YORK ARCHAEOLOGICAL TRUST

# REPORT ON AN ARCHAEOLOGICAL INVESTIGATION at BEVERLEY MINSTER EAST YORKSHIRE

by Mark Johnson

REPORT NUMBER 2004/24

# BEVERLEY MINSTER

## REPORT ON AN

## ARCHAEOLOGICAL INVESTIGATION

by

**Mark Johnson**

**CONTENTS**

## List of Illustrations



## List of Plates



## List of Tables

***ABSTRACT***

*Over the winter of 2003-4 York Archaeological Trust undertook the excavation of two trenches, one on each side of the nave, and the observation of several boreholes at Beverley Minster, Beverley, East Riding of Yorkshire. These excavations represent the first significant archaeological investigations at this internationally important site.*

*Each trench was excavated to a depth just short of 3m below ground level, and natural drift geology was reached. Deposits and features in both trenches could be correlated to a considerable degree.*

*The earliest archaeological features were of probable Anglo-Saxon date and appeared to be of a structural nature. A number of Anglo-Saxon burials succeeded these features. One was accompanied by a willow rod and bead, and was covered by a wooden board; the remainder were in wooden coffins and all were preserved by waterlogging. The early burials were on a different alignment from those that succeeded them and may have been focused on an early church.*

*Further burials, preceding the earliest stone structural remains, followed those of Anglo-Saxon date and must again relate to a church of which no upstanding remains were found. Traces of lime mortar in the earliest contexts of this series suggest the presence of a stone-built structure, or structures, in the vicinity.*

*The earliest stone structural remains were buttresses and parts of nave walling foundation of probable 12th- to 13th-century date. This building, assuming it was ever completed, was slightly narrower than the existing 14th-century nave. Only a handful of burials occurred between the earliest stone structural remains and the 14th-century nave and its buttresses.*

*Extensive sequences of burials post-dated the construction of the extant 14th-century nave. The latest deposits encountered related principally to scaffolding post-holes and modern surfaces.*

## 1. INTRODUCTION

Between 17 November 2003 and 30 January 2004 York Archaeological Trust (YAT) carried out excavations immediately outside the nave of Beverley Minster, Beverley, East Riding of Yorkshire (NGR: TA 037 392; Figure 1, Site and trench location plan). The programme of work entailed the excavation of two trenches, each marginally over 2m square and both located in angles between the nave walling and buttresses, one on the south side, Trench 1, and the other on the north side, Trench 2. Five boreholes cut by geotechnical contractors within the enclosed area of the Minster were also monitored.

The archaeological work was carried out in accordance with a project design formulated by YAT which was based on a Specification for Archaeological Investigations at

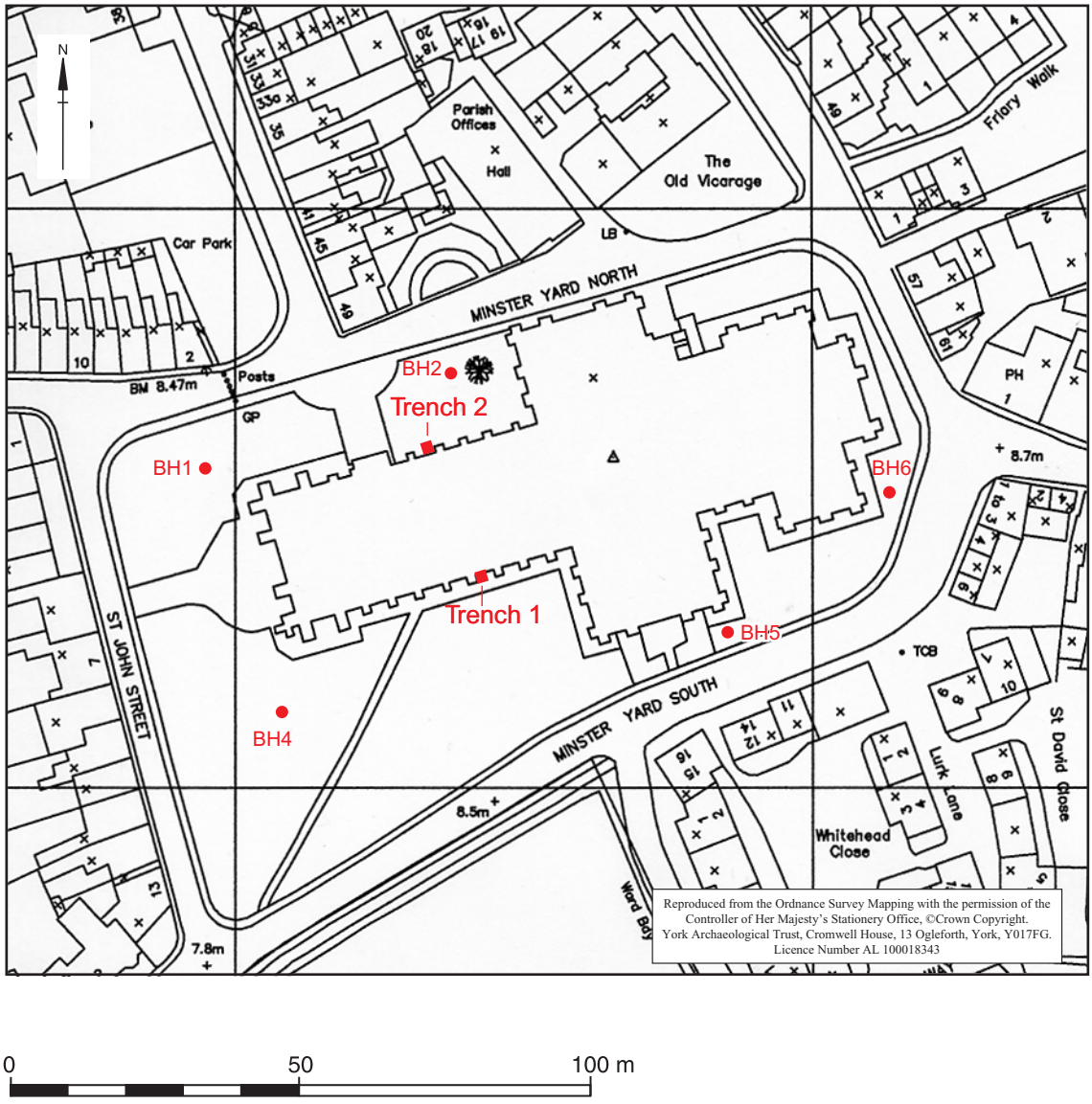


Figure 1: Site and trench location plan (trenches and boreholes in red). Scale 1:1250

Beverley Minster prepared by Wessex Archaeology incorporating comments and advice from the Partnership Manager of Humber Archaeology Partnership, Mr D.H. Evans, and the Regional Advisor for Archaeological Science of English Heritage, Mr I. Panter. All work was facilitated by a Faculty issued in the Consistory Court of York.

The excavations were commissioned by Mr I.H. Stewart of Carden and Godfrey, architects of London, on behalf of their clients, the Trustees of the Minster Old Fund. Monitoring of the YAT excavations was carried out by Mr D.H. Evans of the Humber Archaeology Partnership and by Mr R.K. Morris, Minster Archaeological Consultant.

## 2. METHODOLOGY

The archaeological excavations consisted of two trenches, both located in the angle between the nave wall and buttresses of the standing church nave, one on the south side, Trench 1, the other on the north side, Trench 2. In plan both measured just over 2m square and were excavated to depths approaching 3m below ground level (BGL). Once excavation reached a depth of 1.2m shoring was installed.

With the exception of breaking out of the concrete apron that formed the ground surface in the area of both trenches, all excavation was carried out by hand and in proper stratigraphic manner. All identified contexts (stratigraphic units) were individually planned at a scale of 1:20, and recorded on separate pro-forma context cards. All sections and elevations were drawn at a scale of 1:10. Stratigraphic matrices for each trench were constructed and continuously updated during the course of the excavation. Photographs, in 35mm monochrome print and colour slide format, together with some in digital format, were taken of elevations, sections and significant deposits and features throughout the course of the archaeological work. Environmental samples were taken in accordance with Appendix 1 of the Project Design, these being associated with human remains, deposits and the requirements of dendrochronological dating. Contexts in each trench were numbered separately, those in Trench 1 given a sequence beginning with 1000, those in Trench 2 a sequence beginning with 2000. Finds were retained by context number and in certain instances by a small finds number also.

Notes concerning the nature and depth of deposits within the boreholes sunk by geotechnical engineers were recorded on permatrace as part of the site archive.

All records and finds are held under an East Riding of Yorkshire Museum Service accession code ERYMS 2003.114 and are currently stored by YAT.

## 3. LOCATION, GEOLOGY AND TOPOGRAPHY

Beverley Minster is located at the southern end of the historic core of Beverley and is bounded by the streets of Minster Yard North on the north, by Minster Yard South to the south, by St John Street to the west and by Eastgate and Flemingate to the east.

The ground profile across the modern town is generally fairly flat, any undulations being both gradual and low. The land falls slightly immediately to the north of the Minster. The relative heights of natural clays uncovered at the Minster and at the adjacent Lurk Lane site (Armstrong et al. 1991, 7) suggest that the land falls to a lesser degree to the south also. Effectively the Minster sits on a slight ridge.

The solid geology of the area is of Cretaceous chalk overlain by a drift geology of Boulder Clay (Geological Survey 1957). The town lies at the interface of the Wolds and Hull Valley, and the natural environment of much of the area was originally one of wetland interspersed with low islands. The winding shape of many of the older streets results from their being laid out alongside existing watercourses (Evans 2000). The first element of the place-name Beverley itself appears likely to be derived from Beaver, the second element possibly from lake or stream (Smith 1970, 193-4). Areas of peat-like deposits are known to have been encountered above the level of natural drift in various parts of Beverley (R. Mackie, pers. comm.). Pollen cores taken on the south side of the town indicate that around 600 BC the immediate environment was largely of mixed oak forest and that over the next thousand years parts of this were gradually cleared (Evans 2000). The name of the 8th-century monastery traditionally associated with Beverley, *Inderauuda*, has been translated as 'in the wood of the men of Deira'; this again implies the presence of woodland in the locality at this time.

