springing level of the vaulting), the cover is reduced to 200mm maximum. The main stems on the west elevation are 19mm to 25mm diameter and those on the east are 20mm diameter. The secondary stems remain intertwined on, and within, the masonry and mortar joints. At this level, new growth can be seen to grow into the interstices between masonry units, as well as emerging from within the interstices (see plate 43). The masonry at this level is loose, most of the mortar having weathered away.
- 5.26 At scaffold level 4 (8.5m above ground level), the ivy growth diminishes and ends some 900mm above this level and there is no further vertical masonry in this area. At this point the herb layer which grows from the debris above the top of the stone vaulting begins.

## *Discussion*

- 5.27 At the time of the survey, it was not possible to determine whether there were documentary sources from which the age or historical significance of this stand of ivy can be assessed. However, much appears to be relatively recent and, from the direction of growth of the main stems immediately above ground level, it can be deduced that the brick buttressing which underpins this corner of the tower predates this particular stand of ivy. The fact that one of the main stems has been severed at some time in the past suggests that there has been a perceived threat to the masonry. Nevertheless, ivy growth on ruins, once admired so much during the 18th and 19th centuries for its contribution to the Picturesque value of ruins, is now a rare occurrence and should perhaps be valued for that rarity.
- 5.28 Why so much of the facework has disappeared in this area is not immediately apparent but the presence of passageways, fireplaces and flues within the wall thickness may be a contributory factor. It seems unlikely that this modest stand of ivy has been responsible for the massive loss of masonry in this area of the tower. Ivy has a predilection for corners, and can often be seen climbing external corners of masonry structures, as on the adjacent north-west tower of the castle. In such situations, quoin-stones can be prised out of position (provided that growing stems or adventitious roots can penetrate the mortar joints), and can leave large areas of wall-core vulnerable to further damage. However, in the area of the ivy on this north-east tower there is little evidence of active masonry displacement caused by the ivy, as far as could be determined. There are therefore no areas where the structural integrity of the masonry would be compromised if the ivy were to be removed, with the exception of the top two metres, where the masonry is poorly bonded and the mortar joints are deeply weathered, or absent.
- 5.29 It is evident that the weathering of the masonry and the mortar joints in the area of the ivy predated the ivy. Differential weathering rates are evident between the sandstone quoins and the rubble walling, and between the rubble walling and the mortar joints. This is evident particularly on the north and east elevations of the tower, and the same differential weathering between mortar joints and rubble walling is evident within the stand of ivy. This suggests that the area of wall now covered by the ivy has undergone the same weathering processes as the remainder of the masonry, and that any chemical weathering that could be attributed to the ivy has been short-lived or relatively insignificant.
- 5.30 Unfortunately, much of the ivy had to be removed as part of the conservation of the tower. To attempt to carry out such conservation work with it in place would be impracticable due to the density of the intertwined stems both on the surface of the masonry, within the mortar joints and within interstices. There will inevitably be some disruption to the masonry during any operation to remove the ivy but, since the masonry in question is primarily the exposed rubble core of the wall, the historical integrity of the wall should not be too severely compromised as a result.
- 5.31 The ecological value of this stand of ivy is, perhaps, modest compared to the ecological value of the site as a whole. Nevertheless, the implications of its removal, and the opportunity, or desirability, of allowing it to regenerate following consolidation work should be considered carefully.

## 6 SUMMARY OF REPAIR PROGRAMME

### Introduction

- 6.1 The following text provides a summarised account of the repair programme undertaken on the north-east tower. It is largely drawn from records kept by HPR and has been supplemented by observations made by EDAS and by the project architect Peter Gaze Pace.
- 6.2 As noted in Chapter 1 above, an architectural and archaeological survey of the castle was produced in 1998, and this included a condition survey and recommendations for consolidation (Dennison 1998, 71-90). This identified Area 2 (i.e. the north-east tower and adjacent north-east spur wall) as having the highest priority for repair. Following a partial collapse of the ground floor vault in the north-east tower in December 2000, a new Condition Survey of the castle was produced by the project architect in 2001 (Pace 2001). This also identified the whole of the north-east tower as requiring the most urgent attention (i.e. within the next 12 months), together with upper sections of the north and south elevations of the south-west tower; the north-east spine wall was seen as having a slightly lower priority (Pace 2001, 11-19). Following this, a detailed specification for the repairs and consolidation of the north-west tower was drawn up in January 2002 (Pace & Turner and Holman 2002). The bulk of the work was carried out by Historic Property Restoration (HPR) between April 2002 and July 2003, with smaller-scale works undertaken in June-July 2006.

### Conservation Philosophy

- 6.3 The principles of repair and management for the castle as a whole were outlined in the 1998 report (Dennison 1998, 77-81), while the subsequent Condition Survey set out the approach that was to be adopted (Pace 2001, 10-11).
- 6.4 The conservation philosophy for the castle as a whole, and in particular for the north-east tower, can be summarised as follows:
- the principal of “consolidate as found” would be followed, in accordance with best practice, with any rebuilding or replacement kept to an absolute minimum to preserve the historic integrity of the remains;
  - any interventions, e.g. new mortar or stonework, would match the existing as closely as possible, with fallen stone etc being utilised as appropriate;
  - previous interventions would be respected where they are not harmful to the long-term well-being of the remains;
  - new pointing would be undertaken only where necessary, i.e. no repointing where the original mortar is in a good and stable condition;
  - there would be minimal intervention to the plant, lichen and other vegetation growth, i.e. only those items causing damage to the fabric (e.g. saplings and ivy) will be removed;
  - additional soft topping of walls and surfaces would be carried out, both to protect the structures below and to encourage the expansion or establishment of new colonies of plants and animals;

- architectural and archaeological recording would be carried out prior to, during and in some cases after the conservation work.

### **Summary of Repairs**

- 6.5 The fabric repairs undertaken to the north-east tower comprised four main conservation activities, namely repointing, selective rebuilding, the insertion of structural ties and grouting. Full details of the methodology used are contained in the architect's specification (Pace & Turner and Holman 2002, Section B).
- 6.6 For the most part, the methodology detailed in the architect's specification was followed, although some minor alterations arose from being able to view the fabric close up from the scaffolding, for example the amount of repointing required and the number and position of structural ties.
- 6.7 However, the discovery of well-preserved archaeological deposits at first floor level above the ground floor vault after the removal of the overlying debris meant that the method of consolidating the vault roof beneath had to be changed. The vault was splitting apart because the thrust was no longer being countered by the downward weight of the tower walls, which had collapsed in 1875; this splitting had increased markedly over recent years (see plates 13 and 14). The initial proposal involved the casting of a concrete slab which would be inserted into the floor over the vault, into which ties could be secured through the vault structure from below. However, the requirement to preserve the archaeological remains meant that an alternative proposal was necessary. After some debate, it was decided that this should involve inserting four tie bars across the space of the vault to prevent the walls spreading further, to consolidate and repair the vault roof from below, and to use small ties set into the vault stones from below.

### *Repointing*

- 6.8 As stated above in Chapter 3, several samples of the original mortar were subject to analysis in order to establish its composition (Sandberg 2002; see Appendix 4). A modern lime mortar was then mixed with the same proportions of components (1 part lime to 2.5 parts sand/aggregate) and a test area applied to the north-east tower in order to compare its appearance to the original. When this had been approved by the project architect, repointing commenced across all elevations (internal and external) of the tower from the scaffolding. As a general rule, areas of original pointing which had failed or decayed away were cut back at least by 40mm to a solid face. The new mortar was applied flush to the face and then allowed to dry for a period of c.2-4 hours before being roughened with a stiff bristle brush using a stippling motion to create an uneven weathered appearance capable of shedding water; the new mortar will take several years to fully harden but it was initially protected from wind, rain and frost for some two weeks by damp hessian or canvas sheeting. Very fine joints were repointed with a fine building sand or lime putty.
- 6.9 The percentage of repointing applied to each elevation and to differing parts of the same elevation varied according to local requirements, but it was usually between 40% and 100% of any given area. Details of the precise areas which were repointed on each elevation are shown on the "as-built" drawings produced by HPR, copies of which are contained in the project archive. Plate 44 shows an area of repointed wall face while other repointing is visible on plate 20.

### *Rebuilding*

- 6.10 A certain amount of selective rebuilding was undertaken on parts of the north-east tower. This rebuilding varied from repairs to the exposed corework and the replacement of missing quoins to the resetting of the upper courses of walls which were very unstable (see plate 45). Where new or replacement stone was needed, this was recovered from either the clearance of the basement/cellar (Excavation Area A) or from the overburden removed during the excavation of the first floor (Excavation Area D). An exception to this occurred at the west side of the north elevation, where missing quoins were replaced with coursed rubble and red tile slips.
- 6.11 The largest area of re-building was the creation of a “core” arch to support the opening left by the collapse/removal of the south window in the tower’s ground floor east wall (see plate 15). Here, the head of the arch was supported by an internal concrete beam and eight 3.0m long and 20mm diameter ribbed steel bars were grouted into the adjacent walls. The structure was then further strengthened using localised pinning through some 20 stones (see below). There was also a certain amount of rebuilding done to secure the ends of the new stainless steel tie bars which were positioned across the top of the ground floor vault (see also below), and of the ground floor vault itself. The large hole in the basement vault was not repaired, but the edges were made sound to prevent further collapse or damage. There was also some rebuilding around the base of the centre of the west side, both around the garderobe chutes (C2/2 and C2/3) and on the north side of the garderobe passage here; the rebuilt corner was founded on a new concrete foundation (see plate 18).
- 6.12 Above the first floor level, the extent of rebuilding was generally limited, but on the uppermost floor extensive rebuilding was required to both areas of wall face and core to stabilise the highest parts of the tower (see plate 45). A small area around the second floor spout in the north internal elevation was also rebuilt, for structural stability. As part of the repairs carried out to the first floor, a low retaining wall was created at the south end using re-used stone to retain the replaced soil which was used to re-vegetate this level (see below).
- 6.13 Once again, the precise areas of rebuilding are shown on the “as-built” drawings produced by HBR.

### *Structural ties*

- 6.14 By 2002, the structural condition of the north-east tower, in particular the upper levels, was so poor that extensive pinning was required to ensure its future stability. It was decided that this should be achieved using a combination of two main types of tie bars or dowels.
- 6.15 The largest of these involved the use of 12mm diameter stainless steel rubbed reinforcing bars with threaded ends, which were secured using small steel plates and anchored using a pre-blended hydraulic lime-based grout. In order to test the properties and performance of the grout, a number of trials were undertaken on an area of corework in the central part of the inner face of the south range’s south wall. Although the length and diameter of the individual tie bars used for the pinning varied according to specific requirements, the process of inserting and securing each tie in the north-east tower was undertaken in the same way.



- 6.16 Prior to drilling, the angle and position of each tie was calculated using the elevation drawings prepared from the architectural survey, based on the requirements outlined in the main specification. A 50mm diameter hole was drilled using a diamond core drill, mounted on the tower scaffolding, and the debris blown out using compressed air. The tie bar was then inserted, complete with the end plates and appropriate plastic spacers to ensure the rod ran down the centre of the hole. The grout was then pumped into the hole and allowed to harden for at least seven days. The method of securing of the ends of the ties depended on its position and length – the shorter lengths were secured using small square plates, which were set into shallow recesses cut into the face of the stone and then hidden by re-pointing, while the longest ties and those drilled through areas of core were secured using three layers of circular plates of 150mm, 100mm and 50mm diameter with a washer and nut. Where not re-pointed, some of the holes were hidden using plugs of the drilled-out stonework. The location and form of the structural pinning used on the tower is shown on the “as-built” record, but it can be summarised as follows. At ground floor level, some 22 steel bars varying between 4.0m and 0.4m long were inserted into the east external elevation. The majority of these bars were angled but some horizontal bars up to 7.0m long were also inserted in the south face of the core at this level. At first second and third floor level, ties up to 8.0m long were inserted through the full width of the existing structure. The majority of the ties were angled upwards from north to south.
- 6.17 In some areas, shorter stone restraints were used to secure individual stones to more solid stonework behind. Here, 12mm diameter holes were drilled through the stone using a rotary percussive machine and the new void filled with a polyester resin mortar. Stainless steel rods or dowels, 6mm diameter and up to 1.2m long but typically 0.6m and 0.8m long, were then inserted into the resin, the hole temporarily sealed and the rod left undisturbed for 24 hours or longer depending on the temperature. Once secure, the temporary seal was removed and the top of the hole filled with stone mortar to match the existing. This form of securing was generally used on overhanging masonry, to avoid the need to build up any new supporting stonework, or where the heads of door and window openings had decayed (see plates 46 and 47).
- 6.18 In addition, as outlined above, the ground floor vault was further stabilised by the use of four stainless steel tie-bars which run across the full width of the tower. Each bar was 64mm in diameter and was secured by a 225mm square plate attached to a hidden concrete block which was surrounded by a small area of rebuilt stonework (see plate 48). The bars were positioned 3.5m above ground level, spaced so as to avoid the various openings and flues in the east wall. In order to minimise their visual intrusion, the visible length of each tie-bar running across the vault was then painted dark brown.

#### *Grouting*

- 6.19 Deep and long fissures, for example the prominent fissure which ran across the excavated first floor above the vault below, were cleaned out and then filled with grout. The grout was inserted in stages to prevent sloping out or fractures; the first floor fissure was grouted to a depth of 0.75m.

#### **Protection of Archaeological Remains**

- 6.20 As described in Chapter 4 above, the first floor of the tower was excavated in two stages. The majority of the surviving surfaces and structures were exposed in 2002 but, in order to minimise weathering, frost damage and accidental damage

during the repairs works, they were covered during the winter with a thick layer of straw and Terram geotexture membrane. The protective covering was removed early in 2003 and the excavations were completed.

- 6.21 When the repair programme was fully complete, the structures and surfaces were recovered with Terram and carefully buried using an even 150mm depth of specified sand laid across the first floor (see plate 49). The soil removed during the excavation and stored on site was then spread on top of the sand to a depth of c.1.5m. Finally, the soil was re-seeded using seeds harvested from the first floor flora prior to excavation and re-populated with plants preserved through the same process (see below) (see plate 50). The same process was undertaken on the uppermost level of the tower (Excavation Area E) following the exposure of the mortar floor here.

## **The Ecological Restoration of the North-east Tower**

### *Overall management*

- 6.22 Wherever possible, the restoration work to the north-east tower avoided disturbance of pellitory-of-the-wall *Parietaria judaica* and great lettuce *Lactuca virosa*. These plants are uncommon in Yorkshire and were frequently located in the old mortar between the stonework of the exposed walls.

### *Soft capping the ground floor vault*

- 6.23 From an ecological point of view, the soft capping of the ground floor vault provided an excellent opportunity to encourage the development of additional OV 41 Pellitory-of-the-wall plant communities (see plate 50). To this end, the design of the repaired ground floor vault aimed to replicate the sunnier crevices and ledges in old walls that encourage the development of this unusual plant community. In particular, Pellitory-of-the-wall prefers sunny situations on limestone or mortared walls, and is more frequent on south- and west-facing aspects (Rodwell 2000), although in this case the plant was more frequent on the south- and east- facing walls of the tower.
- 6.24 Standard soft capping techniques using turfs made of top-soil and peat mixes are likely to be nutrient rich and hence unlikely to support, or encourage the development of, a lime-loving and slow-growing OV 41 plant community. The use of use of such turfs, as originally specified by the project architect, was therefore only used where an immediate and uniform soft cover over the vault was deemed essential. Instead, the following course of action was undertaken.
- Once the masonry work was complete, the final hard-capping restoration included the deliberate creation of small crevices, narrow ledges, indentations and hollows using a mixture of old mortar and any remaining stone/rubble;
  - Plants removed from the tower in late August 2002 (after the main flowering period) included most of those found on the wall-top that juts out in a southerly direction from the south-eastern corner of the north-east tower (scaffold platforms 5 and 6), and most of those around the more steeply sloping aspects of the existing ground floor vault where the soil is thin and competitive plants such as couch grass *Elytrigea repens* do not dominate. The removed plants were stored in a prepared receptor site prior to re-instatement.

- The preparation of the receptor site included using the existing thin soils, mortar and rubble as a base on which to temporarily place the removed plant communities. The plants were lightly but regularly watered to ensure their continued survival.
- As soon as possible after the completion of the restoration work, the stored plants were transferred back to the restored vault and bedded into the especially created depressions, hollows, crevices and small ledges. The plants were bedded in using a mixture of old mortar, subsoil and peat, and were lightly but regularly watered until well established.
- Local seed was also collected and stored in August 2002 from the existing OV41 pellitory-of-the-wall *Parietaria judaica* communities of the tower. The seed was then scattered over the newly capped vault at the same time as the stored plants were returned and bedded down. This aided the process of regeneration and the development of an authentic and unusual OV 41 plant community.

6.25 It was known that the ecological restoration of the ground floor vault would not result in a uniform cover of vegetation over the whole surface, and it may also not be achievable in the first year. The locally uncommon and slow-growing OV 41 Pellitory-of-the-wall community recommended as the most appropriate castle wall "habitat" is both structurally and spatially diverse. For example relatively tall perennial and annual herbs such as Pellitory-of-the-wall, ribwort plantain *Plantago lanceolata* and prickly sow-thistle *Sonchus asper* are interspersed by very short, creeping annuals and perennial plants such as thyme-leaved sandwort *Arenaria serpyllifolia* and black medick *Medicago lupulina*. In this particular situation other attractive herbs located at Sheriff Hutton Castle also include the very tall, and locally rare, biennial, great lettuce *Lactuca virosa*, as well as common mallow *Malva sylvestris*.

6.26 In conclusion, the constant presence of annual, biennial and perennial plants within an OV 41 Pellitory-of-the-wall community ensures that they are adapted to relatively harsh conditions. They are dependent on thin, nutrient poor, soils and on the continuing creation of gaps in the vegetation for the annual germination of new seeds. Such an effect can only be achieved if an uneven and nutrient-poor surface is created in the first instance.

## 7 DISCUSSION AND CONCLUSIONS

- 7.1 As stated above in Chapter 1, this report provides a detailed description of the results of the archaeological and architectural survey work carried out on the north-east tower but, given the likely duration of the repair programme for all four towers and associated structures, a fuller publication giving a detailed consideration of the castle's landscape, cultural, architectural and social contexts should be produced only when all this work is complete. The following discussion and conclusions should therefore be read only as an interim statement, and it is probable that they will be amended and greatly enhanced as the repair programme progresses around the other three towers of the inner court.