## 4. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

St John, one time Bishop of Hexham and then of York was, according to Bede whose career he documented, buried in the porticus of St Peter at his monastery at *Inderauuda* in AD 721. On the basis of later documentary sources it is traditionally held that the site of the *Inderauuda* monastery can be equated with the site of Beverley Minster. Excavations at the nearby Lurk Lane site on the southern side of Minster Yard South have revealed what is believed to be the southern part of an early monastic enclosure surrounded by a large ditch (Armstrong et al. 1991). This feature proved to have an origin in the 8th century. The original monastic church is likely to have been constructed of timber though the presence of window glass across the Lurk Lane site in early 9th-century contexts suggests that by this date the church was probably stone-built. The form and arrangement of the early monastery is not known, though all or most of its buildings are likely to have been of timber. A building of 9th- or 10th-century date at Lurk Lane appears to have been used for metal working.

No contemporary record survives to detail the effect of the 9th-century Danish incursions in the north upon the monastery. Whilst local tradition maintains that it was sacked (Armstrong et al. 1991, 1), there is no hard evidence to confirm a break in continuity of a monastic presence (Palliser 2000). It is commonly thought that some time between 934 and 939 St John's monastery was re-founded by King Athelstan as a college of secular cannons, with special grants and privileges. Whilst some modern scholarly opinion questions whether or not it was Athelstan who wrought these changes there is no doubt that the wealth generated by these endowments together with increasing veneration of St John served to raise the importance of Beverley Minster in the later Saxon period (Palliser 2000).

Documentary records survive that detail important information during the period of the last three Anglo-Saxon archbishops of York. It is clear that this was a time of much rebuilding, with a new refectory, dormitory, high stone tower and presbytery being constructed (Palliser, 2000).

No records survive to detail developments at the Minster between the 1060s and 1188. Whether or not a new Romanesque church was built after the Norman Conquest is uncertain, though David Palliser observes that the latest of the Anglo-Saxon works may have been in this up to date style. Palliser does consider, however, that there is enough re-used Norman masonry within the standing Minster, as well as that recovered at Lurk Lane and elsewhere in the town to suggest that at least part of the Minster was rebuilt in the 12th century (Palliser 2000).

A fire in 1188 severely damaged the fabric of the Minster. Whether the building was subsequently rebuilt wholesale or merely repaired is unknown. What is known however is that around 1213 the crossing tower collapsed and this led to a large-scale rebuilding programme (Palliser 2000). This programme resulted in the raising of the extant transepts and east end of the church by 1245. Exactly how this new work articulated with the nave is uncertain, though it may be that the new eastern parts were built up to an existing nave that had largely survived the collapse of 1213. The nave was finally rebuilt in the fist half of the 14th century and is still extant (Horrox 2000). The result of these 13th- and 14th-century building episodes, that is, the present Minster, represents one of the architectural gems of medieval Europe.

At the time of the Reformation the collegiate church was dissolved and parts of the Minster complex demolished (Lamburn 2000). Stripped of its assets, the church became financially dependent upon the town corporation and by the end of the 16th century there were complaints of neglect and decay. There is little record of new building works until the 18th century. Two notable architects, Nicholas Hawksmoor and George Gilbert Scott, directed various remedial and restoration works at the church in the 18th and 19th centuries respectively. Though today technically a parish church, the 'cathedral size' of the Minster is owed entirely to its pre-Reformation wealth and significance (Pevsner and Neave 1997).

The town of Beverley owes its origin to the ecclesiastical presence, with the Lord of Beverley being the Archbishop of York from at least the 11th century (Armstrong et al. 1991). Archaeological evidence for activity pre-dating the church in Beverley is slight, the overall impression being one of a rural character. A small number of pre-8th-century features at Lurk Lane were encountered and are likely to relate to boundaries defining small agricultural enclosures (Armstrong et al. 1991). The town burgeoned in the 12th century as a centre of the wool trade but by the mid 16th century was in a period of economic decline that was exacerbated by the Dissolution. A degree of revival occurred when the town became the administrative centre for the East Riding and a centre for social gatherings of the gentry and aspiring classes in the early 18th century. As a result, Beverley has many fine 18th- and early 19th-century buildings.

In addition to the Lurk Lane excavations, there have been a number of archaeological investigations of various scales in the vicinity of the Minster within recent years. A number of these have revealed significant medieval remains though few of these have had any direct association with the Minster. The excavation of two trenches reported below represents the first archaeological work on the site of the present Minster.

# 5. THE EXCAVATIONS

The results of the excavations are presented on a trench by trench basis with some correlation of common features and deposits being expounded in Section 17 (Concluding Discussion). The deposits and features are described in stratigraphic sequence, starting with the earliest. It has proved possible to break down the trench sequences into broad groups or phases representing the succession of events and activities, and these are detailed under sub-headings. Dates, some more precise than others, can be attributed to these groups. The orientation of burials was, with some variation, approximately east–west (with head at the west), in accordance with Christian tradition. The alignment of burials is shown in Figure 12. Unless stated otherwise in the text, all burials for which a burial position could be reliably determined were laid extended, on their back, legs straight and arms by their side. Owing largely to the small size of the trenches, most articulated burials were neither seen nor recovered in their entirety. Detailed osteological data concerning the human remains is presented in Section 14 (human bone). All categories of finds recovered from the excavations are considered in individual specialist reports that follow this text. The principal finds and dating evidence from these are also cited in the text below. Ceramic building materials could not be dated to a span of less than two centuries at best; consequently this material adds little to the known dating and is little mentioned in this section. Waterlogged deposits were encountered in both trenches, at around 7.25m OD (2.15m BGL) in Trench 1 and at around 7.28m OD (2.08m BGL) in Trench 2. At these depths water was seen to flow into the trenches from the earliest foundation material and a combination of mechanical pumping and hand bailing was necessary in order to permit continued excavation.

## 5.1 TRENCH 1

### 5.1.1 **Natural deposits** (Figure 2)

A stiff, mid greyish-brown clay containing very occasional small rounded pebbles, 1032, was the earliest deposit encountered. Excavated in places to a maximum depth of 6.45m OD (2.90m BGL), the upper part of this material occurred at a height of 6.95m OD (2.38m BGL). This clay, which was also encountered in all of the boreholes, was boulder clay of the natural drift. Boulder clay 1032 was overlain by a deposit of stiff, mid yellow to reddish-brown clay, 1131. This material had a depth of generally around 0.40m with the very uppermost parts occurring at around 7.35m OD (1.98m BGL). The upper horizon of 1131 was truncated by a number of later features and was both darker and siltier than that beneath the surface. This appearance is believed to relate to a degree of mixing at the interface with overlying deposits.

### 5.1.2 **Early alignment burial (Anglo-Saxon)** (Figure 12, Plate 1)

*The earliest burial in Trench 1, on a different alignment to later burials. The alignment mirrors that of the earliest burials in Trench 2.*

Cutting into natural clay was grave cut 1129. This grave was stratigraphically the earliest of an extensive sequence of burials and on a different alignment to those that followed. The western half of this cut, which was rectangular in shape with slightly rounded

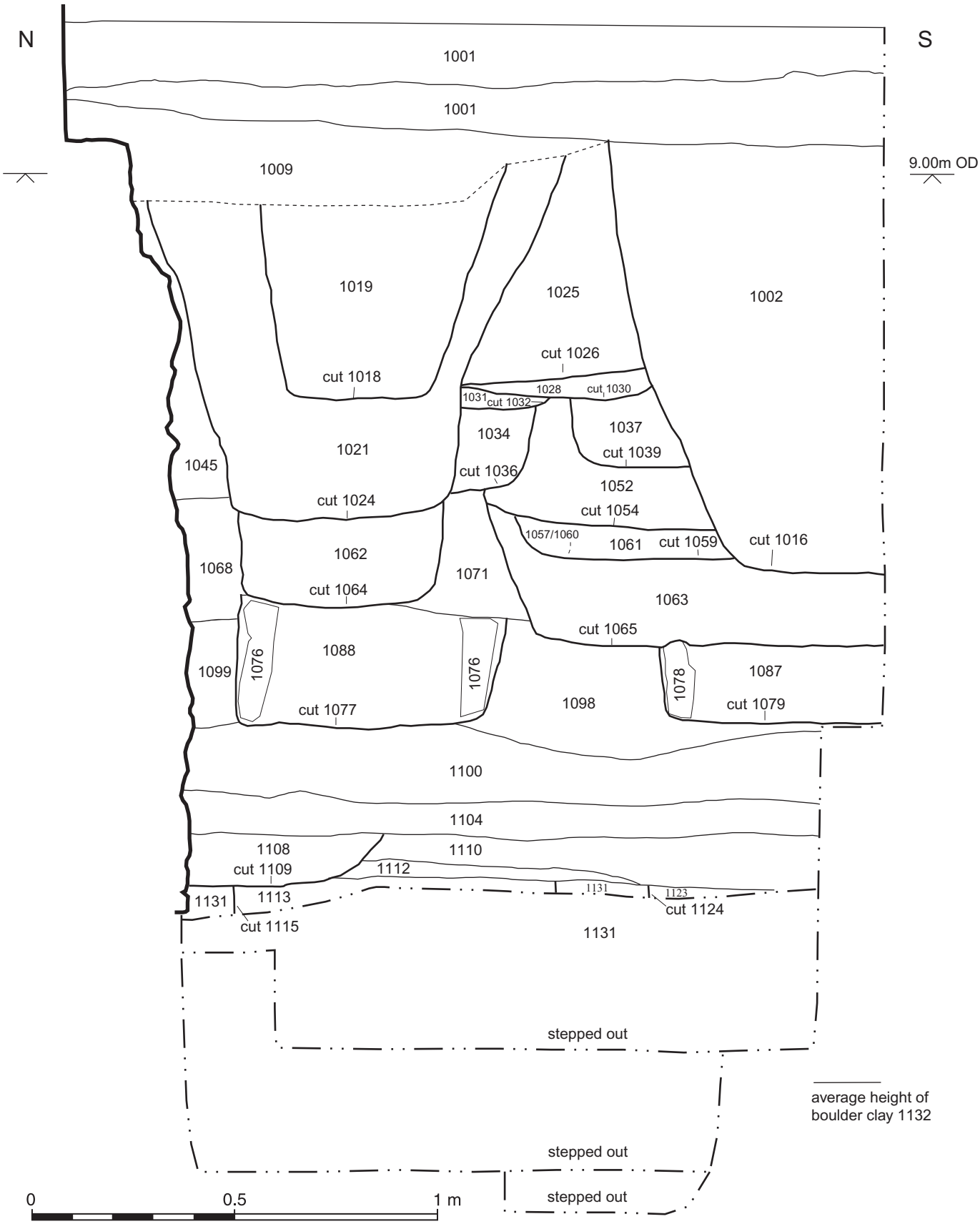


Figure 2: Trench 1, west-facing section.

corners, was fully cut away by later buttress foundations. The remains of a rectangular oak wooden coffin, 1130, sat directly on the base of 1129. Only the base survived intact — the sides, ends and parts of the lid were represented only by wood stains. The lower parts of skeleton 1127 occupied coffin 1130. The bones of the right foot of the skeleton were distributed along the outer side of the right leg. This movement is perhaps most likely to have occurred when the later foundations struck through the western side of the coffin, the jolting effect serving to dislodge the contents. Occupying the interior of the coffin area above the level of the skeleton was fill 1126, a soft, brown clayey silt. A further fill, 1128, was present between the outer edges of the coffin and the grave cut. This fill was a mixture of clumps of yellowish-brown clay and dark greyish-brown clayey silt that contained a single piece of butchered animal bone. One of the components of clay 1128 was clearly redeposited natural disturbed during the digging of grave cut 1129. The other component is likely to have been derived from a topsoil that once sealed the natural clay and was completely truncated by later burial activity.