### **The Late 14th / Early 15th Century**

#### *Construction*

- 7.2 The architectural survey of the north-east tower, particularly of the north and west external elevations, and the excavation of the first floor, together with the wider ongoing landscape works, have revealed much new information about the castle's construction.
- 7.3 For the first time, geological survey work (Myerscough 2005; see Appendix 2) has been able to identify and locate the most likely source of both major types of stone used in the castle's construction, namely the quarries at Mowthorpe near Terrington, some 4km to the north-east of Sheriff Hutton. This location accords well with the statement made by John Leland in 1534 that "*the Stone that the Castel was buildid with was fetchid from a Quarre at Terington a 2. miles of*" (Wright & Richardson 2005, 98).
- 7.4 Given the scale of the castle, the quantities of stone required (it has been estimated that the surviving part of the north-east tower alone contains 1,400 tons of stone (Tony Wood, *pers. comm.*) and the c.20 year construction period, it is not unreasonable to expect that the same complex facilities for working, handling and transporting the stone as have been suggested at Bolton Castle in Wensleydale (Moorhouse 2003, 199) would have existed at Mowthorpe. Although the Mowthorpe quarries were probably worked well into the 19th century, thus destroying some of the evidence for earlier working, it is unlikely that all earlier evidence has disappeared; such evidence would probably be revealed by detailed archaeological/geological survey. Any quarrying activity would of course form only part of the wider landscape here, a consideration of which is currently ongoing and which has already revealed possible early medieval iron-smelting sites in the woods to the north of Birkdale Farm at Low Mowthorpe (Richard Myerscough, *pers. comm.*), as well as undated but possibly medieval earthworks to the south of the same farm (surveyed by S Richardson and R Lamb in 2005). It is also hoped that the planned core sampling across the former flooded area between Sheriff Hutton and Terrington (Richard Myerscough, *pers. comm.*) may reveal further information relevant to the possible transportation of quarried stone to the castle using boats or rafts.
- 7.5 Emery (1996, 390) suggests that rubble may have been used at Sheriff Hutton Castle for speed of construction, and Harrison notes a similar "remarkable economy" of construction at Bolton Castle in Wensleydale, which has mainly rubble walling (LUAU 1992a, 43). Many reasons could be suggested why speed of construction was important at Sheriff Hutton, principally a combination of political and economic ones (Richardson & Dennison 2008, 183-184), and these should be

explored more fully in any final publication that is produced. The spacing of the presumed seasonal building breaks recorded on the north-east tower (see figure 9) suggest that at least nine “seasons” of work were needed to bring the tower to its full height, perhaps equating to nine or ten years. The work appears to have progressed at a fairly steady pace, with breaks spaced at between 2.5m to 3.0m intervals, slightly less than the c.4.0m suggested for each season at Bolton Castle (LUAU 1992a, 11). By contrast, the lifts of the putlog scaffolding are spaced at vertical intervals of 1.75m, and so for most seasons more than one lift would need to be erected. Unfortunately, the drawings reproduced in the Bolton Castle archive reports (LUAU 1992a, 1992b & 1994) do not show the putlog holes and so no direct comparisons can be made, although it was noted on the south-east tower that five scaffolding lifts had been used to complete the tower above the second floor level (LUAU 1992b, 12). In the north elevation of the north-east tower at Sheriff Hutton, the putlog holes rise to 13m above ground level and then stop, whereas in the west elevation they start at 13m and the rise for a further 3.7m before again stopping (see figure 9). This suggests that they form part of the same sequence of building, relating to the original construction of the tower, although it is possible that some might relate to later repairs (see below). In the west elevation, a rectangular area of blocking, situated immediately above the lowest visible putlog and at the same height as a building break, may represent a former beam position, perhaps to support a crane or a larger scaffolding platform.

- 7.6 Internally, the main evidence relating to construction was exposed within Excavation Area D on the first floor. Immediately above the vault core, two very similar deposits of compacted shallow alternating bands of orange sand and charcoal (contexts 036 and 035) were recorded in the south-facing section (see figure 19) and in the area of the lead smelting hearth (009). The occurrence of these deposits at opposite ends of the first floor suggests that they were originally laid down deliberately across the surface of the vault core to act as levelling layers for the floor surfaces above.

#### *Structure and usage*

- 7.7 In its original form, the north-east tower would have risen to a maximum height of c.25m-26m, similar to the south-east tower of Bolton Castle (LUAU 1994, 12). Externally, it measured c.18m long (north-south) by 11m wide (east-west), longer than at Bolton and also the probably contemporary quadrangular castle at Wressle in East Yorkshire. The tower was five storeys in height, including the cellar, with an additional level in the form of a small room set above the third floor. The cellar and ground floor were covered by stone vaults, with wooden floors above; a similar form of construction occurs in the south-east tower of Bolton Castle, where the lowest two floors (the ground and first) have stone barrel vaulting (LUAU 1994, 12). In its original form, the north-east tower would have projected some 6m above the adjacent north range and probably rose to a similar height above the east range, although now there is little or no remaining structural evidence for the relationship between the two.
- 7.8 The lowest surviving level of the north-east tower (the cellar) was lit by a single window (W2/2) set at a high level in the north wall. The original access was through a doorway (D2/3) in the south wall, which meant that the cellar could only be accessed once the inner court had been entered. This doorway may have lead to another cellar to the south, perhaps part of series of such structures located beneath the east range as suggested by Sharp in 1839 (RIBA X(079)So 728.81 (42.74 SH)). Alternatively, the door may have lead directly into a newel stair rising to the ground floor or more probably an east-west passage with a newel stair

located at the east end, i.e. at the south-east corner of the tower, as depicted by Sharp (see figure 5). Sharp also shows a doorway and passage leading to this newel stair at ground floor level which, if this is an accurate depiction, is different from the south-west tower where the newel stair runs from basement to third floor level, with no connection to the ground floor room. The latter arrangement is also similar to that which exists at Bolton, Wressle and Raby (County Durham) castles, where the lowest rooms in some towers were not accessed via the main newel staircase but separately by another means (Emery 1996, 306; Hislop 2007). The cellar in the north-east tower at Sheriff Hutton almost certainly performed a service function and was associated with the east range, rather than the north range.

- 7.9 The ground floor was formed by a single vaulted space, of similar internal appearance to the existing ground floor room of the south-west tower, and it apparently survived largely intact as late as 1875. It was lit by a large fireplace (FP2/1) centrally located in the east wall, flanked by windows to the north and south (W2/1), and with a possible mural garderobe to the south of the south window; there was another window (W2/3) in the north wall. The layout and placing of the room bears some resemblance to the ground floor room of the south-east tower of Bolton Castle, described as a “guard room” by Emery (1996, 307), although unlike Bolton it does not lie adjacent to the gatehouse. The original access into the room must have been from the south, from an east-west passage running parallel to its south wall, as previously suggested (Dennison 1998, 44) and noted above. Sharp shows the remains of a newel staircase at the east end of this passage (see figure 5), effectively contained within the south-east corner of the tower. Hislop suggests that this stair was also shared with the north end of the east range (Hislop 2007, 26), and there is some evidence for a similar arrangement in the north-west and south-west towers.
- 7.10 Assuming what is said about the newel staircase above is correct, then it may have formed the principal access to the first floor chamber, presumably at its south-east corner. The first floor chamber was again formed by a single space but with a timber ceiling rather than a stone vault; nevertheless, at 5.10m the height of the chamber was considerable. The chamber was lit by a two-light trefoil headed window (W2/4) in the north wall, and a pair of similar windows in the east wall. The internal arch of the north wall window retains a chamfered sandstone rib, the only example of such currently known to survive in the castle. The excavation of the first floor confirmed that the fireplace was in a similar position to that on the ground floor, between the windows of the east wall; the surviving hearth (019) projected some distance from the east internal wall, and if original, it must once have been covered by a projecting hood of some kind.
- 7.11 It is as yet unclear why there should be such a marked difference between the two main floor surfaces, the larger flagstones (012 and 013) to the north and the smaller flagstones, cobbles and edge-laid stones (017) to the south, and it is noticeable that the division between the two is not square to the rest of the room (see figure 17). The two most obvious explanations would be that either the floors are of different dates, or that different parts of the room served different functions. However, there is no clear archaeological evidence to suggest that the two are not contemporary, although the small flagstones and cobbles (017) did appear markedly more worn than the larger flagstones. The “groove” defining the north edge of the cobbles (017) might once have housed a wooden partition, perhaps associated with the prominent ashlar wall (005), and this may have been a device to ensure maximum light into the northern space from the large window on the east side of the room.

- 7.12 It seems likely that the ashlar wall (005) was a later addition to the room, and a great deal of trouble was taken with its appearance and the quality and type of the stone from which it was built (see plate 33). Although it has been suggested that it formed the remnants of a diaphragm arch (FAS 2003, 52), this is unconvincing for a number of reasons. Firstly, a diaphragm arch of stone on the first floor would be a massive structure, and no evidence was found for the collapse of such a structure. One might also at least expect the opposite side to survive, at least to some extent, and, although there was a block of stone (023) in this location (see figure 16), it was not convincing as being part of the same structure. Arguably any support produced by a diaphragm arch would have been more economically and less intrusively achieved by the use of timber. The quality of the stonework in the wall is also too high, and the surviving chamfering, together with the evidence for a small opening in the wall, suggest it is more likely to have been an internal partition of some kind.
- 7.13 The other features arranged around the edge of the floor surfaces are easier to interpret. The awkward juxtaposition of the north window (W2/4) and the small circular oven (025) (see plate 35) to its east suggests that the oven is a later insertion, although this is not certain, and a fairly major effort would have been needed to cut the accompanying flue into the existing wall. It is assumed that the oven had a small beehive dome over it, and it may have functioned as a small bread oven, as seen in the kitchens of, for example, Skipton or Harewood castles. The presence of a bread oven in one corner of the room is in contrast to the apparent high status suggested by the ashlar partition wall (005), the rib above the window arch, and the possible projecting hood to the fireplace in the east wall, again suggesting it is a later insertion. The chamber was almost certainly once served by a garderobe, although the exact position of this is now lost; it may have been in the south-east corner over the one on the ground floor (see figure 5). There was no obvious access between the chamber and the north range, although there may once have been a connection to other rooms at this level in the east range.

*The second and third floors, and the uppermost level*

- 7.14 As with the first floor, the second and third floors may have been accessed via a newel stair located at their south-east corner. So little of each floor level now survives that it is difficult to envisage their original layout (see plate 20). At c.4.05m in height, the second floor was substantially lower than the first floor but it was also lit by a window (W2/5) in the north wall. Nineteenth century documentary evidence, and the position of garderobe chutes uncovered on the first floor below, suggest that the second floor may have been sub-divided into two smaller chambers, each served by a separate garderobe. This would not be the usual arrangement in a late 14th century castle of this scale, although Hislop notes that the fourth floor chamber of the south-east tower at Bolton is equipped with two garderobes (Hislop 2007, figure B16). However, given the limited structural survival at this level, it is not absolutely certain that the mural garderobe on the second floor was actually accessed from within the north-east tower, and it may well have been reached from the north range; if the latter, then the second floor would only have been served by a single garderobe, and so is more likely to have formed a single space.
- 7.15 Similar points can be made about the third floor, which again survives in only a fragmentary form. Here, the well-preserved mural garderobe was clearly accessed from within the north-east tower, and so the first floor garderobe chutes noted above might suggest sub-division into two chambers or spaces, although all structural evidence for this has been lost. The third floor chamber was lit by a

window (W2/6) in the north wall, while a doorway (D2/1) in the west wall lead out onto what was presumably the east end of the north range's roof, possibly onto a wall walk along the north side; structural evidence indicates a low parapet wall to the north side of the north range, c.1.50m tall, and incorporating a feature at the east end that may be the remains of a crenellation. The third floor was covered by a north-south aligned leaded pitched roof.

- 7.16 The uppermost surviving level of the north-east tower was represented by a small room, perhaps taking the form of a small corner turret (see plate 25). The room had a sink and spout (perhaps a urinal) in the north wall, and a fireplace (FP2/2) in the west wall, although there was little evidence that this had been used. The room was accessed by a doorway (D2/4) in the south wall, which presumably lead from a wall walk on the west side of the tower. There is no surviving evidence as to how this wall walk was accessed, but the newel stair discussed above in the south-east corner of the tower may have risen to this level; a newel staircase at Harewood Castle in West Yorkshire does just this, rising the full height of a tower to a wall walk (Richardson & Dennison, *in prep.*), and a similar arrangement is shown in reconstruction drawings of Middleham Castle during the late 15th century (Weaver 1998, 15). There is fragmentary evidence for a flight of stone steps rising over the room, perhaps to a corner platform positioned above. This is exactly the arrangement shown at Bolton Castle by Hislop in an isometric reconstruction (Hislop 2007, figure B17), while the external string courses and vertical "ribs" at this level also bear a strong similarity to those seen at Bolton.
- 7.17 It is clear, then, that several parallels can be drawn between the arrangement and form of the north-east tower of Sheriff Hutton Castle and Bolton Castle, particularly the south-east tower, supporting Hislop's suggestion that there was "*some form of consultation between the architect of Bolton and the builder of Sheriff Hutton*" (Hislop 2007, 27). Hislop characterises the upper three floors of the south-east tower of Bolton as having formed a residential suite, and it may be that the same arrangement existed within the upper part of the north-east tower of Sheriff Hutton; the first floor room in particular retains evidence of high quality residential use, although its status appears to have been downgraded somewhat at a later date. This suite may have survived to become the "Master of the Horse's lodgings" mentioned in the later 16th century survey (PRO E134/MISC/2621 quoted in FAS 2003, 24).
- 7.18 By contrast, the survey of the north-east tower has produced little evidence to support Hislop's proposal that the great hall at Sheriff Hutton was located in the north range (Hislop 2007, 26), contrary to earlier suggestions by Emery (1996, 392) and others who place it within the west range. So little survives of the east end of the north range adjacent to the north-east tower that only general statements can be made. Overall, there appears to have been little or no direct access between the north-east tower and the north range, the tower being more closely associated with the east range. There was a cellar beneath the east end of the north range, and a garderobe in the east wall of the ground floor space. Above this, a small surviving area of wall face cuts across the level of an external chamfered offset, perhaps suggesting differing floor levels here to those in the north-east tower. If the garderobe on the second floor of the north-east tower was accessed from within the north range, then this would indicate another space or room at this level. Finally, the north range rose only as high as the third floor of the north-east tower, where a doorway (D2/1) gave access to a wall walk positioned behind a probable crenellated parapet on its north side. One problem with Hislop's placing of the great hall in the north range is that he rules out the north-west tower as being the location for the kitchen; following the parallels of Bolton and Wressle, this would



leave only the north-east tower as the possible kitchen location, for which there is no structural evidence.

- 7.19 Although the north-east tower appears to owe much to Bolton Castle, it does differ in several aspects, most notably the windows. The twin trefoil-headed lights with sunken spandrels are very different to those used at Bolton, although Hislop draws a parallel between them and the form of the blind arcading to a gable pinnacle at the east end of York Minster (Hislop 2007, 26), and also with the windows of the gatehouse at Middleham Castle (Hislop 2007, 26-27). Similar windows also survive in the Neville gateway at Raby Castle, dated to between 1381 and 1388 (Emery 1996, 131) and therefore almost exactly contemporary with their work at Sheriff Hutton. Reconstructing the exact form of the glazing or shuttering to the windows is further hampered by their poor survival. There is some evidence for a grid of external bars, which might be expected given the prevalence of their use at other late 14th century castles in Yorkshire. There is however no evidence for fixed glazing, suggesting that the windows were either fitted with glazed opening shutters or that there was simply no glass; the majority of windows in Bolton Castle were devoid of glazing (LUAU 1992b, 24). Small amounts of window glass were uncovered from the excavation on the first floor of the north-east tower but, given that 16th century documents refer to the purchasing of quantities of different types of glass for repairs, glazing might have been introduced at a later date.

### **The 16th Century**

- 7.20 Although there is documentary evidence for three major overhauls of the castle during the 16th century, there was little surviving structural evidence in the north-east tower that could be directly linked with these events. The two exceptions may be the repointing on the lower part of the north external elevation which includes tile galleting (see figure 9), and some of the alterations to the first floor recorded during the excavation of Area D, for example perhaps the creation of the ashlar wall (005) which must have sub-divided the residential space and/or the insertion of the circular oven which implies a change of function to the room.

### **Dismantling and Decay in the Late 16th and Early 17th Centuries**

- 7.21 Documentary evidence demonstrates that the removal of fixtures and fittings from the castle was well underway by the late 16th century, whilst actual demolition commenced in the early 17th century (Wright & Richardson 2005, 114-115). The hearth (009) uncovered in the north-west corner of the first floor could belong to either period (see plate 34). It was being used to melt down lead window comes; the "slag" or residue resulting from this process may have been scraped off onto adjoining flagstones (033), whilst the lead was allowed to settle and cool in the base of the hearth. It appears that the glass was being removed from the lead before it was put into the hearth, although it is as yet difficult to explain why the hearth needed to be on the first floor, when it would have been much easier to collect the lead and melt it down at ground level. The burning to the south face of the adjacent ashlar wall (005) (see figure 18) was probably also the result of demolition/dismantling activity, although the lesser intensity of the burning suggests the use of a brazier here rather than industrial activity such as another hearth. The burning of material within even a relatively large room, and especially the fumes from the lead hearth, must presumably have produced very unpleasant working conditions, although this could have been partly offset if the windows had already been removed.

- 7.22 There is little evidence for deliberate demolition on the first floor of the north-east tower, instead the picture is of rather slow decay leading to eventual collapse. The most striking demonstration of this is the substantial impact crater in the centre of limestone flagstones (013) (see figure 17). The presence of the crater implies that there the roof to the chamber had already gone, and the depression had been infilled by a fine loose ashy sand (007), perhaps representing slow decay and weathering following the abandonment of the tower. However, the small test pit excavated to the west of the west face of the tower (Area C2), on the line of the north wall of the connecting range, revealed the remains of a robber trench (003). This trench had apparently been cut to remove the north wall, disturbing remnants of its footings (004) and then backfilled with a silty sand (002) containing a high proportion of animal bone, pottery and ceramic building material. The robbing out of the wall could have been done at any time from the early 17th century onwards. Interestingly, a reference is made in 1662 to the castle being “mined” (Wright & Richardson 2005, 115), perhaps referring to undermining caused by the digging away of stone foundations for use elsewhere.
- 7.23 Some of the earthworks surrounding the north and west sides of the castle’s inner court have been interpreted as being the remains of agricultural structures post-dating its abandonment. The yard surface and possible post-pad (004) exposed in Excavation Area A could not be dated accurately due to the lack of associated finds. The pantiles used within the post-pad would preclude a date any earlier than the 17th century, although it is possible that if they were used to block a post-hole rather than to form a post-pad, then the surface could be earlier. Perhaps more significant is the apparent orientation of the surface (almost directly opposite to that of the former east side of the middle court) and its proximity to the former north-east tower of the middle court. On the basis of the current evidence, it seems likely that the surface (004) post-dates the abandonment of the castle, and may also represent the remains of a small agricultural structure, perhaps of 17th or 18th century date.

### **Decay and Repair in the 18th Century to the Present Day**

- 7.24 The north-east tower continued to decay throughout the later 17th and 18th centuries. The lower level of fallen material (004) exposed within Excavation Area D on the first floor accumulated between the mid 17th century and the mid 19th century, when the pigeon cote (006) was built. Unfortunately, the pigeons did not have long to enjoy their elevated roost, as in March 1875 Samuel Tempest noted that “the top of the first floor room” in the north-east tower fell down (Tempest 1875, 41) (see plates 11 and 12). It was this collapse that created the upper level of fallen material (003), with further decay and weathering depositing the levels (002 and 001) above this. As the tower collapsed in stages, the walls of the ground floor began to spread, causing the vault above to split and creating the deep fissure exposed by the excavation of the first floor (see figure 17) and repaired as part of the current phase of works.
- 7.25 The earliest known repairs to the castle ruins in the modern period were undertaken in the early 19th century, and it may be that some of the repointing recorded on the lower parts of the north-east tower relates to this. It appears that attempts to repair the tower continued well into the late 19th century, including the placement of a cast-iron tie-rod through the garderobe passage of the third floor (traditionally ascribed to the 1880s) and the construction of the brick buttress at the base of the west elevation. Nevertheless, the repairs to the castle did not stop the villagers putting it to more prosaic uses, and the excavation of the cellar/basement (Excavation Area B) demonstrated that from c.1800 until the early 20th century,

domestic rubbish was tipped through the part-blocked window in the north wall. At a later date, apparently from the early 20th century onwards, farm debris was then tipped through the hole in the vault into the cellar basement.

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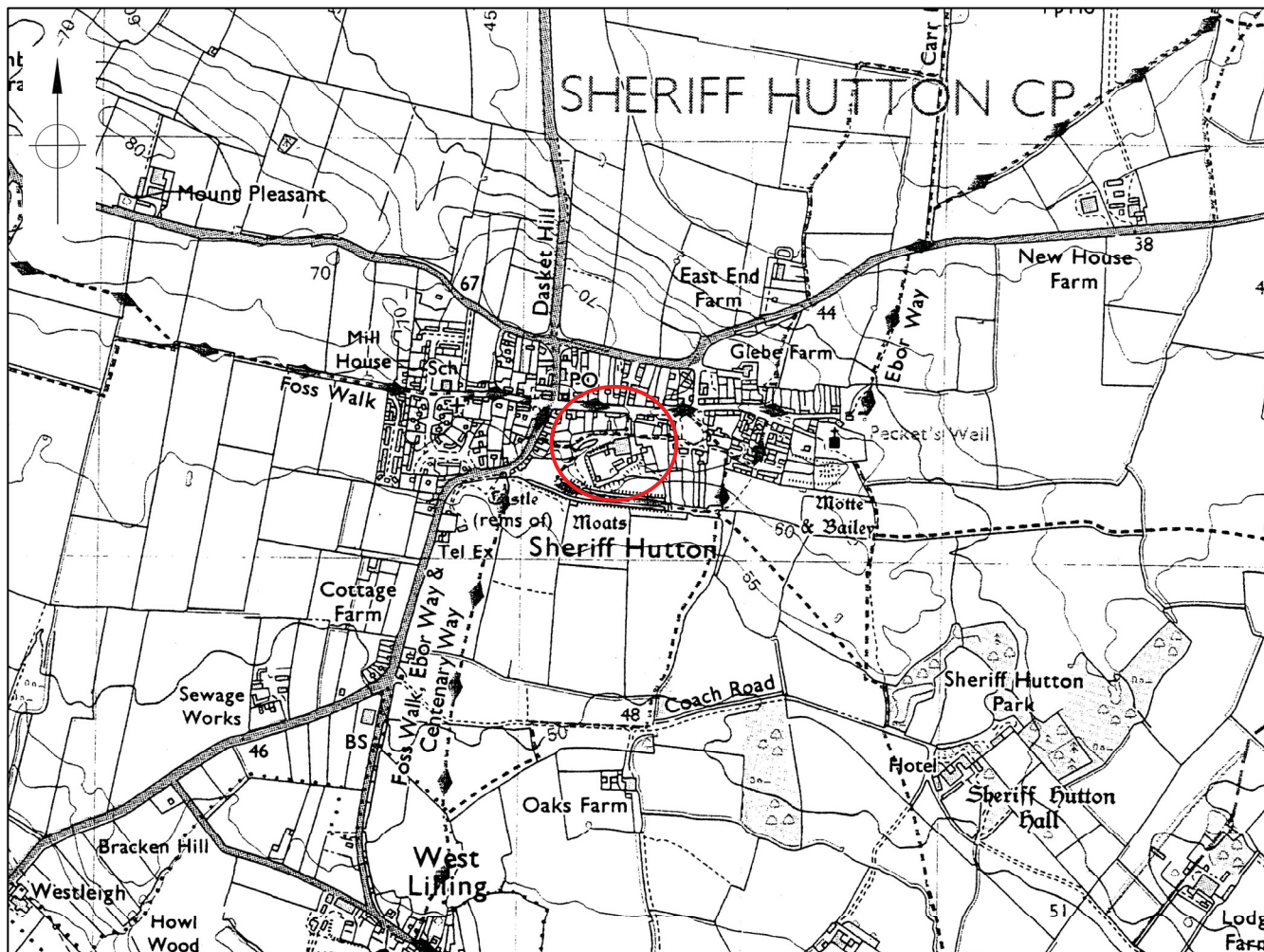
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## 9 ACKNOWLEDGEMENTS

- 9.1 The programme of archaeological and architectural investigation of the north-east tower of Sheriff Hutton castle was instigated by the present owner, Dr R Howarth, and was funded by English Heritage and by Dr Howarth. The work was primarily undertaken by EDAS (Shaun Richardson and Ed Dennison), with the help and support from the following individuals and organisations.
- 9.2 The EDM survey work was undertaken by Benchmark Surveys of Leeds and the medium format photography was done by Stephen Haigh. The fieldwork (architectural recording and excavation) was undertaken by Shaun Richardson and Richard Lamb, with assistance from Ed Dennison. The ecological survey work was undertaken by Dr Madeline Holloway, and Dr Peter Gouldsborough carried out the lichen and ivy surveys. Specialist analysis and recording was carried out by John Tibbles (ceramic building materials), Peter Didsbury (spot dating of pottery and clay pipes), Lisa Wastling (small finds), Mark Noel of GeoQuest Associates (archaeo-magnetic dating), Richard Myerscough of the Centre for Lifelong Learning at the University of Hull (geology), Richard Smith (SEM analysis) and John Carrot of Palaeoecology Research Services Ltd (palaeoenvironmental analysis). Additional historical information, including many of the historic illustrations and photographs, was kindly provided by Tony Wright.
- 9.3 Thanks are also due the main contractors, Historic Property Restoration (HPR), specifically Henry Rumbold, John Gibson, Peter Higson and Steve Taylor, and especially the site owner, Dr Richard Howarth. Other members of the project team included Peter Gaze Pace (architect), David Fotheringham (Turner & Holman – quantity surveyors), Tony Wood (structural engineer), Keith Appleyard (Pearce Bottomley – planning supervisor), and Giles Proctor, Elizabeth Thompson, Keith Emerick and Lindsey Martel of English Heritage.
- 9.4 This report was produced by Shaun Richardson and Ed Dennison, with Tony Wright and Peter Pace providing comments on a draft. Any errors or inconsistencies in the report remain the responsibility of Ed Dennison. The copyright of this report and site archive has now passed to English Heritage as a condition of grant aid.

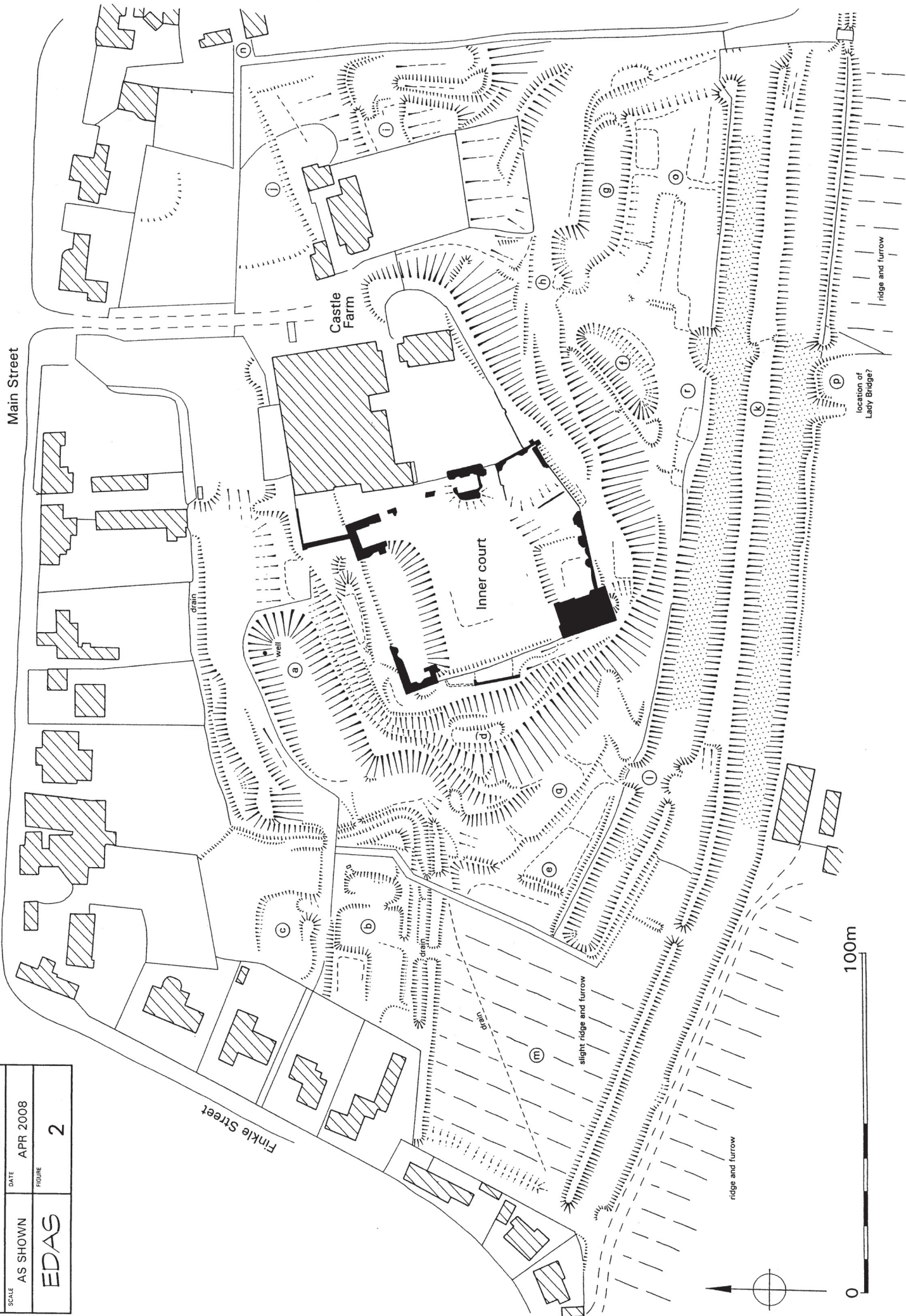


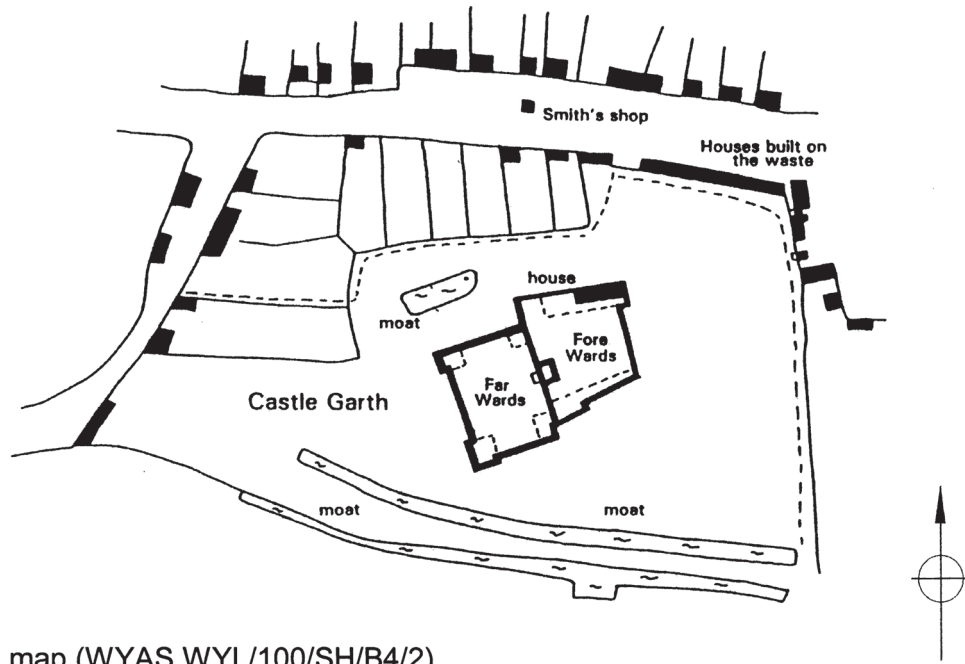
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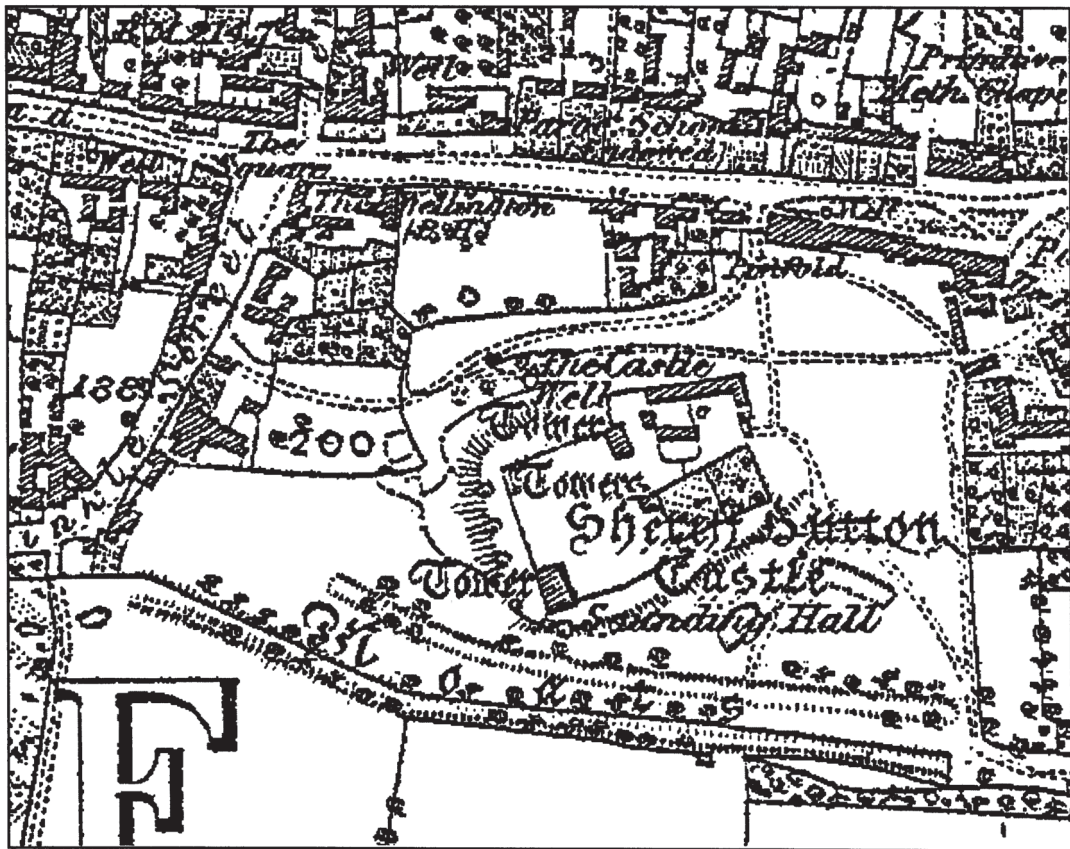


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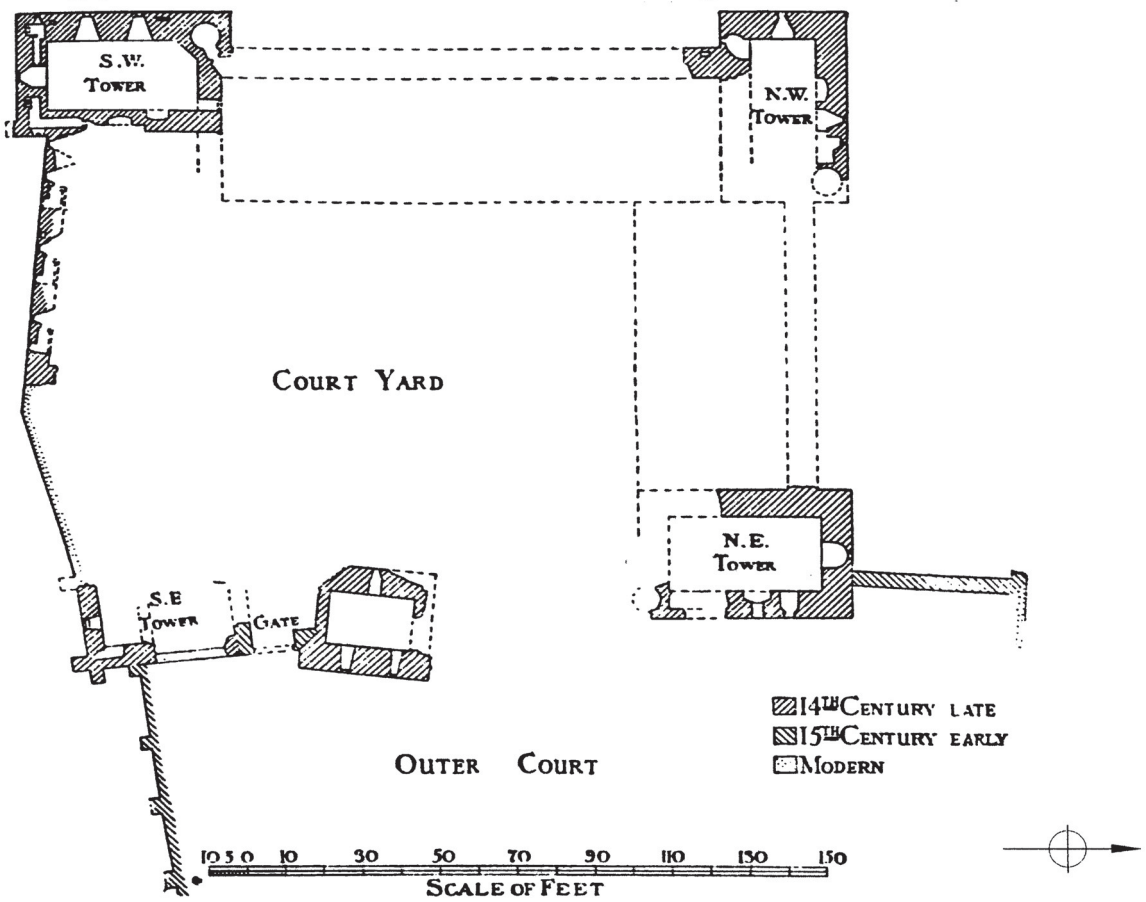


1765 map (WYAS WYL/100/SH/B4/2).

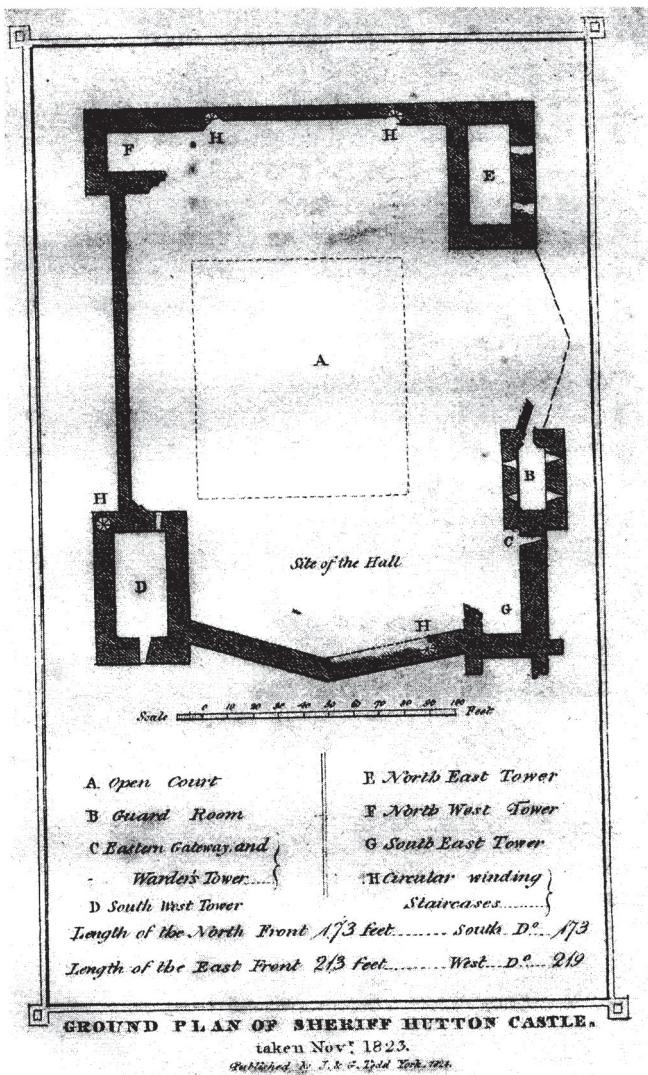


Ordnance Survey 1856 6" map (sheet 140).

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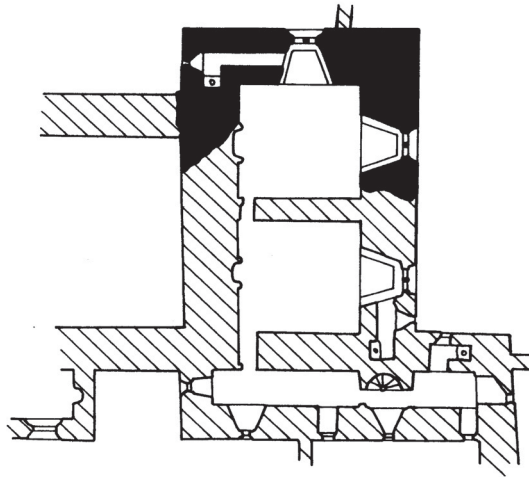


1923 ground plan of Sheriff Hutton castle (source: Calthrop 1923, 175).