**Plate 1***: Trench 1, earliest burial 1127*

The alignment of this burial mirrors that of the two earliest burials in Trench 2. Despite a separation gap of some 25m, they are probably all broadly contemporary and aligned with respect to a common focal point, such as a church.

### 5.1.3 Earlier medieval burials (Figure 12, Plate 2)

*A sequence of seven burials (two of which occurred close to the eastern baulk and were not excavated), one charnel pit and a number of deposits succeeded the earliest burial 1127. The alignments of these burials were all broadly similar and diverged by several degrees from that of 1127.*

A deposit composed of clumps yellowish-brown clay intermixed with dark greyish-brown clayey silt, 1125, sealed the early alignment burial and extended across the southern and western parts of the trench. Generally in the region of 0.10m thick, this deposit represents the lower parts of what developed as a churchyard soil. Several burials cut through this material.

Cutting through 1125 in the southern part of the trench was grave cut 1121; this was sub-rectangular in plan with a slightly rounded eastern end. The extreme west of 1121, and its contents, was truncated by later buttress foundations. Occupying the base of the grave cut was a thick, knotty board derived from the outer section of an oak tree, context 1122, only some 0.265m wide. No sides or lid were present with this board and the absence of any wood stains indicated there never had been. Laid directly on top of the narrow timber was skeleton 1120, the upper half of which had been cut away by the adjacent foundations. A single grave fill of soft, dark brownish-grey clayey silt, 1119, occupied grave cut 1121 above the level of the skeleton. The positioning of a body over a timber board in this early burial represents an unusual funerary rite and further research would be required to find a parallel for this.

**Plate 2***: Trench 1, timber 1122 at base of grave*

In the south-east corner of the trench was the very western end of a square-ended cut, 1124, filled with a soft dark greyish-brown silty clay containing a number of clumps of yellowish-brown clay and a few lumps of lime mortar, 1123. As so little of this feature lay within the trench, it was not excavated. The shape of this feature and its close association with a large number of burials allows interpretation as a grave. The presence

of mortar within the fill is noteworthy and suggests the presence of a stone-built structure, or structures, in the vicinity.

A further sub-rectangular grave cut, 1118, identified as such only in its lower parts, was present in the northern part of the trench. This cut was truncated at its western end by later buttress foundations and at its extreme eastern end by cut 1115. Laid directly onto the base of the grave cut was skeleton 1117, whose lower arms and hands lay across the pelvis. A single grave fill of soft, very dark brown clayey silt, 1116, overlay skeleton 1117. Only the extreme western end of cut 1115, which was square-ended in shape, was present within the trench, the remainder extending beyond the limits of excavation. This feature, like 1124, was not excavated. The fill of this unexcavated cut, 1113, was a mixture of dark greyish-brown clayey silt and clumps of yellowish-brown clay. Within this material a square-ended wood stain, 1114, was apparent. This unexcavated feature almost certainly represents a grave, its fill and the remains of a wooden coffin.

A deposit composed of dark greyish-brown clayey silt with lesser quantities of yellowish-brown clay, 1112, extended across the bulk of the trench at a level above that of the burials detailed above. However, given the fairly shallow nature of those burials (none of the excavated examples being over 0.21m deep), and the close similarity of the fills to deposit 1112, it cannot be entirely ruled out that this material was cut through by the burials and that it more properly forms part of 1125. Whatever the case, this deposit can be interpreted as a churchyard soil. A further equivalent of 1112 is deposit 1110, whose physical attributes were identical. During the excavation of these deposits parts of the right arm and right ribs of an articulated burial, skeleton 1111, were observed in the extreme northern part of the trench, the remainder of the inhumation extending underneath the foundations of the 14th-century nave. It was not possible to determine a grave cut or fill for this burial.

Two features cut into deposit 1110. One of these, in the extreme south of the trench, was a sub-rectangular grave cut, 1107, whose western end was cut away by later buttress foundations. A skeleton, 1106, with lower arms laid across the pelvis, rested on the base of cut 1107. A single grave fill of mid greyish-brown clayey silt, 1105, occupied the rest of the cut above the level of skeleton 1106. The other feature cutting deposit 1110 was 1109, a shallow cut over 0.70m across with steep sides, a flattish base and probable sub-circular shape that partly extended underneath the foundations of the 14th-century nave and the eastern baulk of the trench. A single fill of mid brownish-grey clayey silt, 1108, containing quantities of disarticulated human bone occupied cut 1109. This feature clearly represents a charnel pit dug as a receptacle for human bones disturbed during the digging of later graves.

An extensive deposit of greyish-brown clayey silt containing much lesser quantities of yellowish-brown clay, 1104, overlay features 1107 and 1109 and represents a churchyard soil. A single sub-rectangular grave cut measuring only 0.70m long by 0.22m wide, 1103, penetrated deposit 1104 in the west central part of the trench. Laid within this cut was the poorly preserved skeleton of a young baby, 1101. A single fill of mid greyish-brown clayey silt containing occasional clumps of yellowish-brown clay, 1102, occupied the remainder of grave cut 1103. A deposit with attributes identical to that of 1104 appeared to overlay the baby burial. However, given the similarities of deposits 1104 and 1100 to

grave fill 1102, it cannot be entirely ruled out that the deposits were one and the same and that both had been cut through by grave cut 1103.

The uppermost context of this group was a deposit of greyish-brown slightly sandy clayey silt containing pockets of reddish-brown clayey silt, 1099. This material, much truncated by later graves and features, survived only in the extreme north central part of the trench. Context 1099 is interpreted as churchyard soil. Deposit 1098, of broadly similar characteristics in the south central part of the trench, may also belong to this group.

The burials of this group were not aligned with respect to the early burial detailed in 5.1.2. As these burials pre-date the earliest structural remains encountered in Trench 2, it is also clear (despite the concurrence of alignment) that they cannot have been aligned with reference to this. These burials must therefore have been aligned with respect to some contemporary feature. This may well have been an early church, the remains of which lie beyond the limits of Trench 1, possibly within the area occupied by the present nave.

### 5.1.4 Earliest structural remains (probably 12th–13th century) (Figures 3, 4 and 5)

*The earliest structural remains in Trench 2 consisted of what was almost certainly a buttress and its associated foundations. Any walling associated with this buttress lay north of excavation limits. A possible standing may also relate to this episode.*

The initial component of the earliest structural remains was the eastern side of a construction cut, 1093, for a buttress foundation. The lower 1.03m of this cut had a flat base and vertical sides with the foundation material built up hard against its edge. Above this, the cut stepped out horizontally for 0.55m before rising vertically again for around 0.40m; above this it was truncated by later features.

The buttress foundation 1084, built within the construction cut, extended for a depth of 1.85m below the lowest course of the ashlar-faced buttress (to a depth of 6.62m OD, 2.78m BGL). The width of the buttress and its foundations in both east–west and north–south directions could not be determined owing to its encapsulation within the later fabric of the existing 14th-century buttress and nave. The stone employed within foundation 1084 was predominantly angular fragments of chalk (generally 0.10–0.37m) with a lesser quantity of pieces of Oolitic Limestone (generally 0.10–0.40m), most of which were sub-angular fragments but some were dressed and squared. Where tooling was visible on the dressed pieces this was all fine and diagonal. One of these dressed pieces exhibited a chamfer and would appear to have been re-used, as may have been the other dressed examples. A very small number of rounded cobbles, some up to 0.33m across, were also utilised, mostly at the base of the foundation. Nearly all the stonework of the foundation was roughly coursed and bonded together with copious amounts of a rather soft creamy-white lime mortar.

The ashlar stonework of the buttress proper, 1083, was all of well squared blocks of Oolitic Limestone that were tightly jointed and displayed fine diagonal tooling. A mason's mark was visible on one of these blocks (see Figure 4, East-facing elevation).

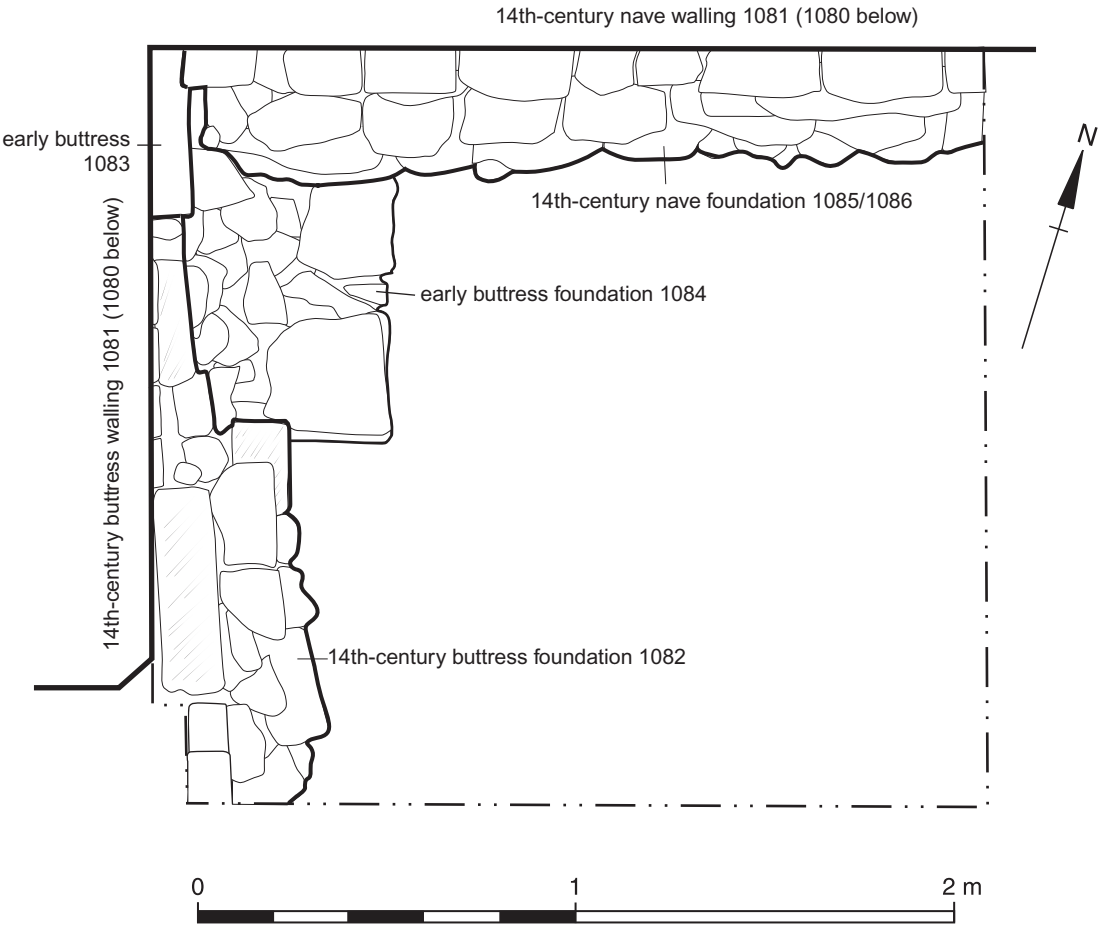


Figure 3: Trench 1, foundation plan. Scale 1:20

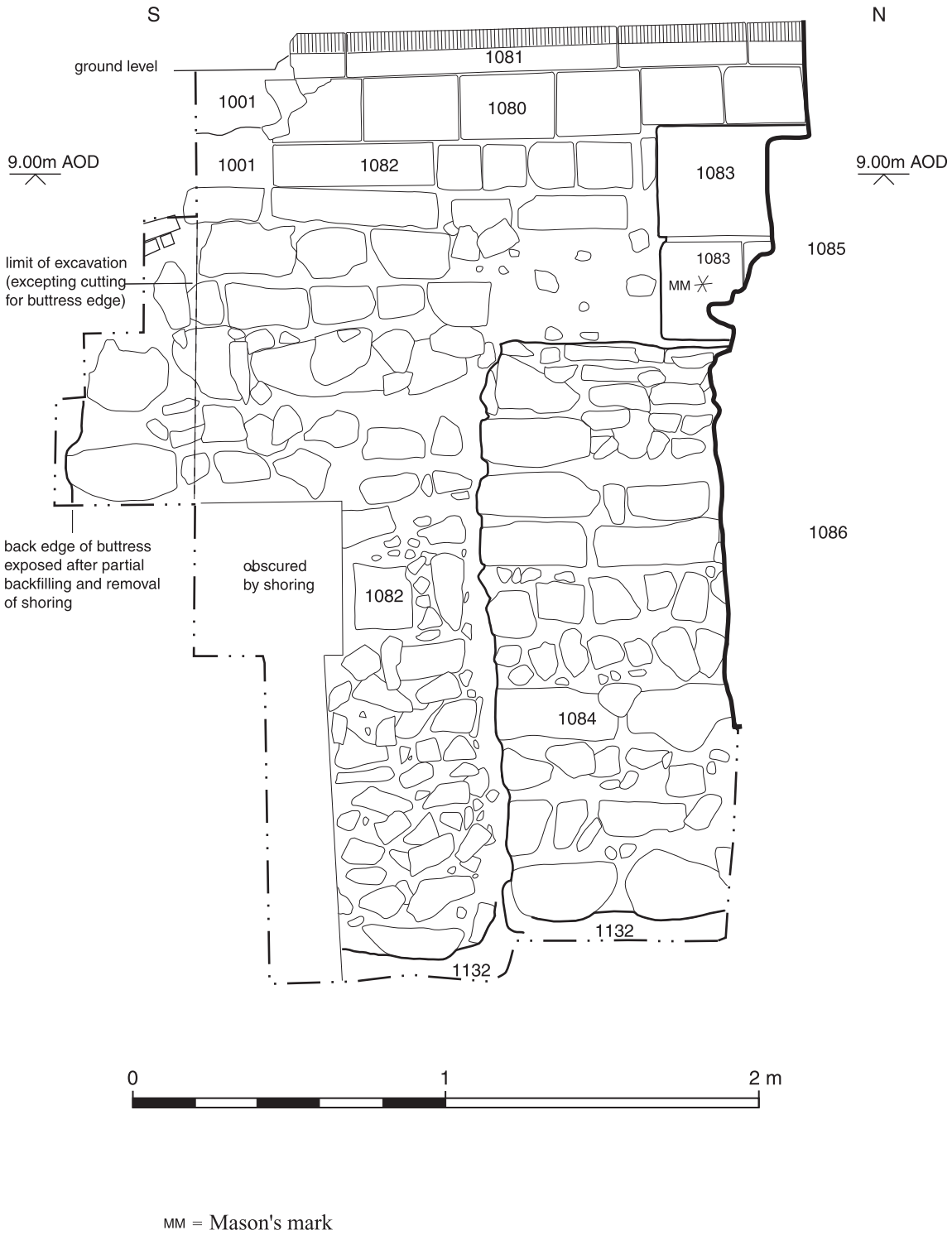


Figure 4: Trench 1, east-facing elevation. Scale 1:20

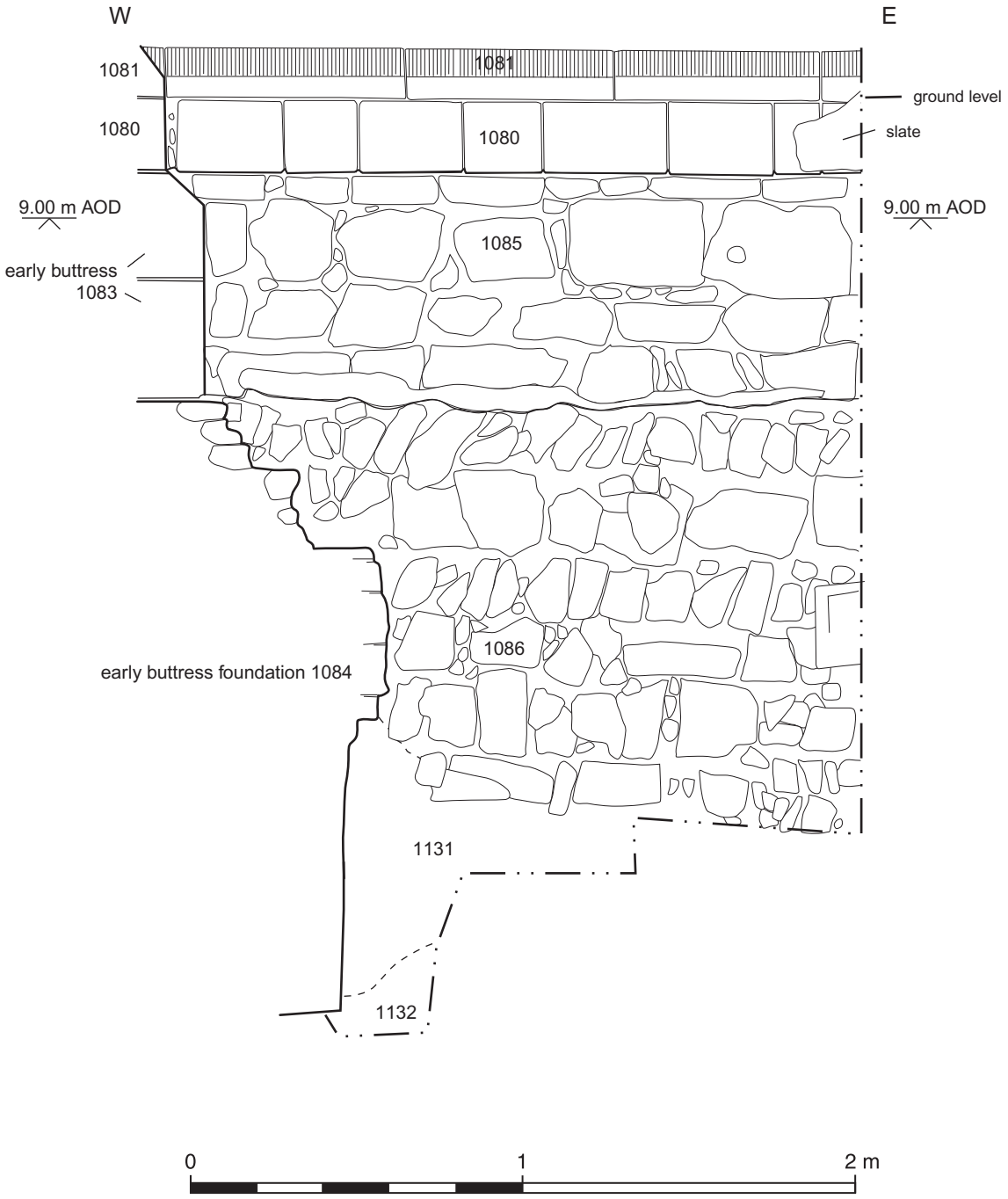


Figure 5: Trench 1, south-facing elevation. Scale 1:20

The buttress survived only two courses high, a later buttress of 14th-century date being built up from this level. Whilst the back edge of the buttress was identified, its inner edge, which should meet with a contemporary nave wall, was not reached because only a maximum depth of 0.65m of the face of the buttress could be revealed. The tooling on the ashlar blocks of the buttress suggests a 12th- to 13th-century date. It is apparent that the ground surface contemporary with this structural phase was lower than that of the existing 14th-century structure, possibly as low as 8.47m OD (0.93m BGL).