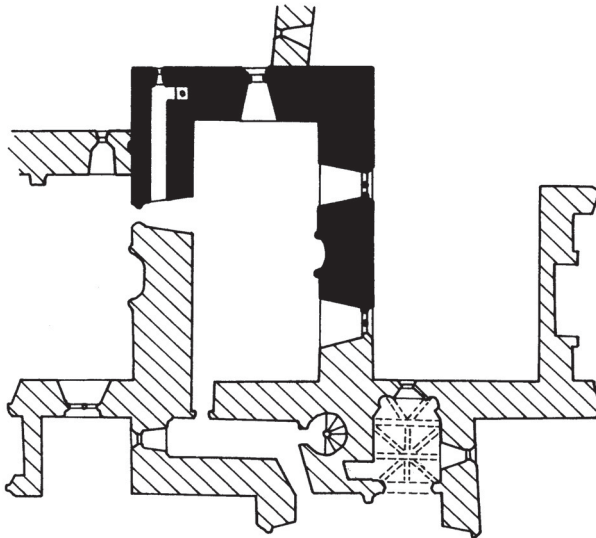


1824 ground plan of Sheriff Hutton castle (source: Todd 1824, facing p6).

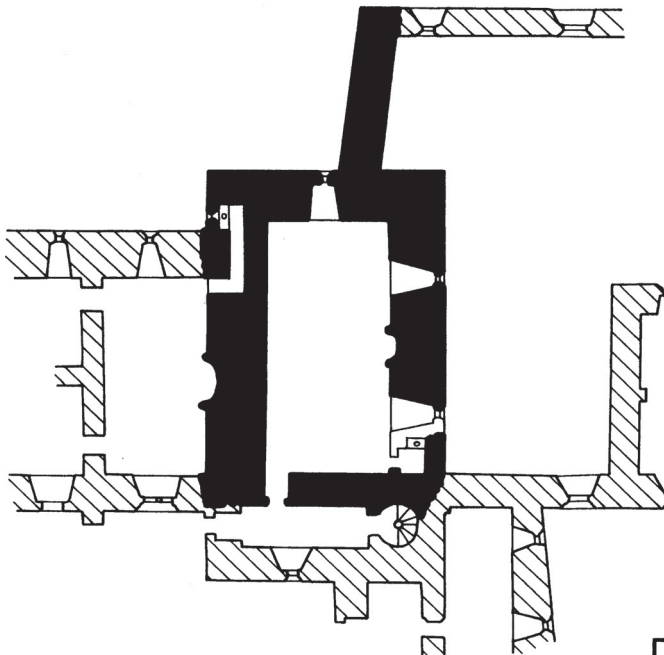
PROJECT		SHERIFF HUTTON CASTLE, NE TOWER	
TITLE			
HISTORIC GROUND PLANS			
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	4



Chamber Plan  
(Third floor)



Principal Plan  
(Second floor?)



Ground floor



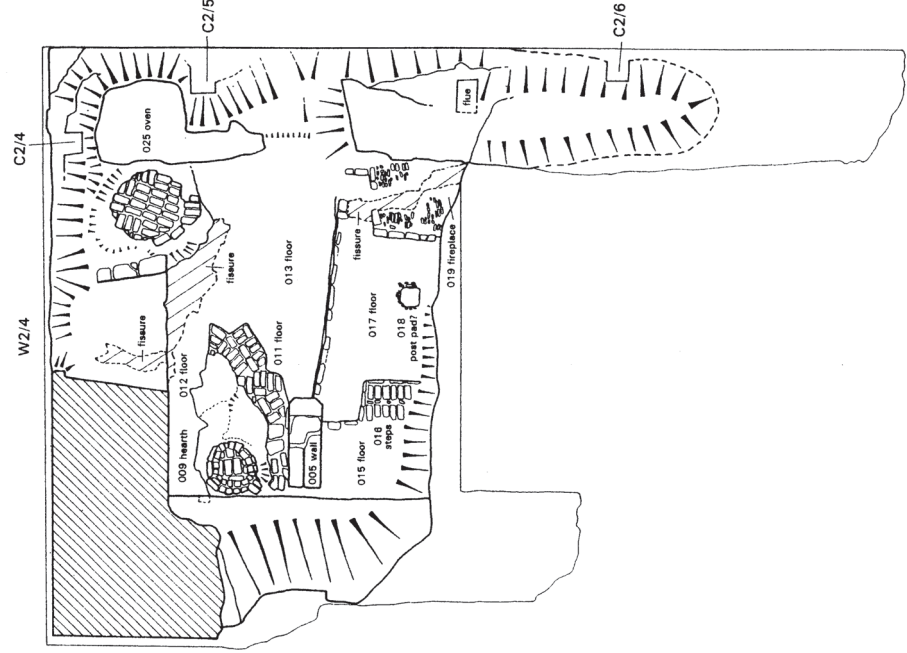
Extant masonry

Reconstructed masonry

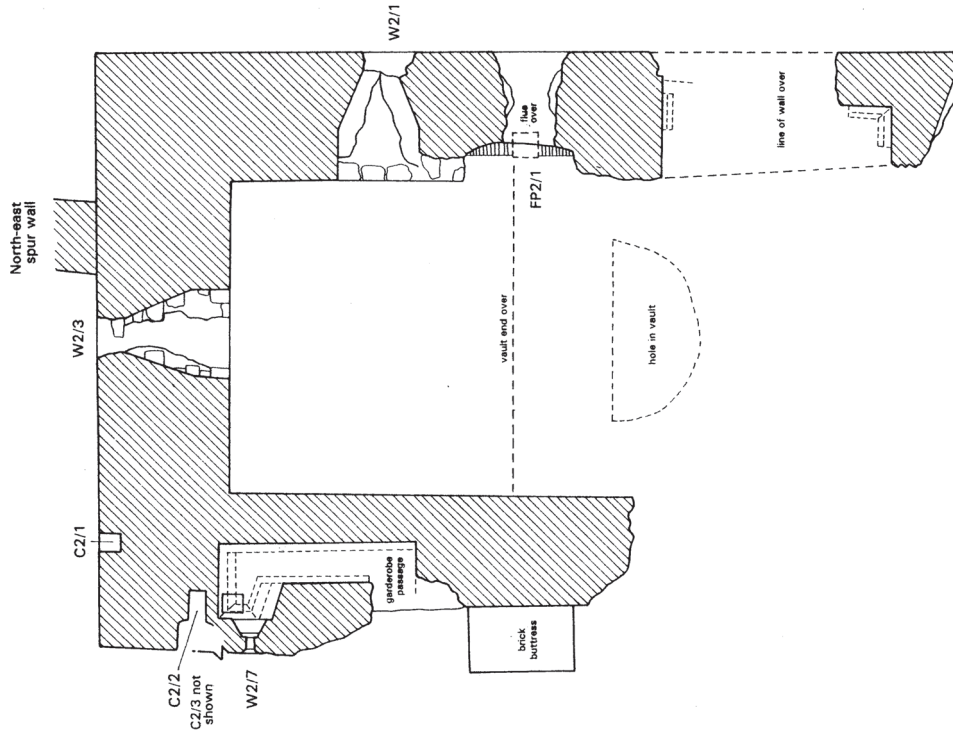
Source: RIBA X(079)So 728.81 (42.74 SH).

PROJECT		SHERIFF HUTTON CASTLE, NE TOWER	
TITLE		SHARP'S 1839 PLANS	
SCALE	NTS	DATE	APR 2008
EDAS		FIGURE	5

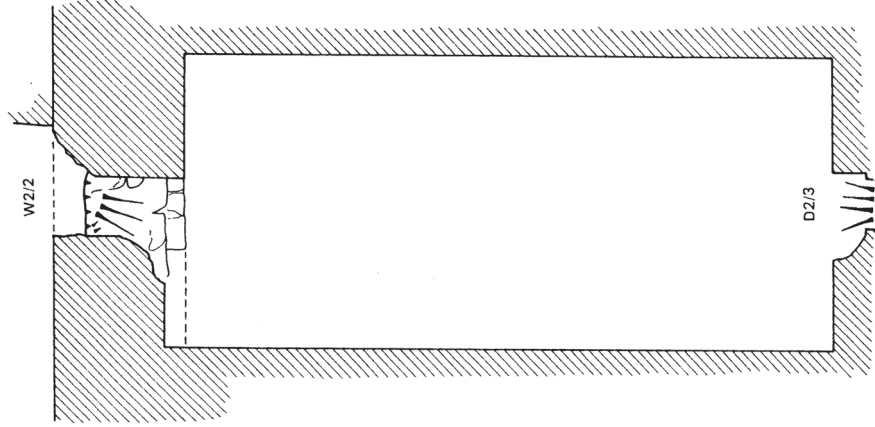
PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	FLOOR PLANS		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	6



First floor



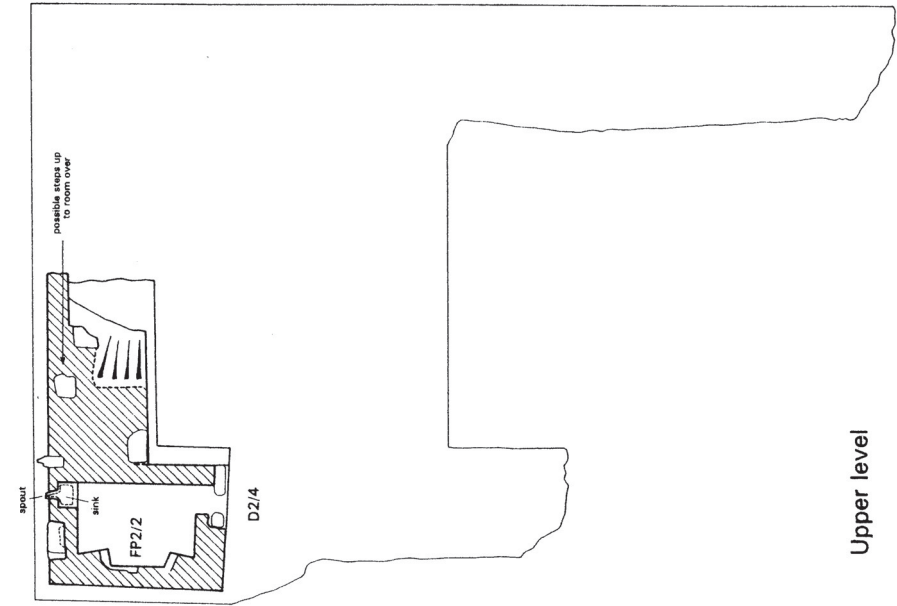
Ground floor



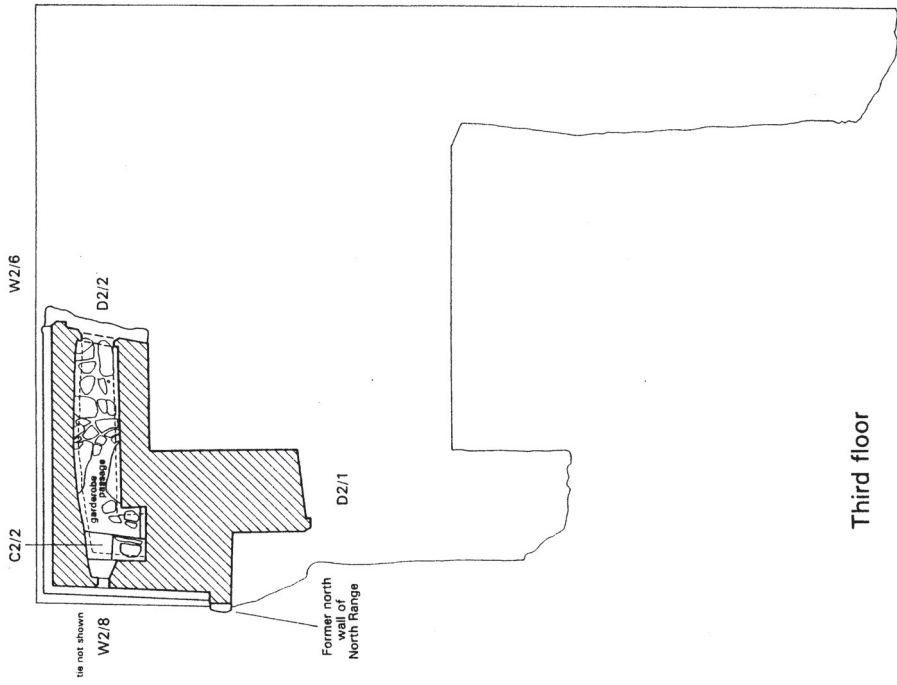
Basement / Cellar



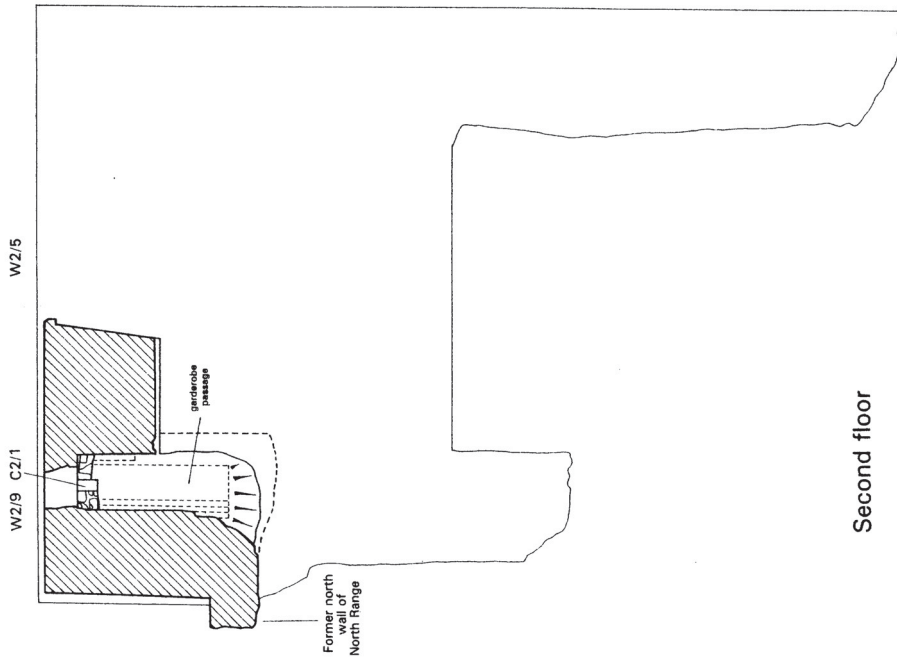
PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	FLOOR PLANS		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	7