Three fills were present within the wider upper part of construction cut 1093. The lowest of these, 1097, was a light greyish-brown slightly clayey sandy silt containing numerous flecks of lime mortar. The latter element of the fill presumably relates to the dropping of mortar slops during the construction of the buttress foundation. A fill of light grey slightly silty clay, intermixed with a smaller amount of orangey clay, 1075, overlay 1097 and was in turn sealed by fill 1091. Forming the uppermost surviving fill of the construction cut, 1091 was a light to mid grey gritty silt containing frequent fragments of chalk, Oolitic Limestone and mortar.

A group of nine sandstone fragments, ranging in size from 0.14 x 0.07 x 0.05m to 0.52 x 0.28 x 0.12m, were observed in the extreme north central part of the trench. All these fragments originated from a single large rectangular slab, context 1092, that had fragmented whilst laid flat on the ground. Subsequent to deposition, the slab had also been truncated at its western side by buttress foundations of 14th-century date and been partially chipped away on the north side by a grave. Originally this slab was over 1.20m long by over 0.34m wide and around 0.10m thick. The upper surface was rounded and smoothed, the underside tooled. A thin deposit of mid greyish-brown clay, 1090, covered 1092. Although quite probably a re-used item, this slab was not, in the location in which it was found, functioning as a cover for a grave or other feature and so it must be assumed that it formed a meaningful entity in its own right. Quite what purpose it served is open to speculation, though one function may have been as some sort of hard standing, perhaps related to the construction works detailed above.

### 5.1.5 Thirteenth- to early 14th-century burials (Figure 12, Plate 3)

*A sequence of four burials post-dated the first structural episode of 5.1.4 but preceded that of 5.1.6, representing the building of the extant nave and associated buttresses. As the earlier building episode is likely to be of 12th- to 13th-century date and the later episode is known to be of earlier 14th-century, the date of these burials can be estimated with a reasonable degree of certainty. Interestingly, three of the four burials were within chalk block-lined graves.*

A deposit of brownish-grey slightly clayey silty sand containing frequent small fragments of chalk, 1098, extended across the central region of Trench 1. On stratigraphic grounds this deposit, which represents a churchyard soil and had been truncated in several places by later graves, could relate to the pre-first structural episode of 5.1.3.

Truncating the northern side of 1098 was grave cut 1096 which also cut away parts of the southern side of the construction cut 1093 and various of its backfills. This demonstrates

that this grave post-dates the first structural episode. The western end of cut 1096 was also truncated by later buttress foundations of 14th-century date. The sub-rectangular cut 1096 was occupied by skeleton 1095. This skeleton was rather poorly preserved, being largely cut away on the left side by a later burial. A single fill of mid greyish-brown clayey silt, 1094, lay within the cut above the level of skeleton 1095.

Grave 1096 was cut at its extreme east end by grave cut 1077, only the very westernmost square-ended part of which was present within the north-eastern part of the trench. The remainder of cut 1077 extended beyond the limits of excavation. Lining the edge of the grave cut was a series of partially faced and dressed chalk blocks, 1076, effectively forming a composite stone coffin. No skeleton was present at the extreme west of this grave, the body no doubt lying immediately east of the baulk. The single fill within the stone coffin, 1088, was a dark brown silty clay.

**Plate 3:** *Trench 1, burial 1072*

A second burial in a composite stone coffin was located in the extreme south-east corner of the trench. The grave cut of this feature, 1079, which cut through deposit 1098, was again square-ended with only the westernmost part within the limits of excavation. Within the chalk block lining, 1078, only the skull of an inhumation, skeleton 1089, was revealed. A single fill of mid brown silty clay, 1087, occupied the interior area of 1078 above the level of the interment.

Grave cut 1074 of the latest burial of this group was located in the central part of the trench, parts of the northern side of the cut butting hard against the southern face of the early buttress foundation, 1084. The westernmost part of this grave was fully cut away by later buttress works of 14th-century date. A lining of dressed chalk blocks (with one piece of Oolitic Limestone), 1073, fitted tightly within the cut. On the northern side these were positioned in line with the southern face of foundation 1084, effectively utilising the foundation as one side of the lining. Skeleton 1072, with lower arms and hands across the

pelvis, occupied 1073. Given that skeleton 1072 extended fully up to the southern face of 1084 in an undisturbed and articulated form, there is no reason to suppose that this burial was cut by the foundations. A backfill of brown sandy silt, 1071, overlay skeleton 1072 and produced pottery of 12th- to 13th-century date, as well as a small chip from an ashlar limestone block. Although no evidence was found to suggest that this or any of the other stone-lined graves had been fitted with covers, it cannot be ruled out that they may have been sealed by organic materials such as timber which has since decayed.

### 5.1.6 Fourteenth-century nave and buttress (Figures 2, 3, 4 and 5)

*The construction of the nave wall and buttress with their foundations for the extant building. These were built over and incorporated the earlier structural work detailed in 5.1.4.*

The initial element of the building of the early 14th-century nave and buttress was the digging of construction cut 1070 to house the foundation material. Rather in the manner of the construction cut for the buttress of the earlier construction, the upper part of cut 1070 was wider than the lower part, though much of the upper parts of this had been cut away by later graves. Within the lower parts of the cut the foundation material of both nave and buttress were built close to, and in some places hard against, the cut. Despite some loss of information due to truncation of the upper parts, it appeared that both the nave wall and buttress were housed within the one cut. The cut was deeper in the area of the buttress because the foundation of this component was constructed from a deeper level than the foundation for the nave wall. It was also noted that in the area of the buttress the lower parts of the cut curved inwards, by c.0.20m to the west in the lower 0.50m of the cut.

The 14th-century buttress incorporated the earlier buttress and its foundations. This was achieved by extending the buttress to the south (to a distance of 2.35m from the existing nave wall) as well as by building over it. All this buttress extension work was recorded as 1082. From its lowest parts, at a height of 6.50m OD (2.90m BGL) right up to the level of the top of the early buttress foundation (8.53m OD, 0.87m BGL), the buttress extension was composed of angular and sub-angular stone rubble ranging from a few millimetres to 0.45m. Nearly all the stone employed in this buttress extension was chalk, only one or two cobbles being noted. No coursing whatsoever was apparent in these lower parts; stone rubble seems simply to have been tipped into the construction cut. No mortar had been utilised as a bonding agent in this area, though quantities of a loose yellowish-brown sandy silt were present between some of the stones. Voids were present throughout this lower foundation material and accounted for c.15% of the volume. The voids, combined with an absence of effective bonding material enabled material from the foundation to fall away once exposed. The upper 0.65m of buttress foundation 1082 was composed of chalk, both worked and unworked, together with slightly fewer small Oolitic Limestone blocks. The latter all displayed at least some signs of having been worked or tooled, nearly all being square, typically around 0.15m across, and clearly re-used fabric.

The lower part of the nave foundations, 1086, extended to a depth of 7.18m OD (2.18m BGL), some 0.68m higher than those of the contemporary buttress extension 1082. The

bulk of foundation 1086 was composed of angular fragments of chalk, typically 0.10m to 0.39m, with much less Oolitic Limestone, generally of similar size. Some of the Oolitic Limestone pieces had been worked and represent re-used building material. Coursing, albeit rather poor, was evident throughout 1086. The only bonding material employed in this part of the foundation was a light brown silty sand. A small number of voids were present throughout 1086 though not to the same extent as in buttress extension 1082. The uppermost course of foundation material 1086 was composed solely of chalk fragments laid at an angle pitched from the vertical. The upper horizon of 1086 coincided approximately with that of the top of the earlier buttress foundation 1084. Further foundation material, 1085, overlay 1086. 1085 was composed overwhelmingly of large undressed blocks of chalk up to 0.45m across. Lesser quantities of small pieces of Oolitic Limestone, a number of which were clearly re-used, were also present, all in the upper parts where their size selection seems to have related to a requirement for levelling up at a specific height. 1085 was well coursed and copiously bonded with a cream-coloured lime mortar. The relative shallowness of the nave foundations in relation to the buttress is marked. It is likely, however, that earlier nave foundations associated with the structural episode of 5.1.5 lie only a short distance to the north of the outer side of the 14th-century nave and that this material has also been incorporated into the present structure.

The very uppermost part of the foundations was a single course of tight-jointed stonework, 1080, that extended across the top of the coarser foundation material of the nave and buttress. This material was seen to slump down very slightly to the south. All the stones were well-faced and dressed blocks of Oolitic Limestone, many of which bore fine diagonal tooling. Atop this sat a chamfered course of Oolitic Limestone, 1081, forming the lowest above-ground stonework of the present nave and buttress. It is probable that the ground level contemporary with the 14th-century work was the same as today's.

The lowest backfill of the wider upper part of construction cut 1070 was 1068, a light yellowish-brown sandy mortar containing occasional fragments of limestone and chalk, one of these pieces being a moulded block of Oolitic Limestone and another a fragment of a block. Two further backfill deposits lay above 1068. One of these, 1067, was an orangey-brown sandy silt clay restricted to the northern area of the buttress and the other, 1045, formed a narrow strip that ran parallel to the nave wall. This latter material was a light brown sandy silt containing moderate fragments of limestone and chalk.

### 5.1.7 Later medieval to post-medieval burials and charnel deposits (Figure 12)

*A sequence of eleven burials and six charnel deposits, mostly in pits. All of mid 14th-century to 19th-century date.*

Some of the earliest features of this sequence were charnel pits of various size. One of the earliest of these, 1069, which was located against the eastern edge of the 14th-century buttress extension, was sub-circular in shape and measured only 0.40m across and 0.37m deep. The mid brown silty fill of this cut, 1066, contained a number of disarticulated human bones. This feature was clipped on its south-eastern side by a considerably larger sub-rectangular cut, 1065, that measured over 1.50m x 1.0m, the feature continuing

beyond the southern and eastern baulks of the trench. In places nearly 0.50m deep, this pit contained very large quantities of disarticulated human remains.

A somewhat irregularly shaped grave cut, 1059, cut through the northern part of charnel pit 1065. Skeleton 1058, which was truncated on its right side, occupied this cut and was in turn sealed by a grave backfill of brown slightly clayey silt, 1061. Along the left side of skeleton 1058 a linear arrangement of six skulls together with other human bones, 1057, was present. These were associated with two undated sherds of pottery and occupied a narrow cut, 1060. It seems reasonably clear that grave 1059 cut through a number of burials and/or charnel deposits, and that these remains were then placed in a widening of the north side of the grave cut.