Upper level

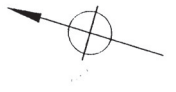


Third floor

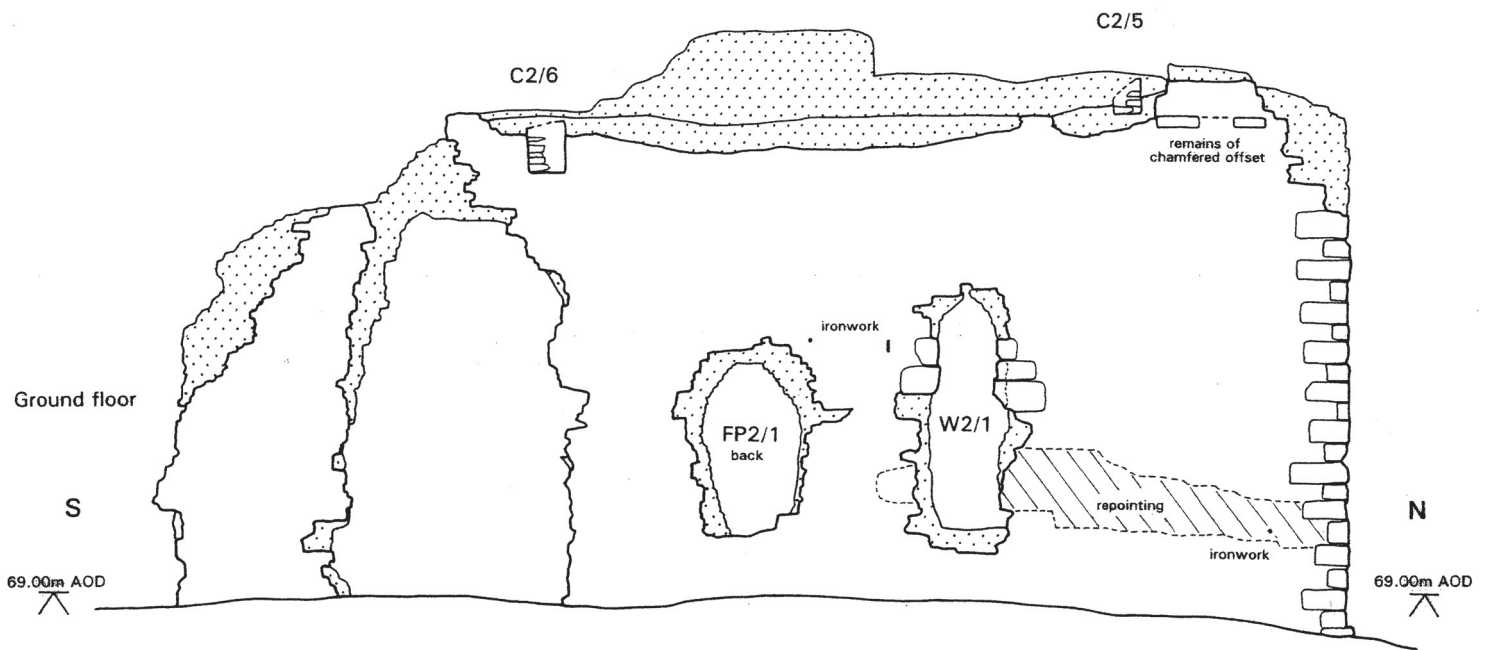


Second floor


All plans show outline of floor and vault at first floor level

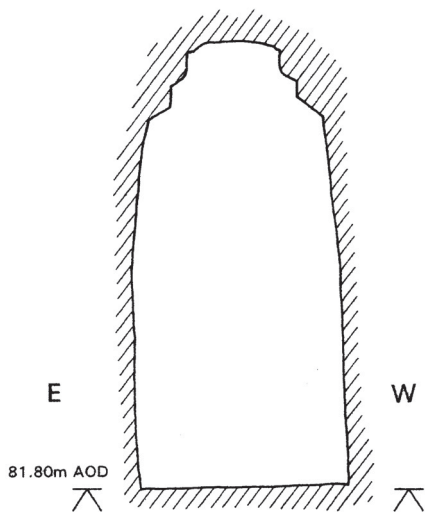


PROJECT SHERIFF HUTTON CASTLE, NE TOWER	
TITLE EAST EXTERNAL ELEVATION	
SCALE AS SHOWN	DATE APR 2008
EDAS	FIGURE 8

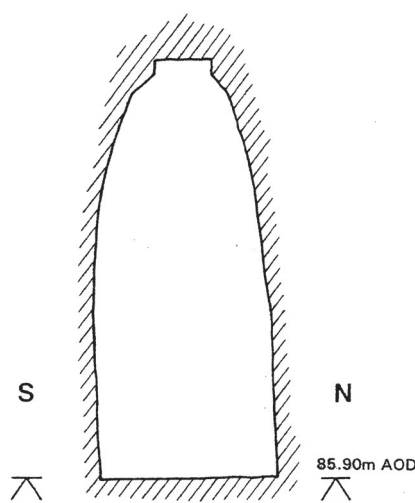


East external elevation

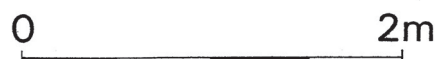
 Core



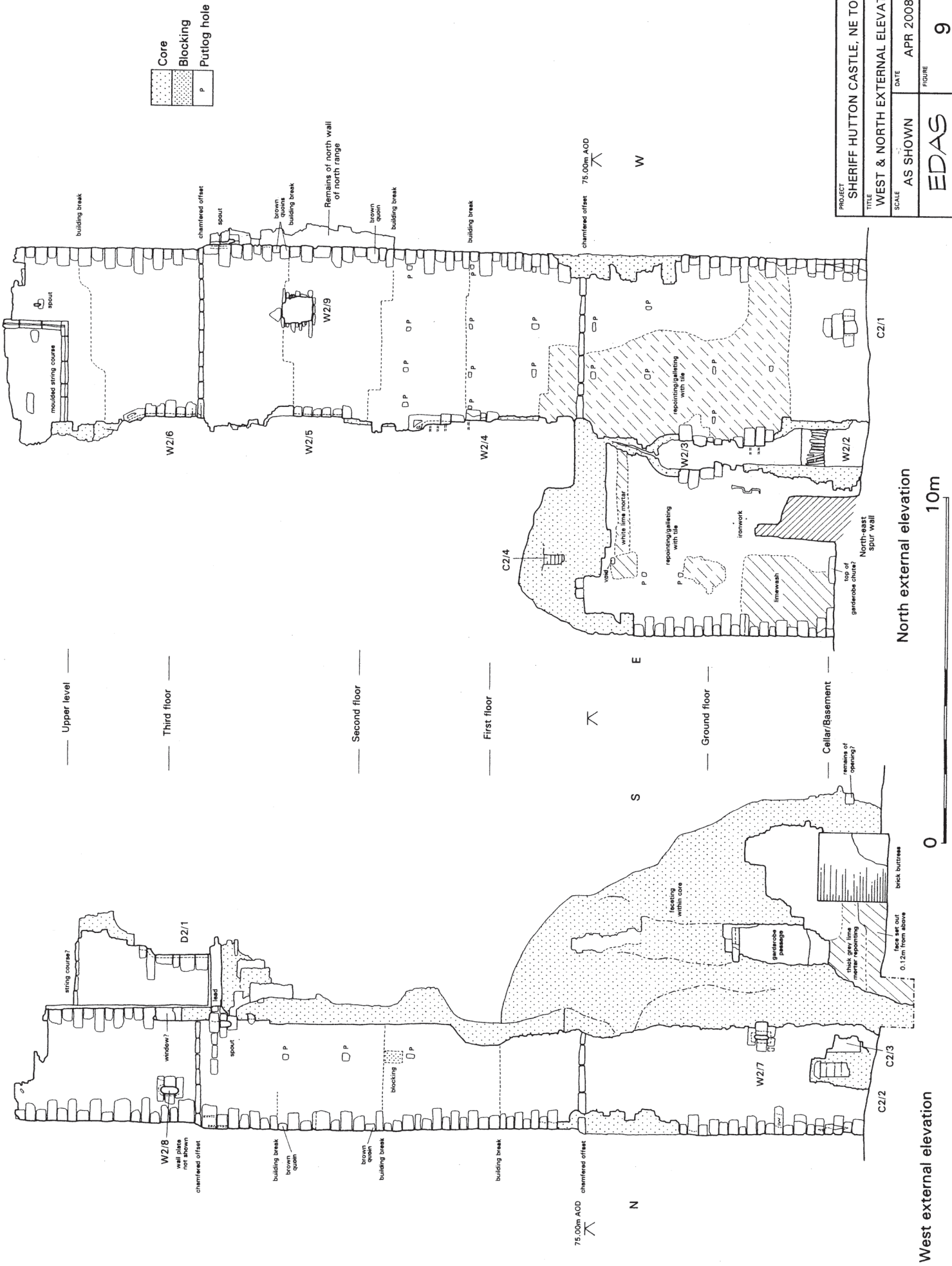
Cross-section through  
second floor  
garderobe passage



Cross-section through  
third floor  
garderobe passage



PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	WEST & NORTH EXTERNAL ELEVATIONS		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS		FIGURE
			9



Core  
Blocking  
Putlog hole

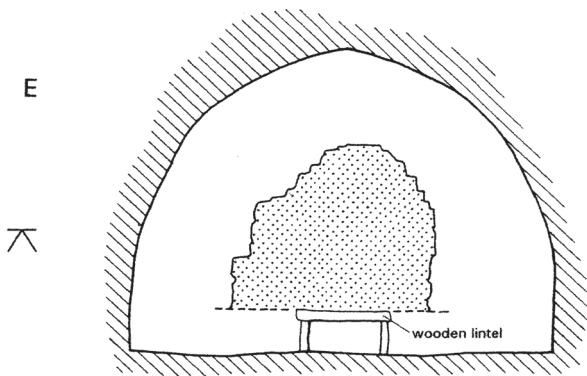
North external elevation

10m

West external elevation

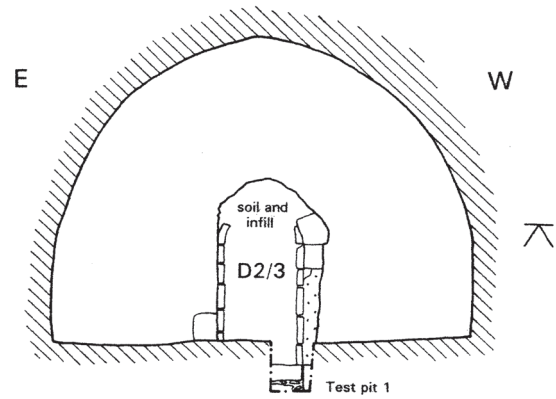
0



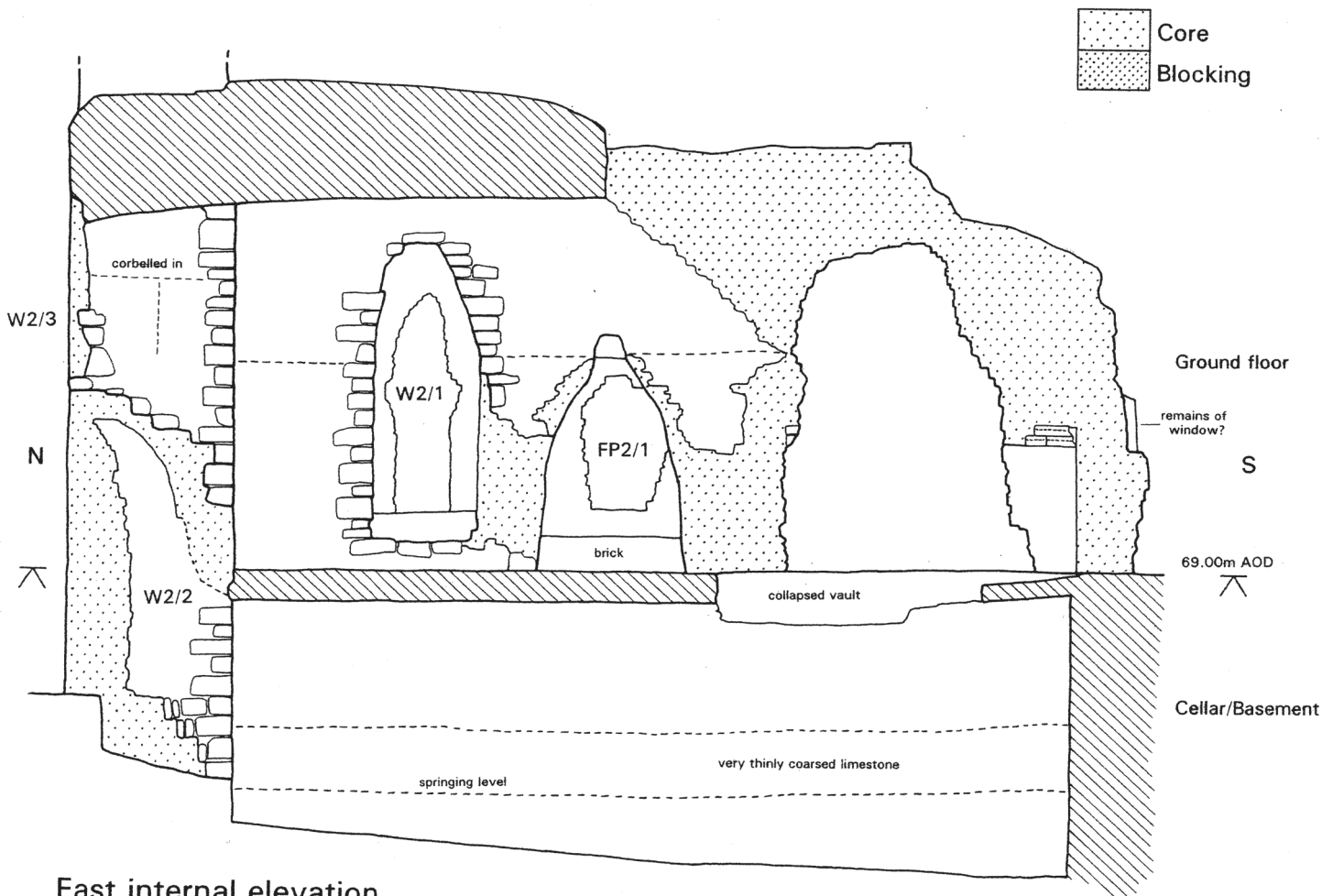


South internal elevation of basement prior to collapse

66.35m AOD



South internal elevation of basement after collapse showing doorway

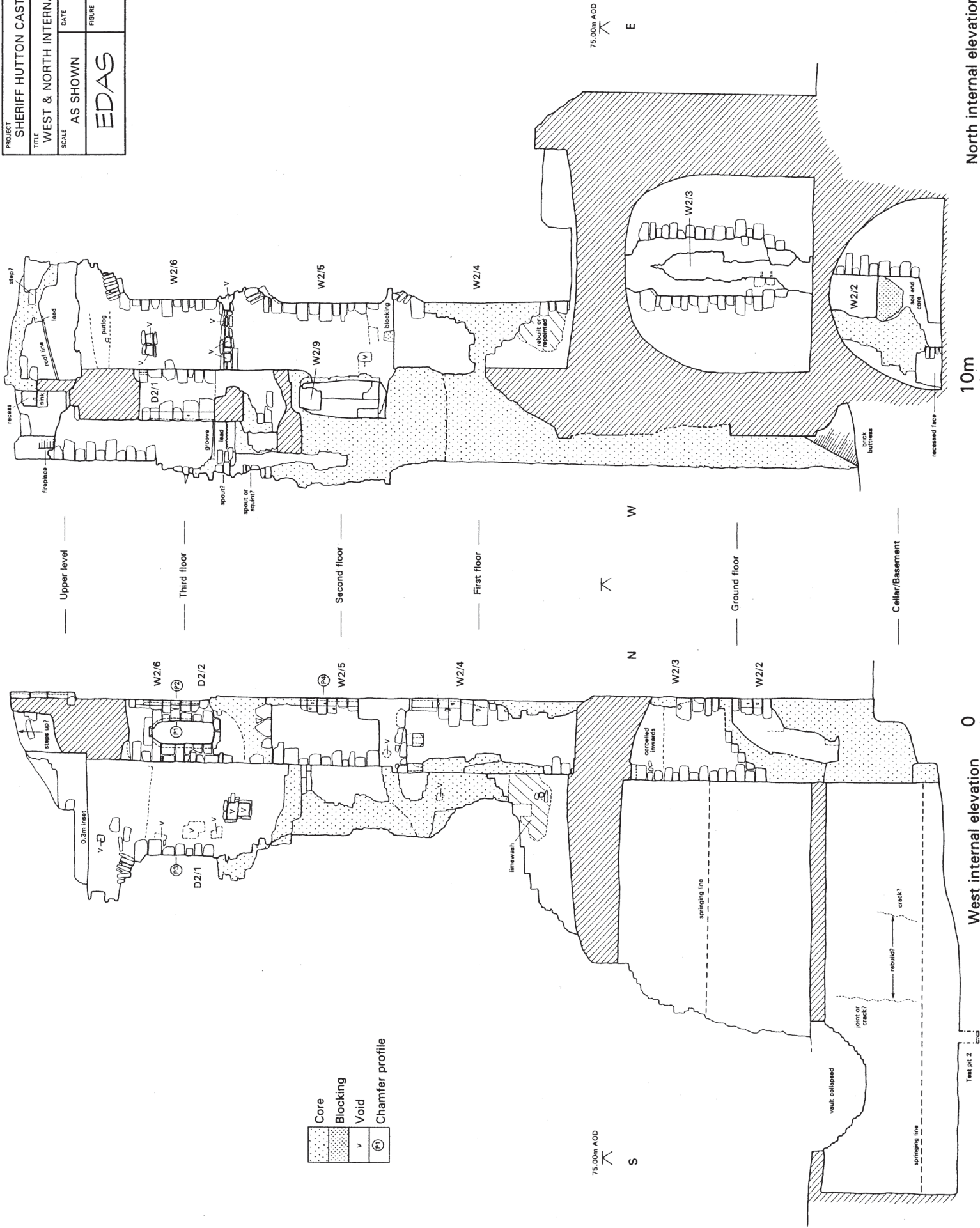


East internal elevation



PROJECT		SHERIFF HUTTON CASTLE, NE TOWER	
TITLE		EAST INTERNAL ELEVATION	
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	10

PROJECT	SHERIFF HUTTON CASTLE, NE TOWER
TITLE	WEST & NORTH INTERNAL ELEVATIONS
SCALE	AS SHOWN
DATE	APR 2008
FIGURE	11

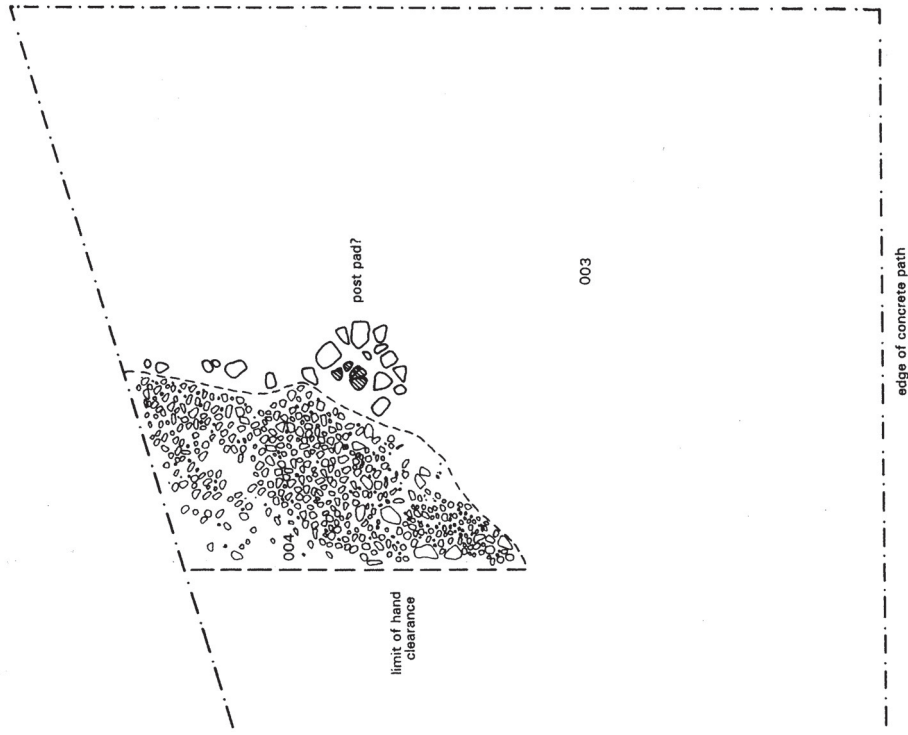


North internal elevation

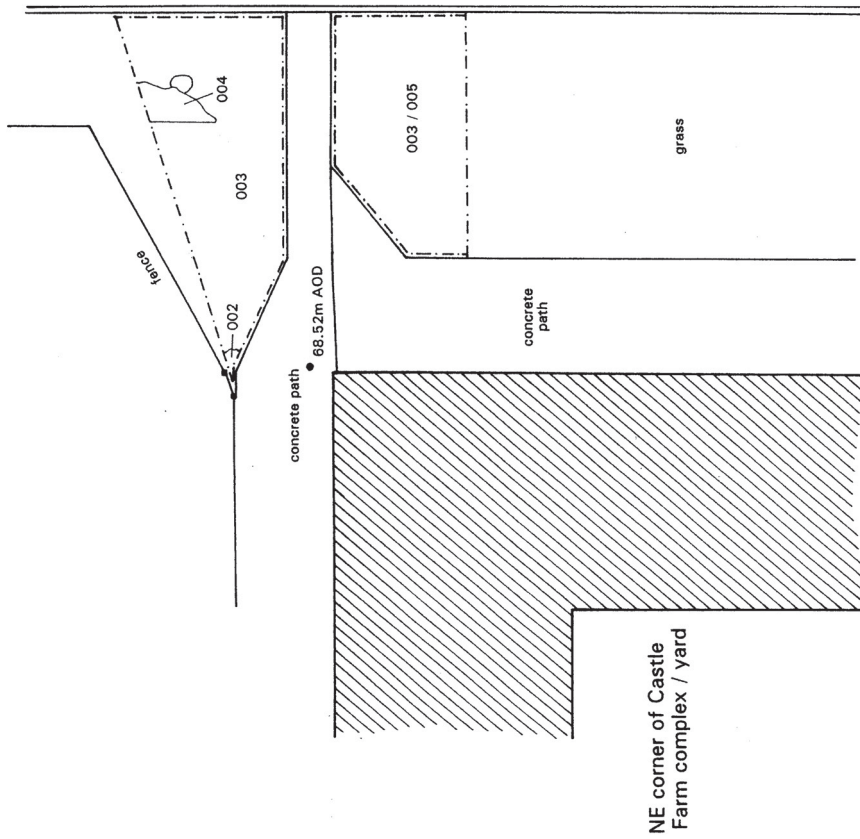
10m

West internal elevation

Test pit 2



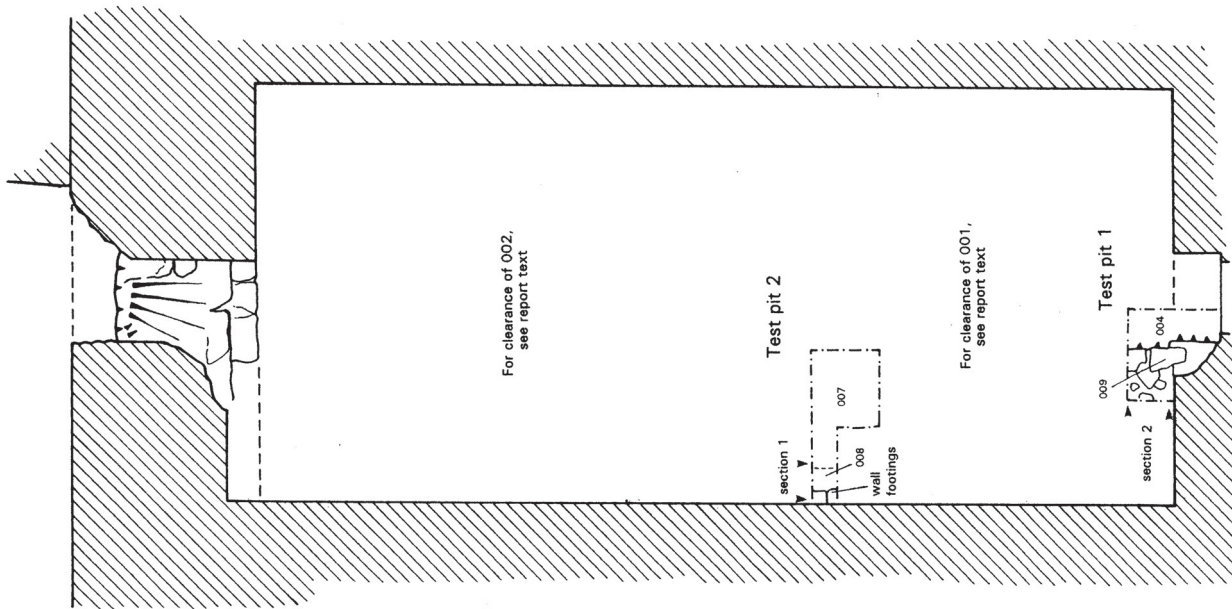
Plan of context 004



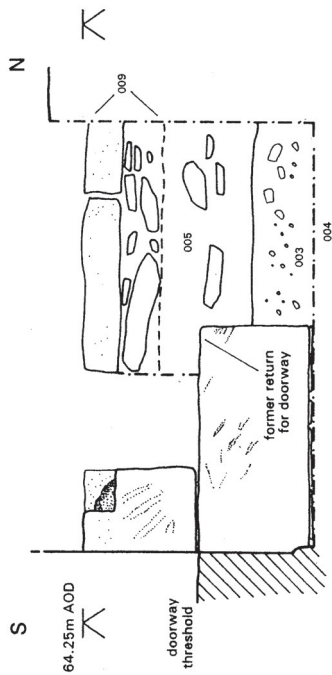
Location plan



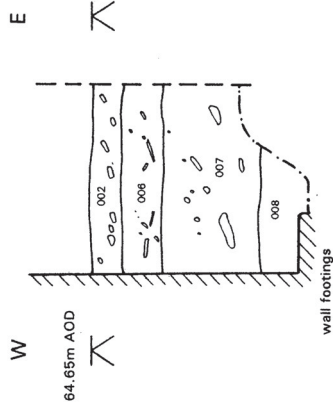
PROJECT SHERIFF HUTTON CASTLE, NE TOWER	
TITLE EXCAVATION AREA A	
SCALE AS SHOWN	DATE APR 2008
EDAS	
FIGURE 12	



Location plan - basement / cellar



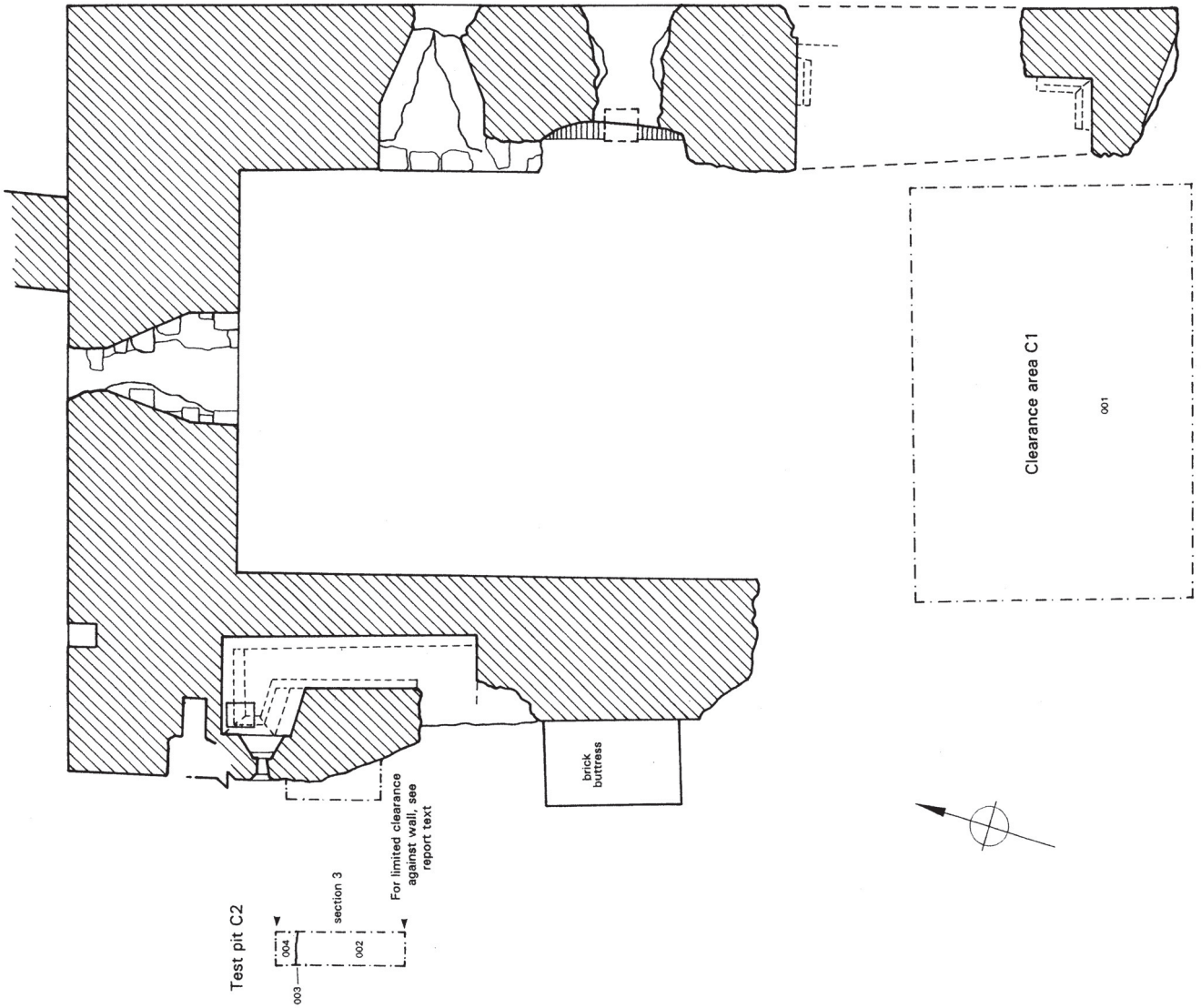
Section 2 - west side of pit 1



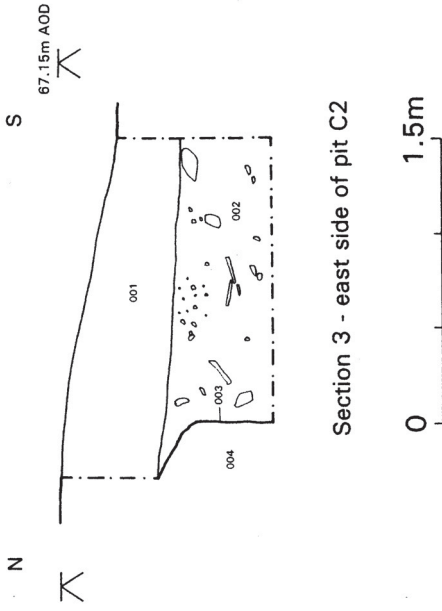
Section 1 - part of north side of pit 2



PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	EXCAVATION AREA B		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	13

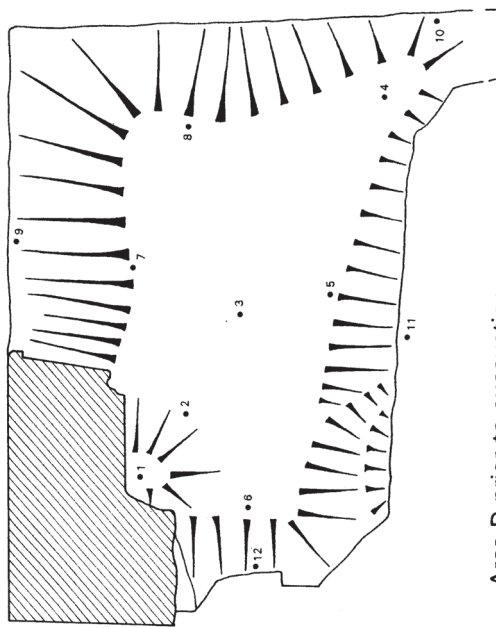


Location plan - ground floor

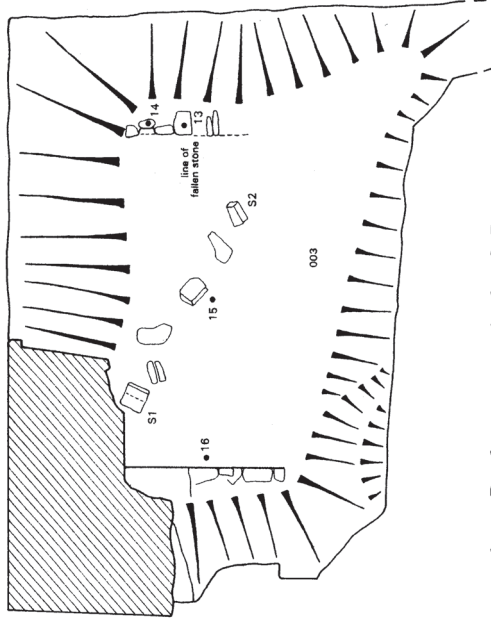


Section 3 - east side of pit C2

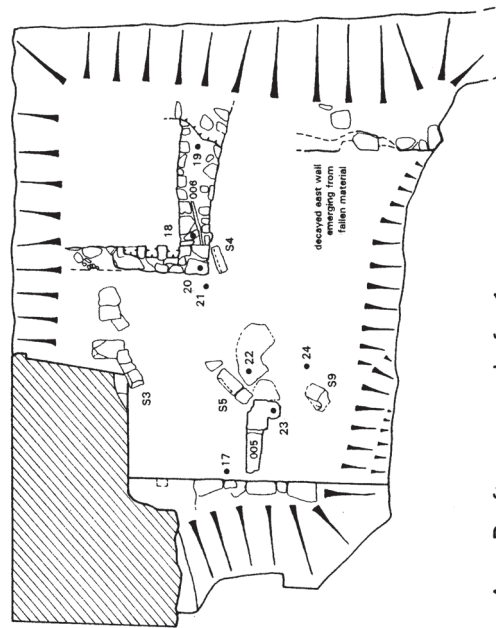
PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	EXCAVATION AREA C		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	14



Area D prior to excavation



Area D after removal of c.0.5m  
depth of deposits



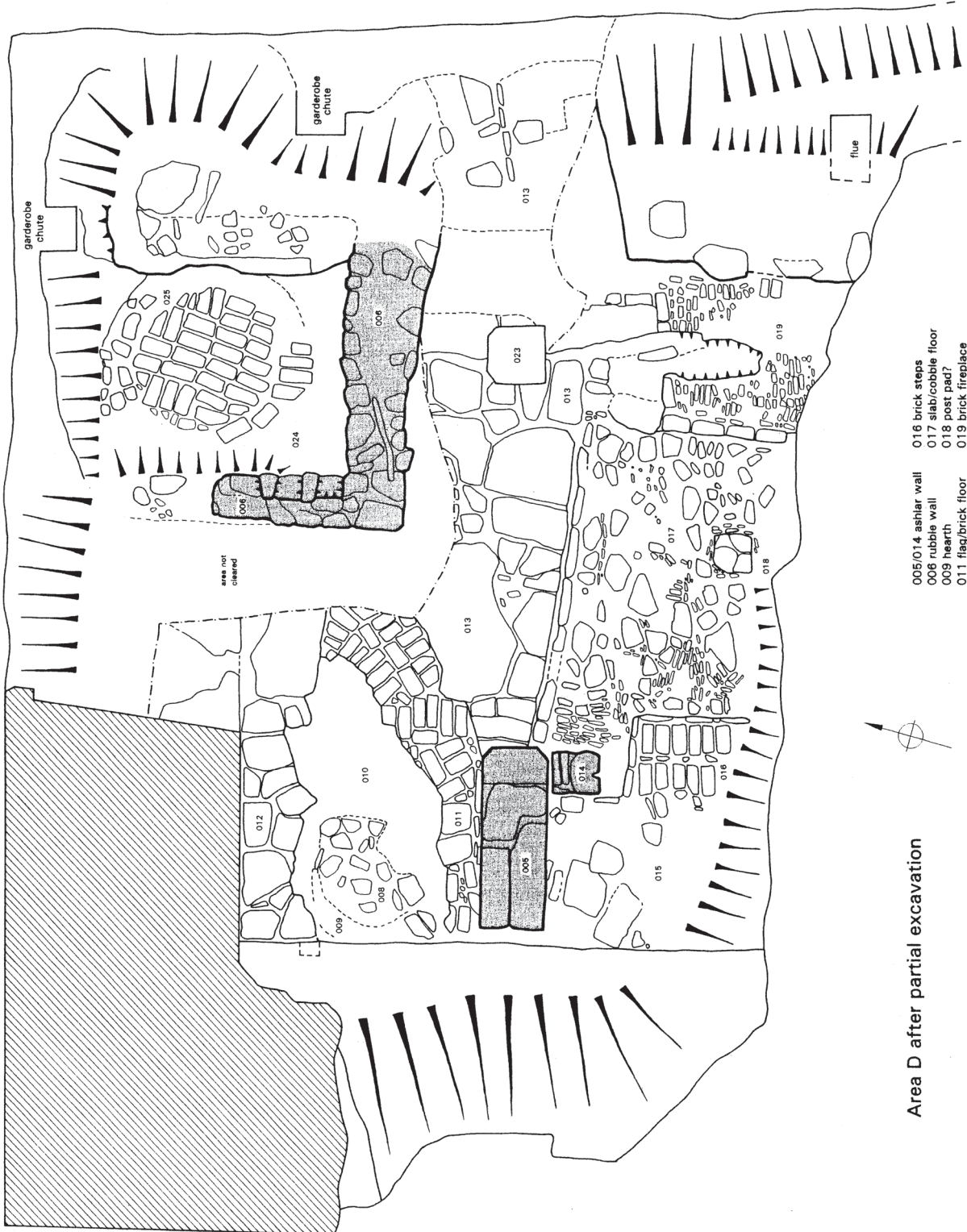
Area D after removal of c.1m  
depth of deposits

Reduced levels (AOD)

1 - 76.03m	9 - 75.19m	17 - 76.40m
2 - 77.49m	10 - 75.13m	18 - 76.37m
3 - 77.56m	11 - 75.36m	19 - 76.32m
4 - 77.27m	12 - 75.36m	20 - 76.84m
5 - 76.99m	13 - 77.03m	21 - 76.37m
6 - 77.20m	14 - 76.87m	22 - 76.52m
7 - 77.01m	15 - 76.93m	23 - 76.39m
8 - 76.72m	16 - 76.92m	24 - 76.14m

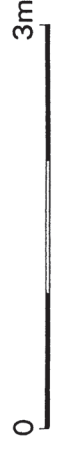


PROJECT	SHERIFF HUTTON CASTLE, NE TOWER
TITLE	EXCAVATION AREA D: CLEARANCE
SCALE	AS SHOWN
DATE	APR 2008
FIGURE	15



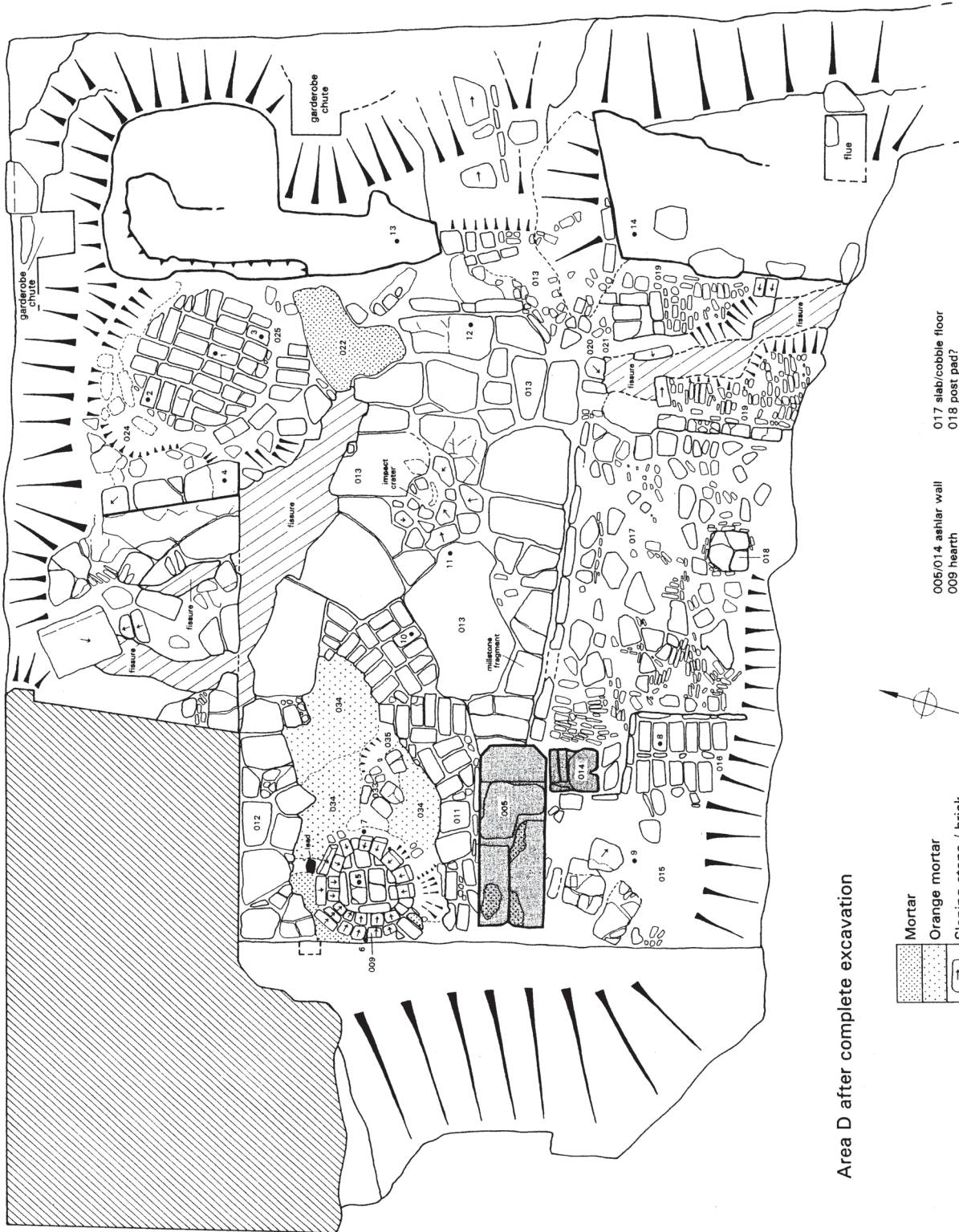
Area D after partial excavation

- 005/014 ashlar wall
- 006 rubble wall
- 009 hearth
- 011 flag/brick floor
- 012/013 flag floor
- 016 brick steps
- 017 slab/cobble floor
- 018 post pad?
- 019 brick fireplace
- 025 brick oven base

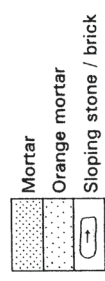


PROJECT	SHERIFF HUTTON CASTLE, NE TOWER
TITLE	EXCAVATION AREA D: EXCAVATION
SCALE	AS SHOWN
DATE	APR 2008
FIGURE	16

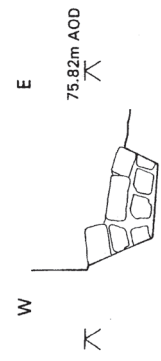
EDAS



Area D after complete excavation



- 005/014 ashlar wall
- 009 hearth
- 011 flag/brick floor
- 012,013 flag floor
- 016 brick steps
- 017 slab/cobble floor
- 018 post pad?
- 019 brick fireplace
- 025 brick oven base

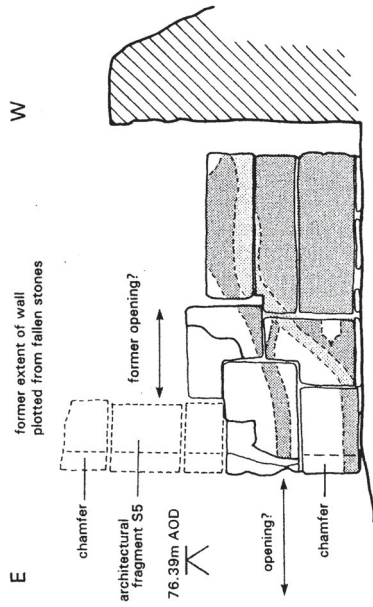


Section 5 - hearth 009 after excavation

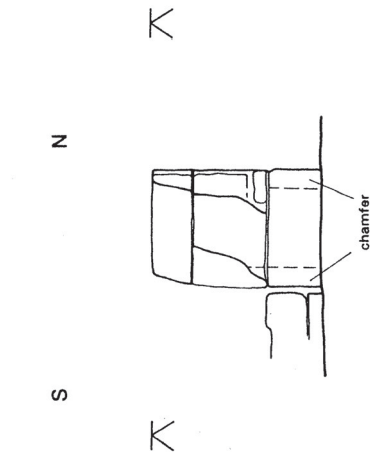
- Reduced levels (AOD)
- 1 - 75.78m
  - 2 - 75.86m
  - 3 - 75.68m
  - 4 - 76.00m
  - 5 - 75.36m
  - 6 - 75.82m
  - 7 - 75.54m
  - 8 - 75.67m
  - 9 - 75.66m
  - 10 - 75.46m
  - 11 - 75.47m
  - 12 - 75.73m
  - 13 - 76.28m
  - 14 - 76.75m