A further grave cut, 1054, cut through the upper part of charnel 1057/1060. The skeleton occupying this cut, 1053, was almost intact, only the skull and extreme right side of the body being cut away by later interments. A grave fill of brown clayey silt, 1052, overlay skeleton 1052.

Two burials clipped grave 1054. One of these, grave cut 1051, cut into the backfill of 1054 on its north-western side. 1051 contained the poorly preserved remains of a young child, skeleton 1050, and was overlain by a mid yellowish-brown sandy silt backfill, 1047, that produced a sherd of 12th- to 13th-century pottery.

This burial was in turn cut by grave cut 1039, containing the partially truncated skeleton 1038. Traces of wood staining, 1046, down the left side of 1038 indicated the former presence of a wooden coffin whilst coffin fittings indicate a burial date no earlier than the late 17th century. A grave backfill of mid brown sandy silt, 1037, overlay the remains of 1038 and 1046. Pottery of 13th to 14th-century date from this fill is clearly residual.

Grave cut 1036 clipped the extreme northern edge of grave 1054. This cut and its contents had in turn been severely truncated. Only parts of the extreme right side of skeleton 1035 survived within cut 1036. Traces of wood staining, 1040, adjacent to 1035 indicated that this burial had originally been within a wooden coffin. Only remnants of the dark brown clayey silt grave backfill, 1034, survived within grave 1036. Due to later truncation fewer remains survived of grave 1032 that overlay 1036. All that was left of the occupant of this grave was the right arm of skeleton 1033. This in turn was overlain by the remnants of brown clayey silt grave backfill 1031.

The heavily cut away remains of grave cut 1030 overlay graves 1039 and 1032. Just the right side of the occupant of 1030, skeleton 1029, remained and only a part of the brown clayey silt grave backfill, 1028. Given that this burial post-dates 1039, this interment is probably 18th-century in date. Parts of grave cut 1026 overlay grave 1030, the extreme northern and southern areas of which had subsequently been cut away. Parts of skeleton 1027 occupied cut 1026, which was in turn overlain by its grave backfill, 1025, a brown slightly clayey silt. The stratigraphic position of grave 1026, combined with a sherd of pottery recovered from fill 1025, suggests an early 19th-century date for this burial.

In the north-eastern area of the trench parts of an oval feature, 1064, cut into the backfill deposit 1068 that was associated with the building of the 14th-century nave. Cut 1064

was filled with a yellowish-brown clayey silt, 1062, that contained some disarticulated human bone. 1064 and its contents are interpreted as a charnel pit. A small sub-rectangular cut, barely 0.30m across, 1056 partially truncated the northern part of charnel pit 1064. This small feature was filled with a dark brown sandy silt, 1055, that contained a single skull, a number of disarticulated bones and a single sherd of 19th-century pottery. Again, despite its small size, this feature is interpreted as a charnel pit.

A number of features not containing articulated human remains were also present in the extreme north-west corner of the trench cutting directly into deposits associated with construction of the 14th-century church. The earliest of these was a small sub-square cut, 1044, measuring less than 0.30m across and located hard in the angle between the nave wall and buttress. A fill of mid brown sandy clay silt, 1043, in which a pipe-shaped void was identified, occupied this cut. The former presence of a rain-water drain may be indicated by this feature, the void once holding a pipe. Supporting evidence for this is provided by its corner location and a number of iron fittings higher up on the nave and buttress walls. The squared western end of a cut of unknown function, 1049, overlay the possible drain 1044. The cutting of 1049 had caused superficial damage to the foundations of the buttress. A single fill of dark brown sandy silt, 1048, occupied 1049. The function of this feature is not known, though it may have been intended for a grave, perhaps being abandoned because of the stepping out of the foundation material. This enigmatic feature was in turn succeeded by a sub-circular cut, 1042. Measuring just over 0.50m across, 1042 was filled by a dark brown gritty silt, 1041, in which a number of disarticulated bones were present. This feature probably served as a charnel pit.

The latest features of this sequence were three coffined burials that on the basis of finds and stratigraphy were all of 19th-century date. One of these, grave cut 1024, overlay burial 1026 and a number of the charnel deposits; it was the cause of much truncation of earlier burials because of its large size and depth. The coffin associated with this burial, 1022, survived solely as wood stains and an assortment of metal fittings. Skeleton 1023, which had lower arms and hands laid across the pelvis, occupied this coffin and was in turn sealed by grave fill 1021, a mid brown sandy silt which produced 19th-pottery.

Grave 1024 was partially overlain by grave cut 1018, at the base of which the full outline of a coffin, 1020, was apparent, though preserved only as a wood stain. Large numbers of iron nails and metal fittings relating to coffin 1020 were revealed and lifted. The occupant of this coffin, complete skeleton 1015, was present within the trench with lower arms and hands across pelvis. Two distinct backfills were noted in this grave. The lower, 1019, a mid grey sandy silt produced two sherds of medieval pottery and a silver threepence of Elizabeth I dated 1565. These finds were clearly residual. The upper fill, 1009, was a yellowish-brown sandy silt which contained pottery of 18th-century date.

The largest of the graves within Trench 1, cut 1016, was located against the southern baulk. This grave was around 1.20m deep and contained the poorly preserved remains of a wooden coffin, 1017, that had survived as a series of wood stains together with a few fragmentary pieces of iron. Only the left side of the occupant of this coffin, skeleton 1014, could be examined, the remainder lying beyond the limits of excavation. A grave backfill of greyish-brown clayey silt, 1002, sealed skeleton 1014. The pottery recovered from this fill provides a 19th-century date for this grave.

### 5.1.8 Late 19th- to early 20th-century post-holes

*A series of three post-holes, probably part of a scaffolding system.*

Three small cuts, 1008, 1003 and 1011, were noted, two directly adjacent to the nave wall and one adjacent to the buttress. Partial voids, up to 0.15m in diameter, with loose fills 1006/1005 and 1010/1013, were noted in the latter of these and represent the position of withdrawn posts. These were surrounded by packing fills of brown sandy silt containing occasional fragments of limestone. A similar fill, 1007, was present within 1008. Given the form and location of these small features they are likely to represent part of a scaffolding system, presumably relating to repairs or maintenance in this part of the Minster.

### 5.1.9 Modern

*Existing 20th-century concrete surface and bedding.*

The existing concrete apron, generally around 0.12m thick, together with its rubble bedding, all numbered 1001, form the latest deposits at the site. A thin barrier of slate was present between the concrete and ancient fabric.

## 5.2 TRENCH 2

### 5.2.1 Natural deposits (Figure 7)

A stiff mid greyish-brown (with a slight bluish tint) clay, 2094/2108, was the earliest deposit encountered in Trench 2. Excavated to a maximum depth of 6.63m OD (2.66m BGL), the upper parts of this material occurred at a height of 6.93m OD (2.36m BGL). The upper surface of 2094/2108 sloped down to the south. 2094 represents boulder clay which forms part of the natural drift geology at the site and can be correlated with 1132 in Trench 1. A stiff orangey-brown clay containing very occasional rounded pebbles, 2092/2103, directly overlay boulder clay 2094/2108 and was in turn sealed by an almost identical clay, 2083/2105, that displayed a slight yellowish tinge. It is almost certain that these two contexts form one and the same deposit and can be equated with 1131 of Trench 1. The uppermost parts of this material occurred at around 7.28m OD (2.0m BGL). Truncated by a number of features, parts of the upper horizon of this deposit were darker and more silty than the remainder, as a result of disturbance by later features and mixing at the interface with overlying deposits.

### 5.2.2 Earliest features (probably Anglo-Saxon) (Figure 6)

*Two small features, one a post-hole with post preserved, cut into natural clays. A squared timber within a cut that had been partially truncated by later foundations may also be contemporary.*

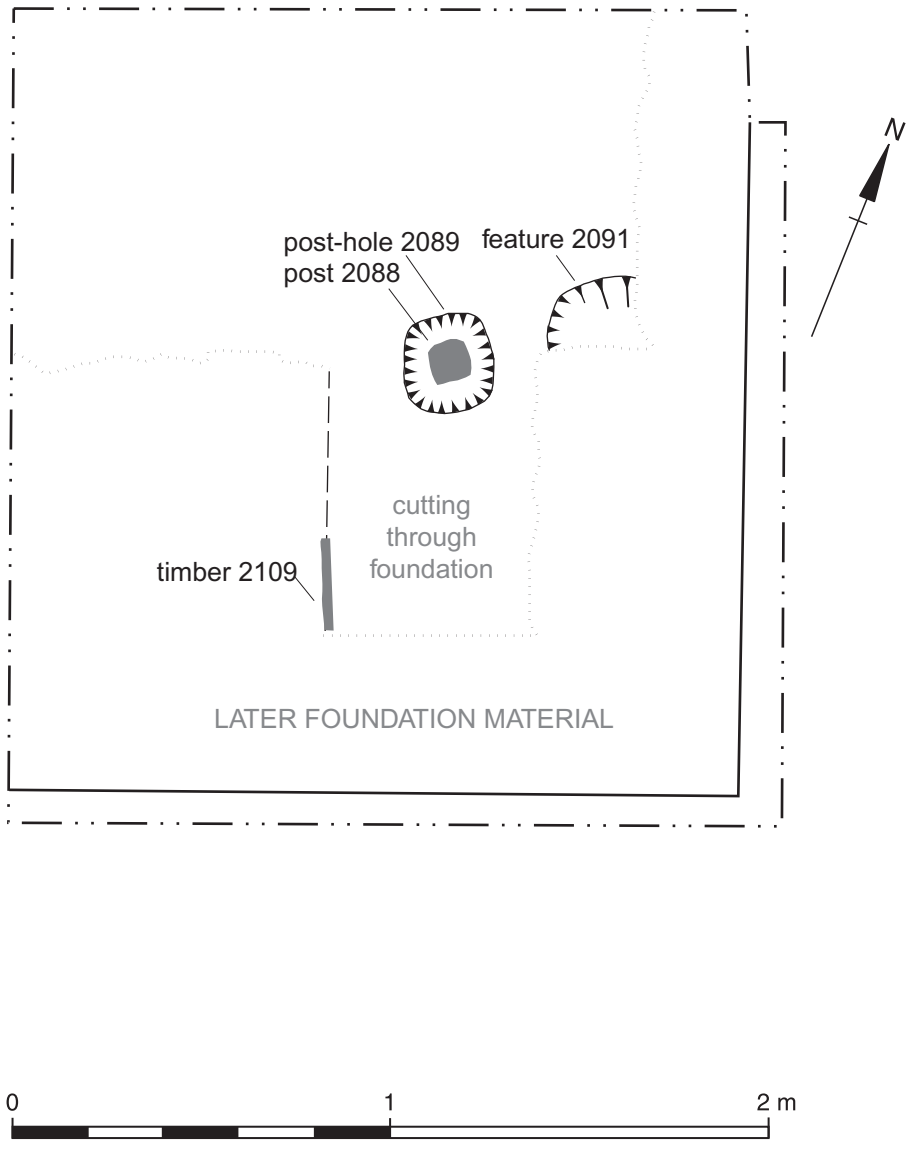


Figure 6: Trench 2, plan of earliest features. Scale 1:20

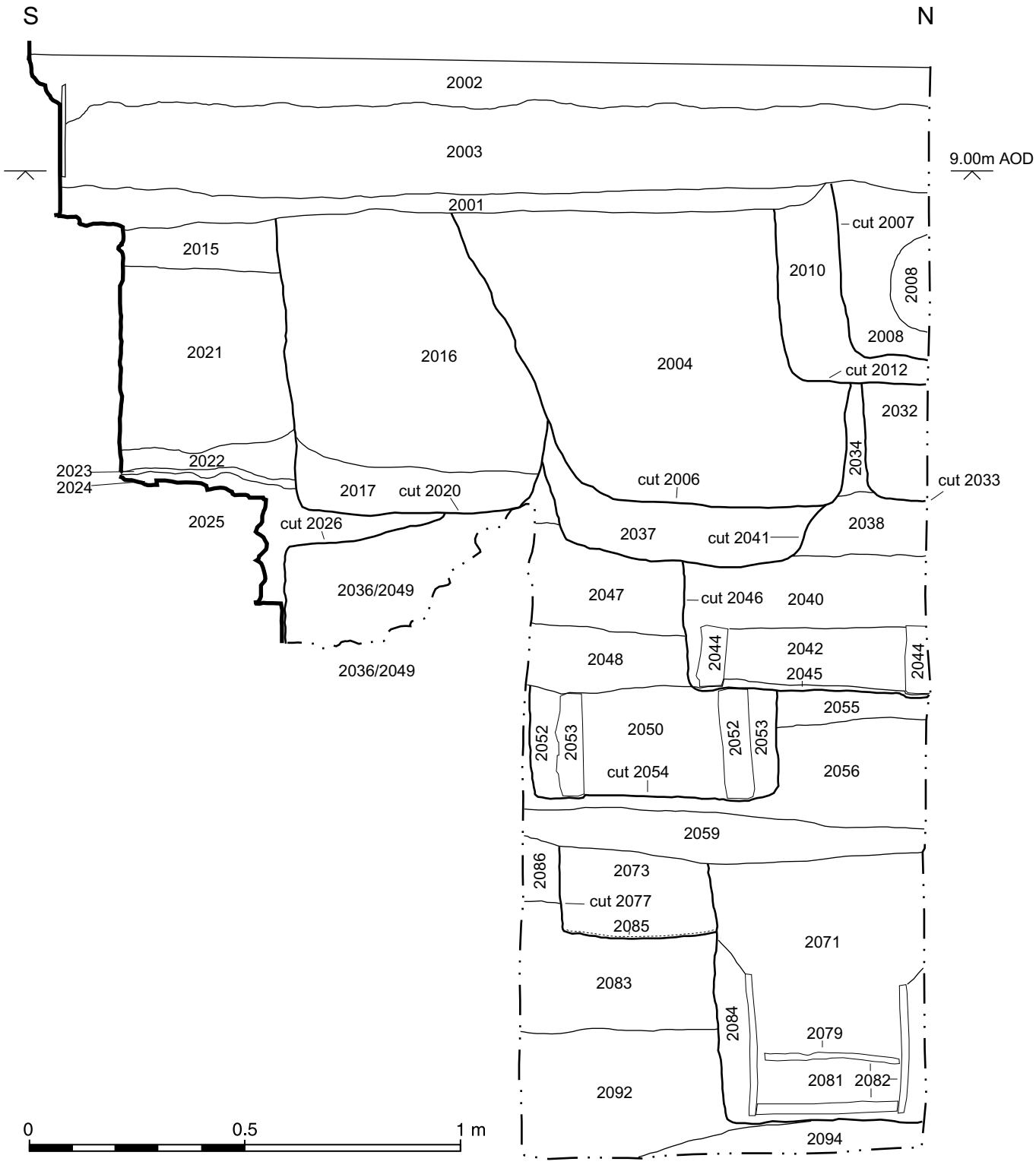


Figure 7: Trench 2, east-facing section.

A sub-square cut measuring around 0.25m across and just over 0.30m deep, 2089, was located in the east central part of the trench. This feature had near vertical sides, a rounded base and contained the remains of the lower part of an oak post, 2088 (sf 010), made of halved roundwood and displaying axe hewing marks. The only packing between the post and post-hole was a dark greyish-brown clayey silt, 2087. Approximately 0.15m east of 2089 was a further cut, 2091, that had been truncated on its south and east sides by later foundations. 2091 was c.0.22m deep, and had moderately steep sides and a concave base. A single fill of mid greyish-brown clayey silt, 2090, occupied this cut.

A layer of greyish-brown slightly clayey silt, 2086/2102, overlay the natural deposits and possibly the early cut features 2089 and 2091 also. This contained occasional small rounded pebbles and flecks of charcoal, together with a few small pockets of orangey clay; the latter no doubt originating from 2083/2105 below. There is some uncertainty over this as, although the features were not recognisable until the removal of 2086/2102, its characteristics and stratigraphic location above natural deposits suggest it may represent a former top soil or sub soil.

Revealed only in the east-facing section of a cutting through later nave foundation material was part of a feature, 2107, with vertical sides and a flat base, over 0.40m deep, that had been cut through 2086/2102. At the base of this cut lay a piece of timber, 2109, at least 0.14m thick, over 0.24m wide and of an unknown length, that had been at least partially squared. The true alignment of this timber could not be ascertained beyond an approximate east–west. This was overlain by 2110, a soft dark brown silt that was in turn sealed by 2111, an orangey-brown clay that formed the uppermost fill of cut 2107. Although later foundations served to remove the upper part of cut 2107, and therefore any evidence of sequential relationships to deposits above 2086/2102, comparisons of heights of this feature to those of 2089 and 2091 suggest they may be broadly contemporary.

There can be little doubt that 2089 functioned as a post-hole, though its purpose is unknown. The shallower cut 2091 does not seem to have been a post-hole though this cannot be ruled out absolutely. Whilst only parts of 2091 survived, it should be noted that a line drawn across the northern edges of these features mirrors that of the early alignment burials of 5.2.3 below. Although timber 2109 within cut 2107 may be contemporary with 2089 and 2091, it is not possible to offer a fuller interpretation of this enigmatic feature. It is conceivable that small parts of an early, pre-conquest structure may be represented by these features, but given the small areas of this horizon exposed caution must be exercised.

### 5.2.3 Early alignment burials (Anglo-Saxon) (Figure 12, Plates 4 and 5)

*The three earliest burials in Trench 2, all on a different alignment from the later burials. The alignment mirrors that of the earliest burial in Trench 1.*

One of this group of burials, contexts 2098-2100, was located in the extreme north-east of the trench and was seen only in section. The grave cut of this burial, 2100, had vertical sides and a flat base. The western end and small parts of the southern side of a well-

preserved wooden coffin, 2099, sat on the base of 2100, whilst a backfill of sticky dark greyish-brown silt, 2098, occupied the area between the coffin and grave cut. This burial was not excavated.

**Plate 4:** *Trench 2, burial 2076*

A steep-sided flat-based grave cut, 2077, was located in the north central part of the trench. Extending fully across the base of cut 2077 was a layer of fine chalk flecks, 2085, typically less than 1mm thick. Directly above this was skeleton 2076, whose lower arms and hands lay across the pelvis. This burial was accompanied by two objects: a thin willow rod or wand (sf 232), some 0.46m long, lay by the left leg; and an Anglo-Saxon glass bead (sf 231) lay in the region of the hands. A very thin layer of soft grey silt fill, 2075, surrounded and lay over skeleton 2076. Immediately above this fill lay a wooden board of radially faced oak, 2074, which survived for a length of 1.20m and a width of up to 0.38m (see wood report). Although not particularly well preserved, it is clear that this board had been used as a simple cover directly over skeleton 2076 and did not form a coffin lid that had been associated with a base and sides. Filling the remainder of grave cut 2077 above the level of board 2074 was a mixed backfill composed predominantly of greyish-brown clayey silt but also containing clumps of orangey-yellow clay, 2073. This suggests that it originated as a mixture of soil (2086) and natural clays through which the grave cut. Stratigraphic evidence suggests this burial was 10th-century or earlier.

A small part of the very southern edge of 2077 clipped another burial of the early group, grave cut 2072. This grave was rectangular in plan and had near vertical sides and a flat base. Although the extreme east and west ends of this grave lay just beyond the limits of excavation it was possible to examine this burial in its entirety. A well-preserved and complete oak wooden coffin, 2082/2079, lay at the base of the grave cut and was held together with small wooden dowels (see wood report). The component parts of this coffin, base, lid and sides, were apparently all derived from the same tree that was felled in or shortly after AD 992 (see dendrochronological dating report). Evidence from other coffin assemblages suggests that such a coffin would be constructed from green oak. A small amount of soft dark brown organic silt, 2081, was present within the coffin, along with its occupant, skeleton 2080. The distribution of the bones of 2080 was curious: the

legs, arms, pelvis and skull fragments were all approximately in their correct position within the coffin though somewhat displaced, whilst the ribs and vertebrae were thoroughly jumbled though again in roughly the correct area of the coffin. There are two possible explanations for this disturbed state: a rat or other small animal may have gained access to the coffin whilst in the ground, or the body and coffin may have been translated from elsewhere. A backfill composed predominantly of greyish-brown clayey silt with lesser amounts of clumps of orangey-yellow clay, 2071, occupied the remainder of grave cut 2072 above the level of the coffin.