PROJECT SHERIFF HUTTON CASTLE, NE TOWER	
TITLE EXCAVATION AREA D: EXCAVATION	
SCALE AS SHOWN	DATE APR 2008
EDAS	
FIGURE 17	

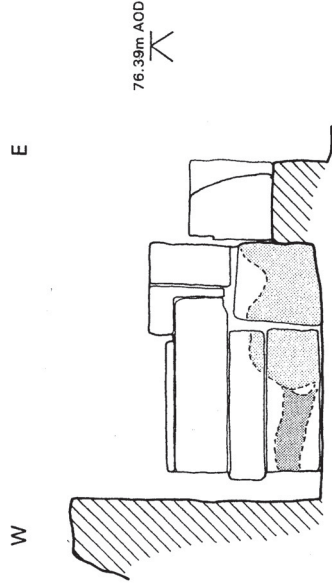




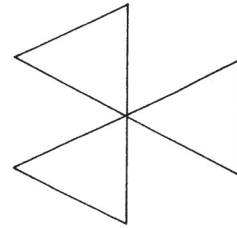
North side of wall 005



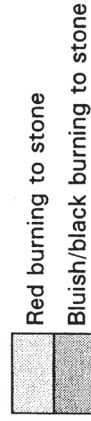
East end of wall 005



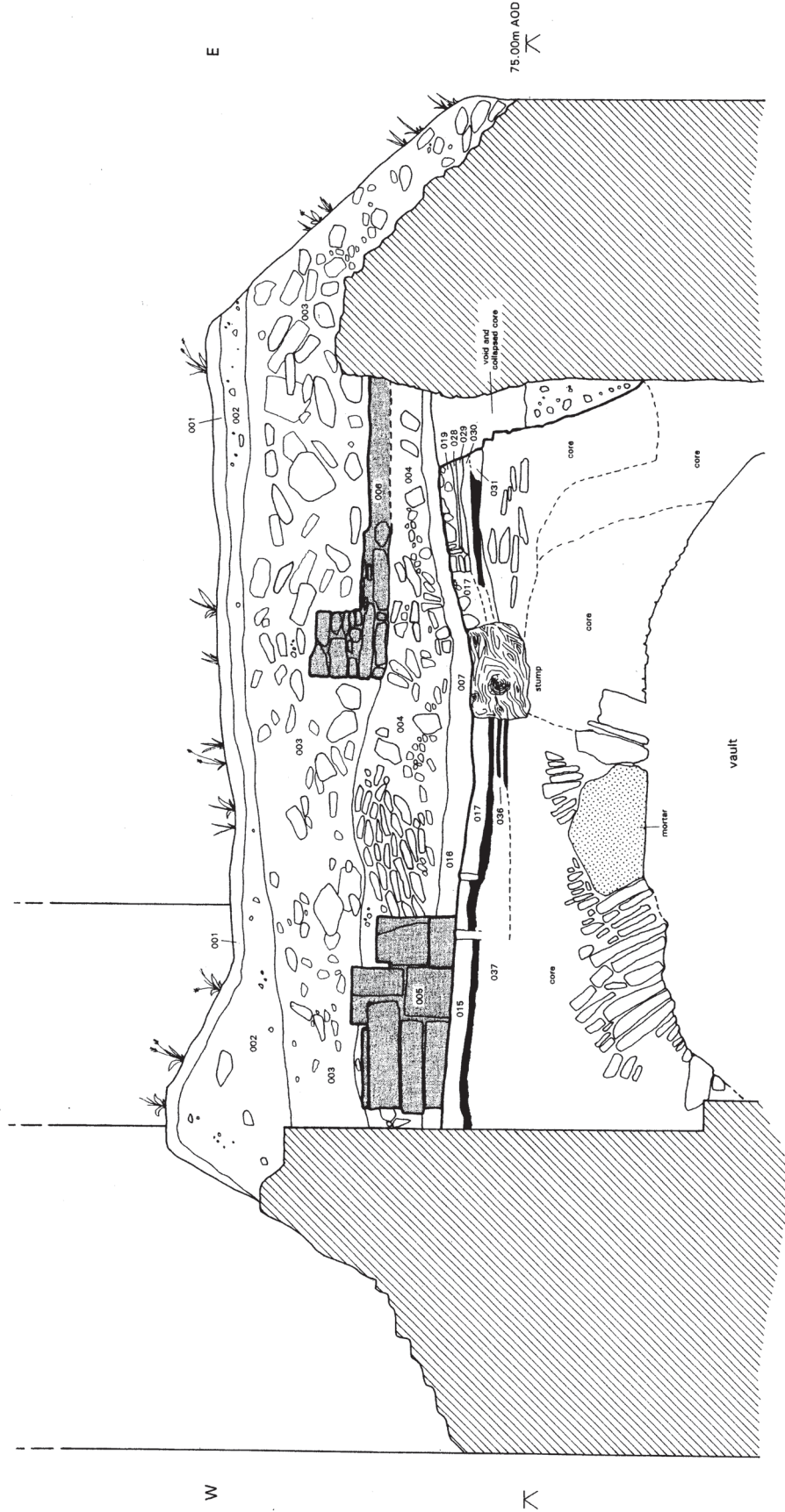
South side of wall 005



Mason's mark on base of stone S5



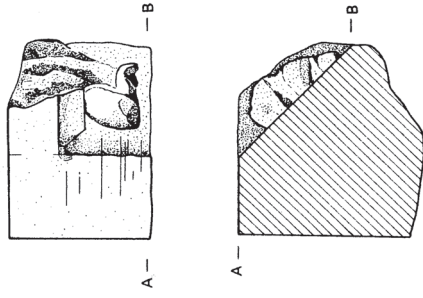
PROJECT SHERIFF HUTTON CASTLE, NE TOWER	
TITLE EXCAVATION AREA D: WALL 005	
SCALE AS SHOWN	DATE APR 2008
EDAS	
FIGURE 18	



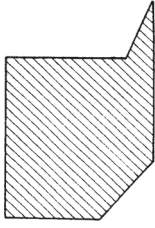
Section 4 - south side of Area D



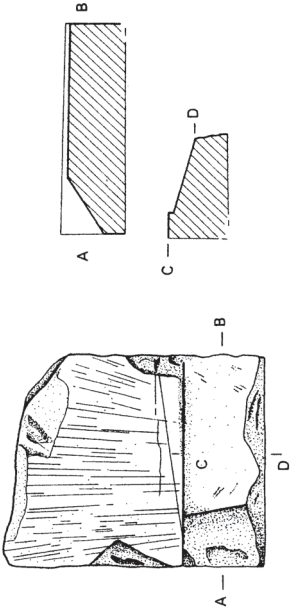
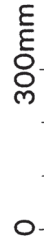
PROJECT		SHERIFF HUTTON CASTLE, NE TOWER	
TITLE		EXCAVATION AREA D: SECTION	
SCALE	AS SHOWN	DATE	APR 2008
EDAS		FIGURE	19



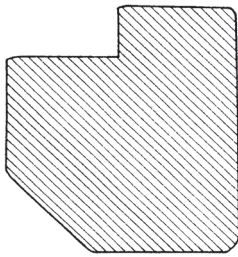
Stone S10: elevation and profile



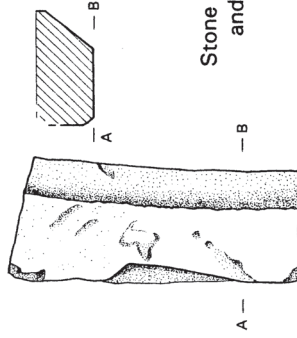
Stone S9: profile



Stone S2: elevation and profiles



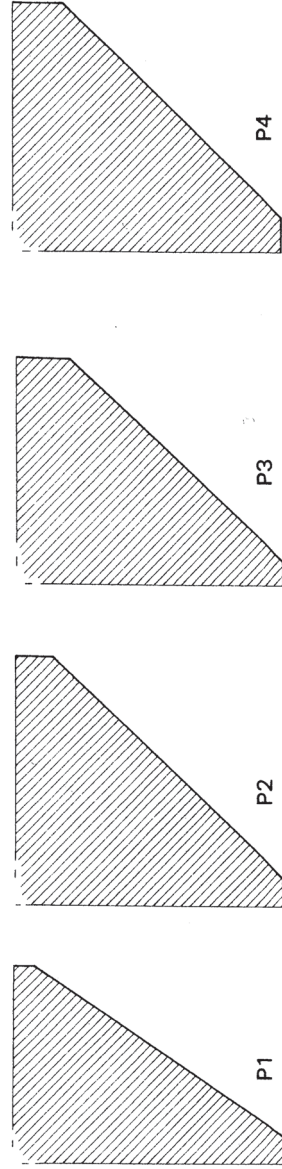
Stone S1: moulding profile



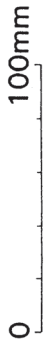
Stone S3: elevation and profile



Stone showing typical tooling marks



Profiles of chamfers on windows and doors  
(see elevations for locations)



PROJECT	SHERIFF HUTTON CASTLE, NE TOWER		
TITLE	EXCAVATION AREA D: STONES		
SCALE	AS SHOWN	DATE	APR 2008
	EDAS	FIGURE	20



Plate 1: Aerial view of Sheriff Hutton Castle and village, taken June 1991 (Aeroscene Ltd, AJC 260/22).



Plate 2: Sheriff Hutton Castle, looking SE (NE tower on left).



Plate 3: North-east tower, looking N, prior to repair and consolidation (September 2001).



Plate 4: North-east tower, looking SW, prior to repair and consolidation (September 2001).



Plate 5: Buck's engraving of the "North View of Sheriff Hutton Castle, near York, 1721"  
(Tony Wright collection) (NE tower on left).

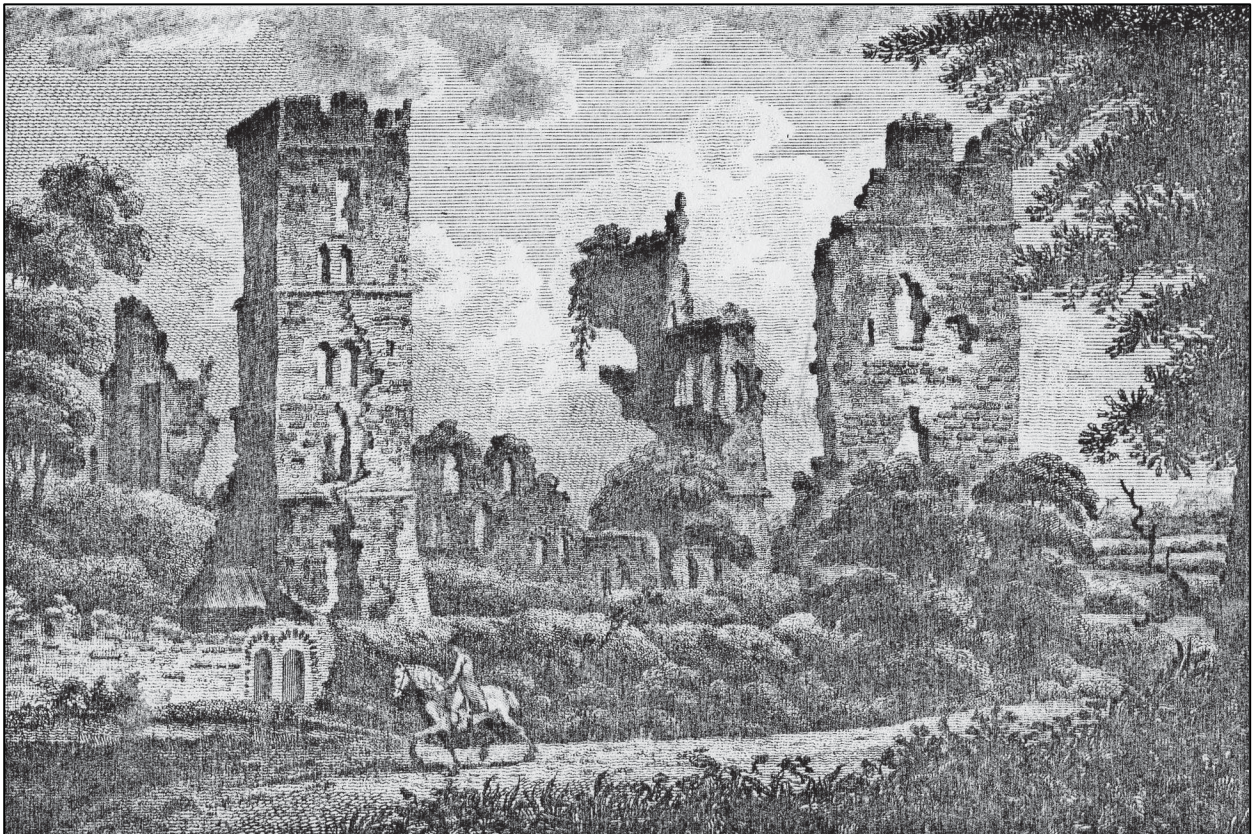


Plate 6: Engraving by J Walker from an original drawing by Mr J Hornsey of  
"Sheriff Hutton Castle, Yorkshire" published 1797  
(Tony Wright collection) (NE tower in left foreground).

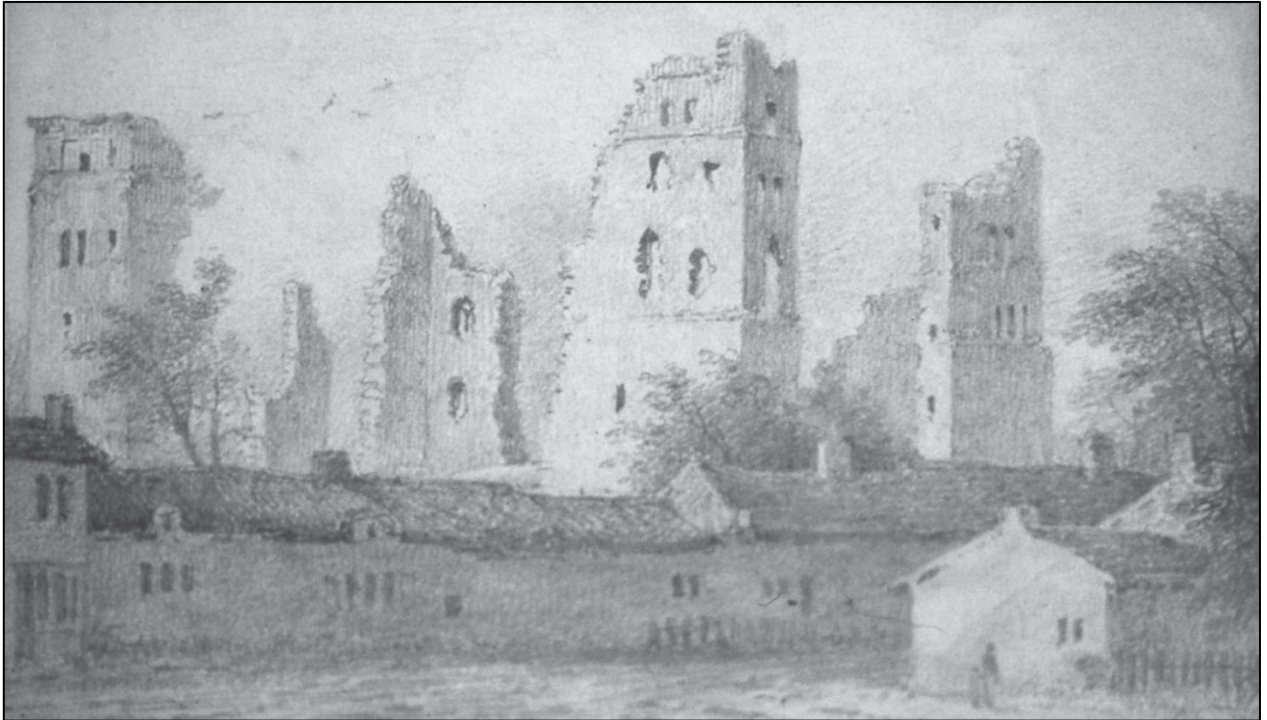


Plate 7: North-west view of Sheriff Hutton Castle by Henry Cave, c.1809  
(York City Art Gallery PD424a) (NE tower on left).

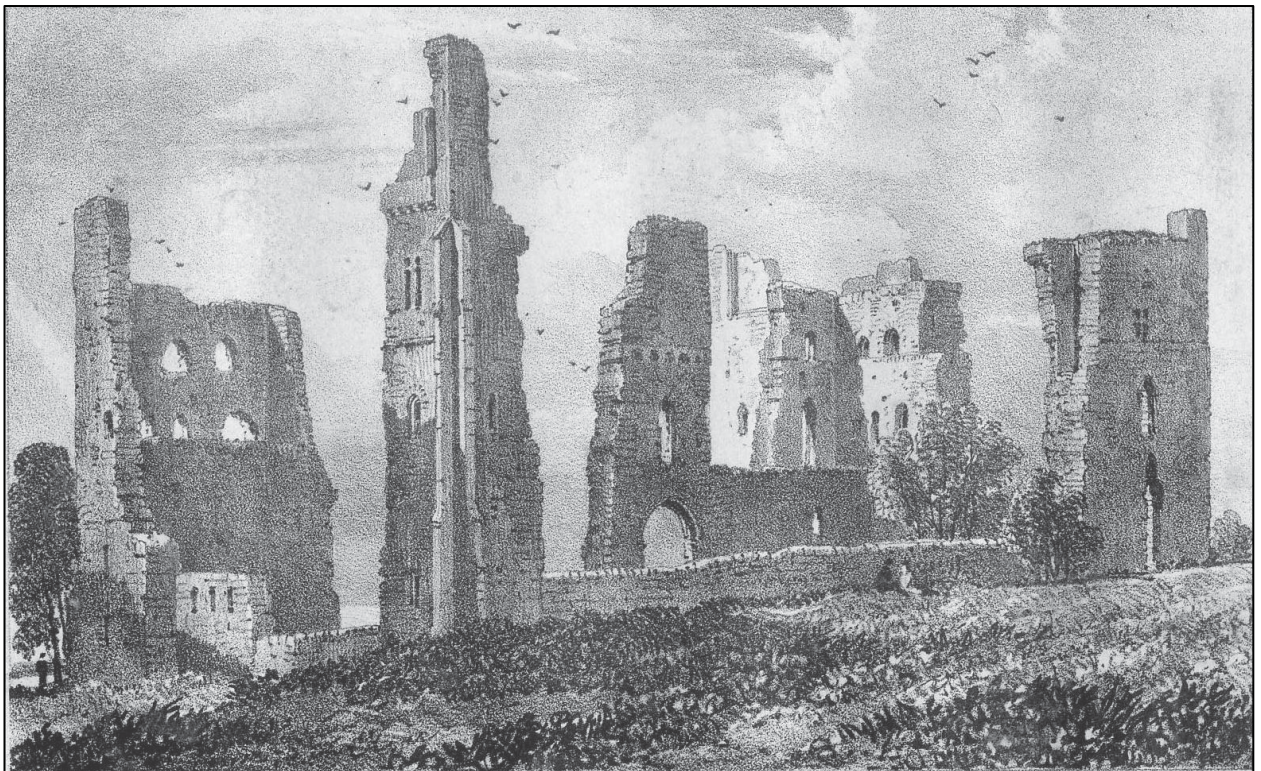


Plate 8: South-east view of Sheriff Hutton Castle by Henry Cave, 1824  
(Todd 1824, facing p7) (NE tower on right).

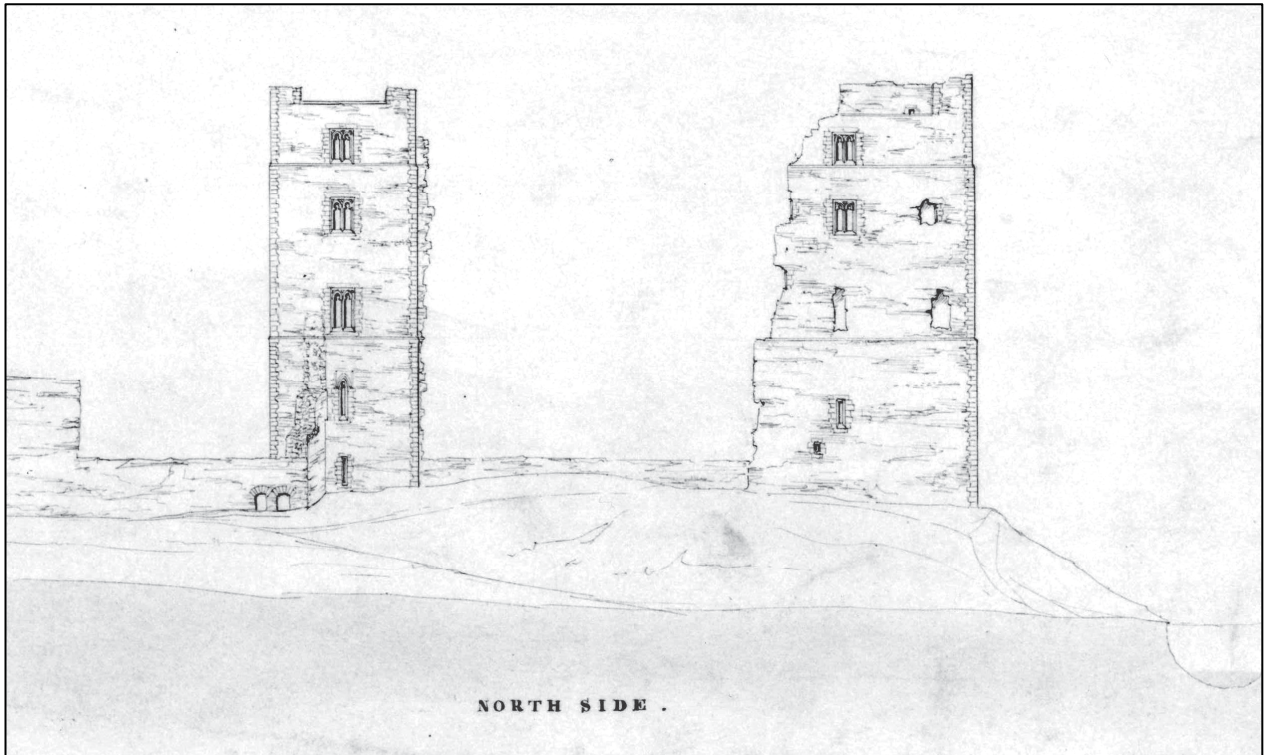


Plate 9: North side of Sheriff Hutton Castle, as existing, drawn by Sharp in 1839 (RIBA X(079)So 728.81 (42.74 SH)) (NE tower on left).

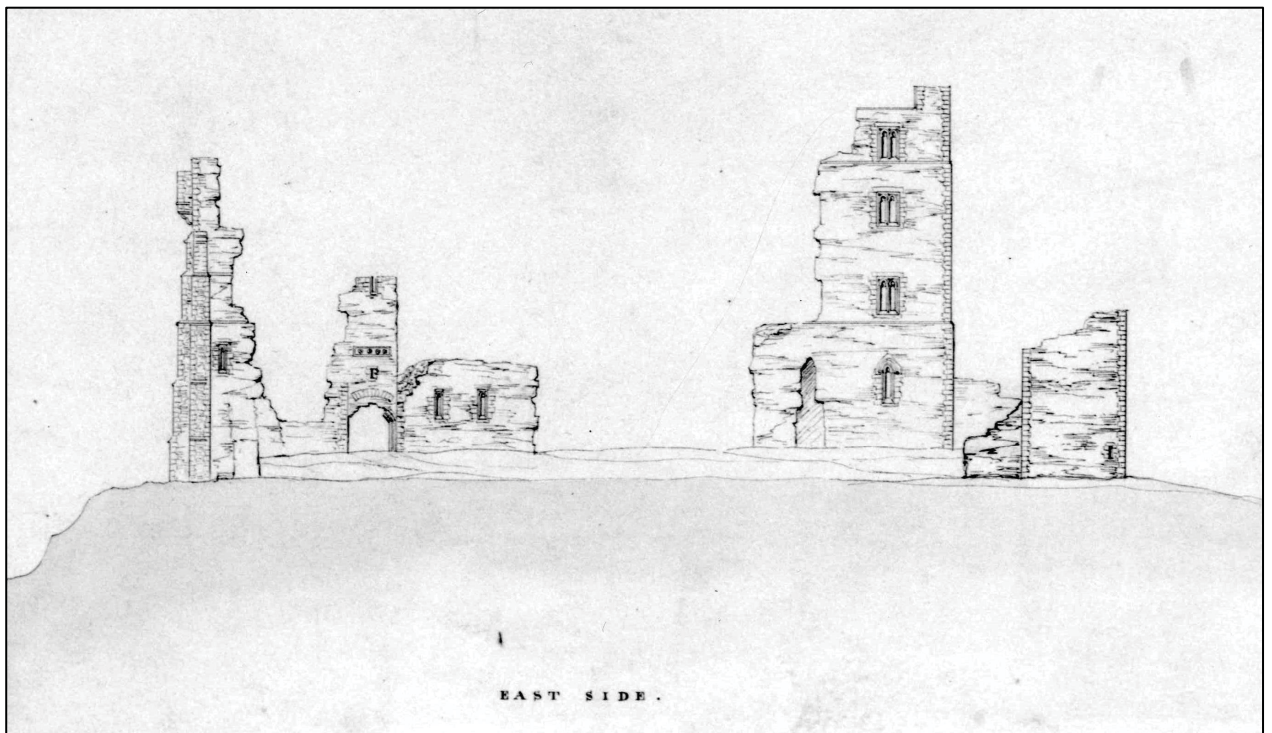


Plate 10: East side of Sheriff Hutton Castle, as existing, drawn by Sharp in 1839 (RIBA X(079)So 728.81 (42.74 SH)) (NE tower towards right).





Plate 11: Sheriff Hutton Castle from the south-east, drawn by the Revd. S J Allen in 1840 (York City Archives 100/S01/156) (NE tower on right).



Plate 12: Photograph taken between 1875 and 1887, showing collapse of the NE tower (Tony Wright collection) (NE tower on extreme right).

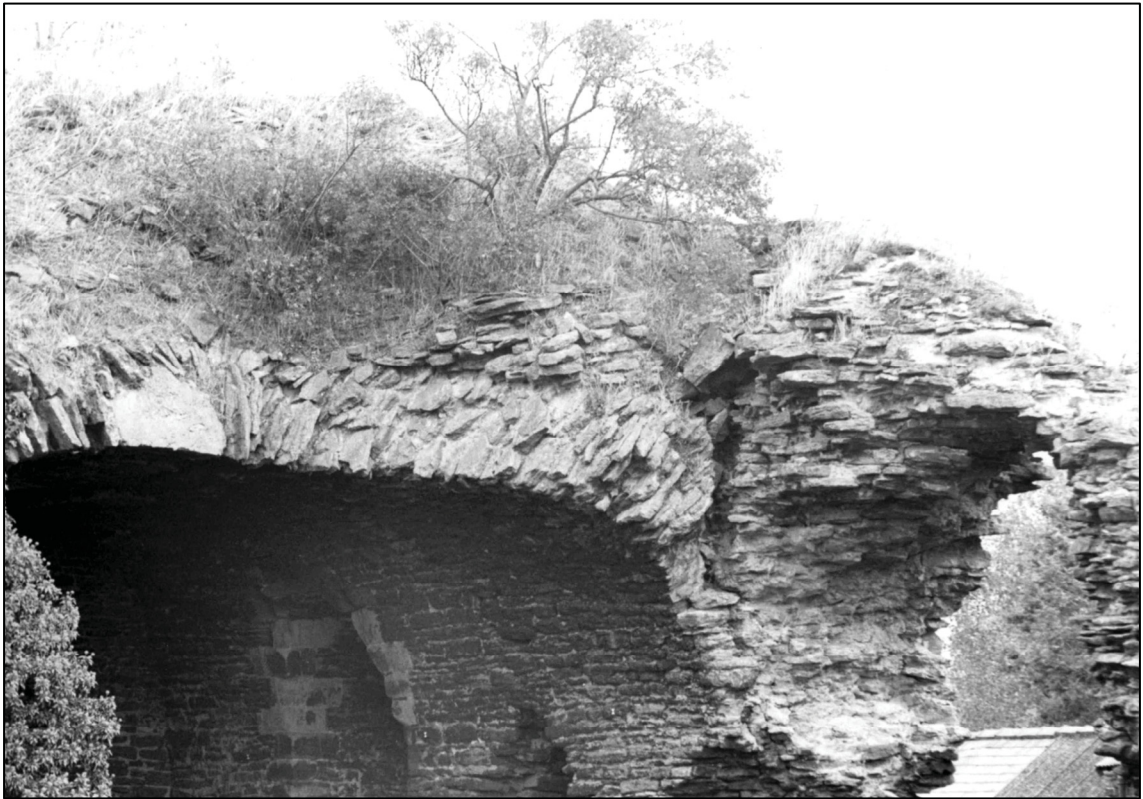


Plate 13: South edge of ground floor vault, showing fracture, looking NE  
(September 1996).



Plate 14: South edge of ground floor vault, showing fracture, looking NE  
(September 1997).



Plate 15: Area of collapse, east external elevation, prior to consolidation (September 1996).



Plate 16: Lower part of north external elevation, showing crack over window W2/3, prior to consolidation, looking S (May 2002).



Plate 17: Hole in basement vault, prior to consolidation, looking north-west.



Plate 18: Garderobe chutes (C2/2 & C2/3) in west external elevation, after selective rebuilding and consolidation.

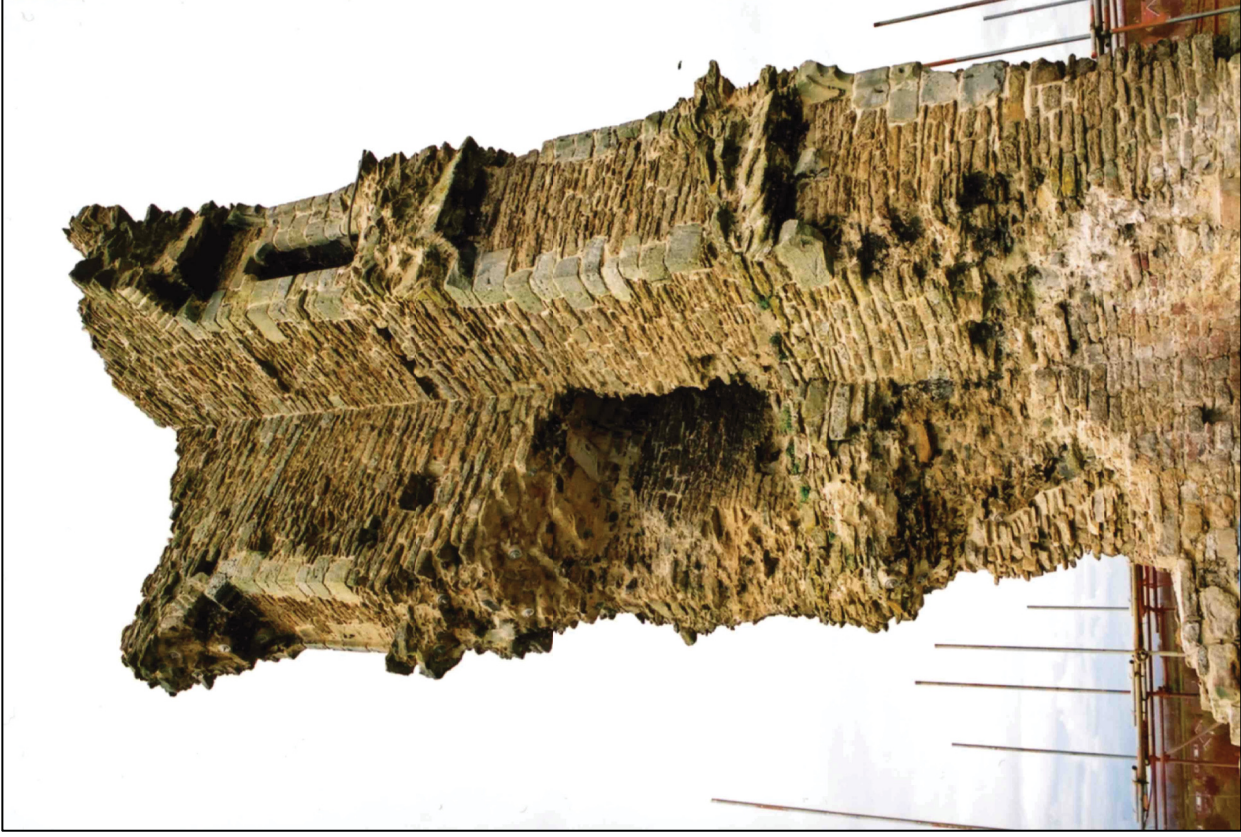


Plate 20: Upper levels of north-east tower, after consolidation.



Plate 19: Newly exposed door opening (D2/3) in south wall of basement, prior to consolidation.

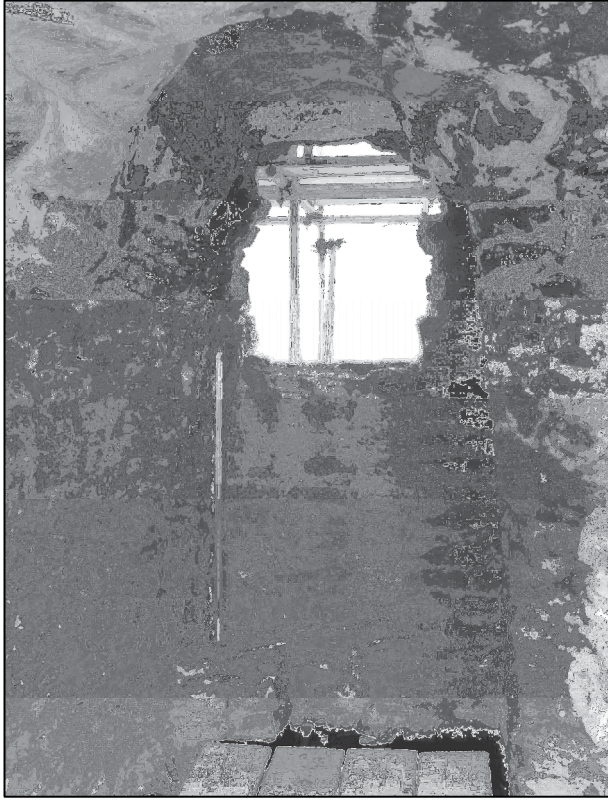


Plate 21: Second floor garderobe position (L2/2), chute (C2/1) and window (W2/9) looking W, prior to consolidation.



Plate 22: Second floor spout, west external elevation, prior to consolidation.

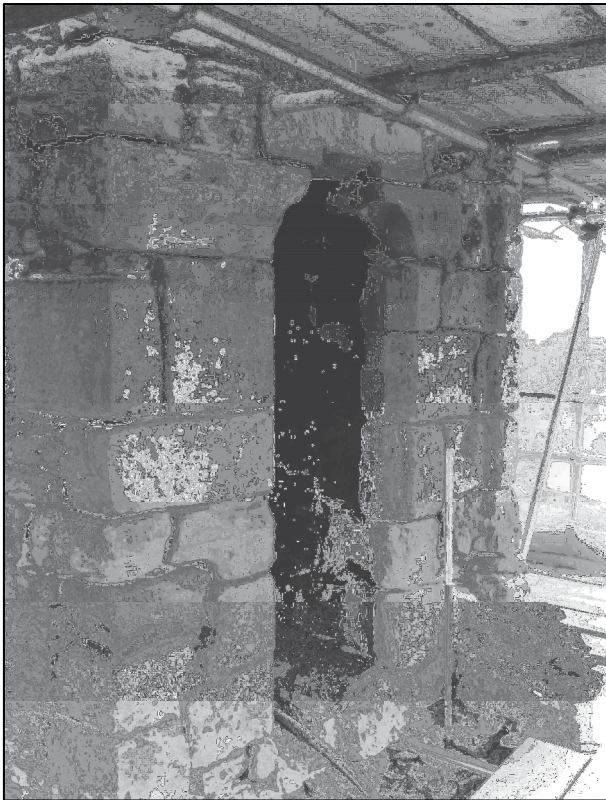


Plate 23: Doorway (D2/2) into third floor garderobe passage, prior to consolidation.



Plate 24: Third floor garderobe seat (L2/3), chute (C2/2) and window (W2/8) with tie bar.



Plate 25: Room at uppermost level, showing fireplace (FP2/2), after excavation and prior to consolidation, looking NW.



Plate 26: Sink in north wall of uppermost room, looking N.



Plate 27: External spout from sink in north wall of uppermost room, adjacent to vertical string course, looking E.



Plate 28: Excavation Area A (NE corner of Castle Farm), context 004, looking W.



Plate 29: Excavation Area D (first floor of north-east tower) after initial clearance and excavation, looking W.





Plate 30: Excavation Area D - rubble wall (context 006) showing nesting boxes, looking W.



Plate 31: Excavation Area D - excavated floor surfaces (contexts 013/017), looking NW.



Plate 32: Excavation Area D - ashlar wall (contexts 005/014) with brick steps and floor surface (016/015) adjacent, looking NW.



Plate 33: Excavation Area D - detail of ashlar wall (context 005), showing burning on south side.



Plate 34: Excavation Area D - hearth (context 009).



Plate 35: Excavation Area D - brick oven base (context 025), looking S.



Plate 36: Excavation Area D - fireplace (context 019), split by fissure, looking E.



Plate 37: Vegetation at the top of the north-east tower, prior to consolidation.

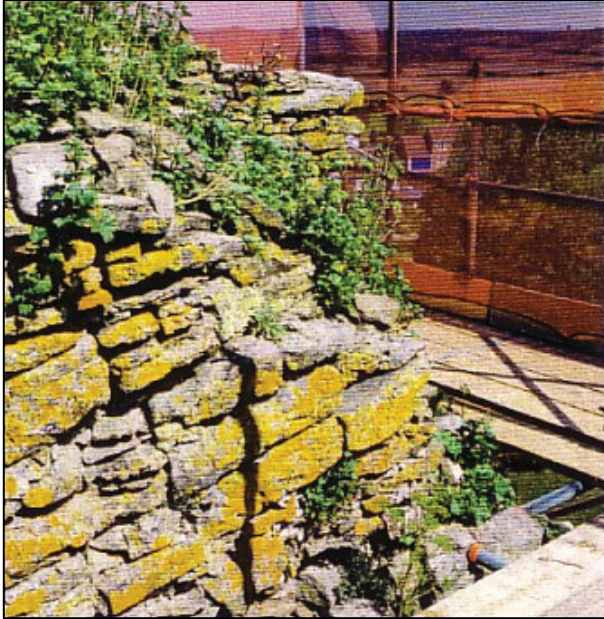


Plate 38: Lichen *Xanthoria* species on the south side of the uppermost level of the tower.



Plate 39: Lichen *Diploicia canescens* on the lower level of the east external elevation.



Plate 40: Detail of lichen *Caloplaca flavescens* with *Lecanora dispersa* on the north elevation.



Plate 41: Detail of lichen *Haematomma ochroleucum* (left) and *Verrucaria muralis* (right) on a quoin on the north elevation.



Plate 42: Lattice of intertwined ivy stems  
3m above ground level.



Plate 43: Ivy stems and loose masonry  
7.5m above ground level.



Plate 44: Area of repointed masonry, third floor, north internal elevation.



Plate 45: Rebuilt and reset stonework at the top of the north-east tower (compare with plate 37).



Plate 46: Structural ties inserted to support overhanging masonry.



Plate 47: Detailed view of structural ties.



Plate 48: Inserted anchors to support structural ties running across the ground floor space.



Plate 49: Excavation Area D - protection of recorded archaeological deposits.





Plate 50: Ecological restoration over re-buried first floor of tower.



Plate 51: Consolidation and repair work complete.