**Plate 5:** *Trench 2, burial 2080*

### 5.2.4 Earlier medieval burials (Figure 12)

*A sequence of six medieval burials, together with a number of deposits, probably spanning the period 11-12th to 13th centuries. All these burials were on a similar alignment, which diverged by several degrees from the earlier alignment.*

The earliest of these burials occurred in the extreme north-east corner of the trench where a small steep-sided but shallow sub-rectangular grave cut, 2070, contained the poorly preserved remains of a very young child, skeleton 2069. A backfill of greyish-brown sandy clay silt, 2068, occupied the remainder of the grave above the level of the skeleton. A deposit of brownish-grey clayey silt containing frequent fragments of chalk, lesser amounts of Oolitic Limestone and flecks of lime mortar, 2059/2101, overlay burial 2070. Although the origin of this deposit is uncertain, the stone and mortar content point towards the presence of stone buildings in the locality at this time.

A further child burial, skeleton 2057, was seen in the north central part of the trench at the upper horizon of 2059. No associated grave cut could be determined. Traces of wood staining, 2058, were noted on the right side of the burial, however, and these may

indicate the former presence of a coffin. A single sherd of pottery, possibly of 13th-century date, was present within this staining.

Two deposits lay above burial 2057. The lower of these, 2056, was a spread of mixed materials that generally had a depth of around 0.15m. Composed mostly of a light brownish-grey sandy clay silt, 2056 also contained clumps of yellow-brown clay and lenses of dark brown silt, together with fragments and flecks of lime mortar. Deposit 2055 overlay 2056 and was largely restricted to the northern part of the trench. Composed mostly of a brownish-grey slightly sandy clayey silt, approximately 20% of the deposit comprised fragments of chalk and around 10% lime mortar fragments. It is not possible to be absolutely certain about the origin of these deposits; however, their mixed nature, the rubbly content and the presence of a number of tipping lines suggest the dumping of unwanted debris. This may be related to the discard of materials during building demolition or construction.

Grave cut 2054 cut through the earlier deposits in the central part of Trench 2, the westernmost parts of the cut laying beyond the limits of excavation. This cut had been lined with dressed chalk blocks, together with a small piece of Oolitic Limestone, 2052, effectively forming a composite stone coffin. A small amount of light greyish-brown clayey silt, 2053, filled a number of small spaces between the chalk blocks and grave cut. Skeleton 2051 occupied the lower part of the interior of the grave lining and was in turn overlain by a fill of light greyish-brown clayey silt, 2050, from which were recovered three abraded sherds of pottery of a probable 12th- to 13th-century date. It should be noted that no grave cover was associated with this burial, unless it had been of timber which has since decayed.

Two deposits overlay burial 2054. The lower of these, 2048, was a greenish-brown sandy silt containing frequent fragments of chalk. Deposit 2047, a light greyish-brown clayey silt containing three sherds of 12th-century pottery overlay 2048. Although both deposits were severely truncated it seems most likely that they represent churchyard soils.

A large grave cut with vertical sides, 2046, cut away the northern sides of deposits 2047 and 2048. The very western end of this feature lay beyond the limits of excavation. A thin bedding of fine chalk gravel intermingled with lesser amounts of clayey silt, 2045, extended fully across the base of cut 2046. A series of dressed chalk blocks, 2044, had been laid as a lining tight against the grave cut above the level of the basal deposit 2045. Within this lined grave the remains of skeleton 2043 were uncovered. This skeleton was sealed by a lower grave fill of light greyish-brown clayey silt, 2042, and was in turn overlain by an upper fill, 2040, that was nearly identical to 2042 but contained more inclusions of chalk — including some chips from dressed blocks, mortar and charcoal. Again, there were no indications of a grave cover to this burial.

In the extreme north-west corner of the trench parts of the right leg only of skeleton 2039 were uncovered; this appeared curiously flexed. No grave cut could be identified for this burial, which was sealed by a greyish-brown sandy clay silt that appeared to extend across the trench, 2038, containing a single sherd of 12th-century pottery.

The only other burial belonging to this episode was one partially uncovered in a narrow archaeological cutting through part of the early foundations of 5.2.5. This burial was defined by a flat-based shallow cut, 2097, into which the remains of skeleton 2096 had been placed. A backfill of light greyish-brown slightly sandy clayey silt, 2095, occupied the remainder of the cut above the level of 2096.

### 5.2.5 Earliest structural remains (probably 12th to 13th century) (Figures 8, 9 and 10)

*The earliest structural remains in Trench 2 consisted of a buttress and its associated foundations, together with foundations for the nave wall. An adjacent feature, possibly a padstone, may be associated with this episode.*

The earliest component of this episode relates to the construction trench cut to house the foundations for the nave wall and its associated buttress. Although excavation confirmed that the foundations of both nave and buttress were contemporary and housed within what was effectively a single construction cut, at the time of excavation two separate numbers were allocated to this cut, 2066 and 2067. The lower parts of the construction cut, which extended to a depth of 6.79m OD (2.50m BGL) in the case of the buttress and were some 0.14m higher in the case of the nave wall, were flat-based and had vertical or near-vertical sides up to a height of 7.80m OD (1.49m BGL). Above this, and in line with the northern edge of the buttress, the cut stepped out horizontally for some 0.30–0.35m before rising vertically again to a maximum surviving height of around 8.17m OD (1.07m BGL).

The foundation for the buttress, 2064, was built of Oolitic Limestone with lesser quantities of chalk and was constructed hard against the vertical sides of the lower part of the construction cut. Much of the Oolitic Limestone was of roughly shaped blocks up to 0.40m across, a few of which are likely to have been re-used — including part of an engaged column displaying fine diagonal tooling and likely to be of 12th-century date. The chalk tended to be smaller and less well shaped. Although it cannot be stated with absolute certainty, one or two pieces of stone within 2064 may have been of Magnesian Limestone. All the stonework was bonded with a rather sandy creamy-white lime mortar, much less so towards the south than the north. A degree of coursing was evident within the buttress foundation, particularly towards the northern end of the feature. The nave foundation, 2106, was contemporary with the buttress foundation, as demonstrated by a number of blocks of stone that bridged from one to the other, one of these being a very large piece of fossiliferous limestone. In spite of this, clear differences in construction and materials were identified within 2106. One of the key variations was the relative proportions of stone types employed, this being mostly of chalk with lesser amounts of Oolitic Limestone though again with one or two possibly of Magnesian Limestone. Again, relative to 2064, very few of the stones within 2106 bore any signs of tooling. The other significant difference was that the stonework of 2106 could, at best, only be described as crudely and inconsistently coursed. A weak sandy mortar was present in some parts of the foundation, in others a matrix of silty sand. The early buttress foundation extended to a height of 8.23m OD (1.04m BGL), the nave foundation some 0.35m lower than this.

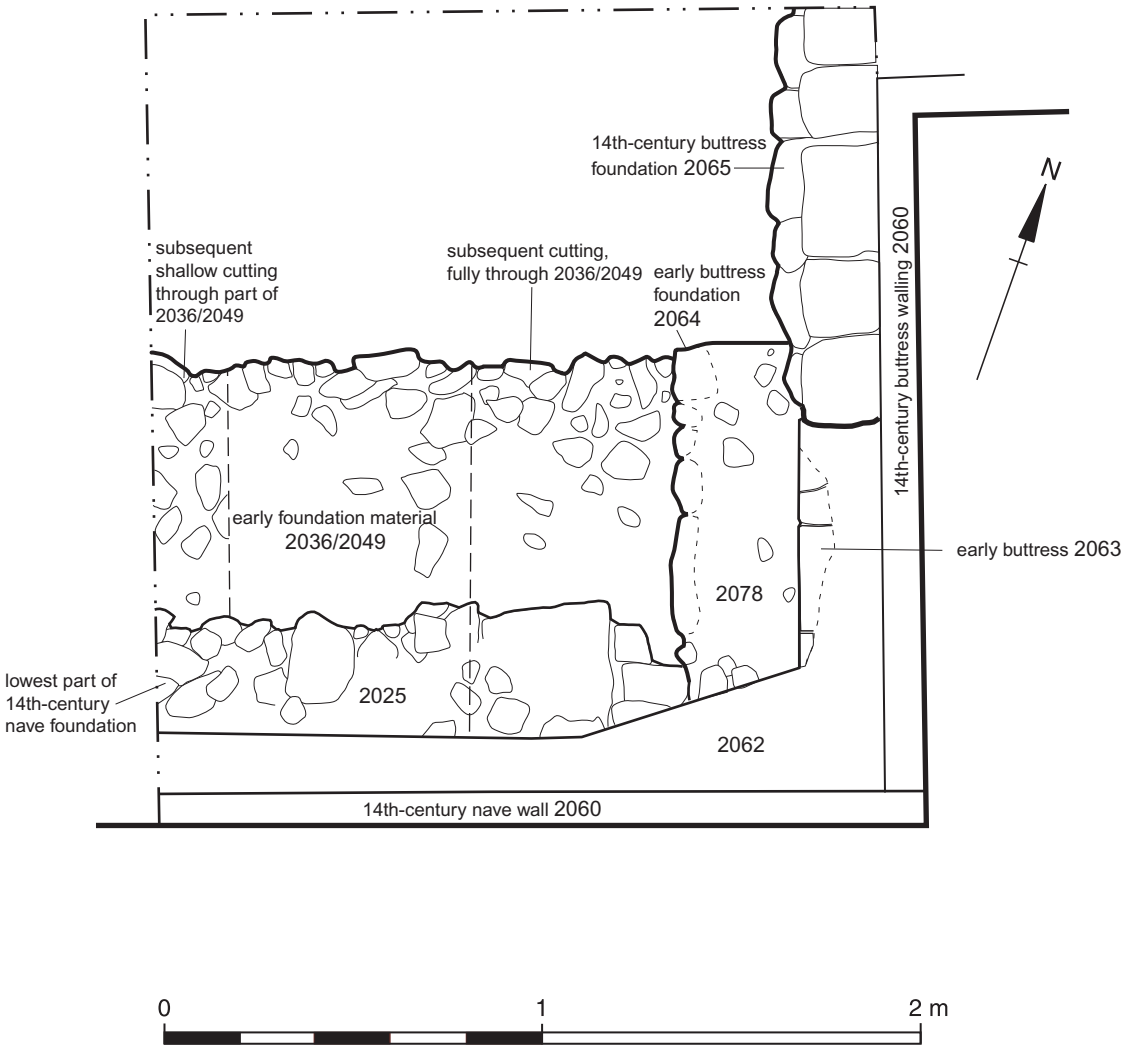


Figure 8: Trench 2, foundation plan. Scale 1:20

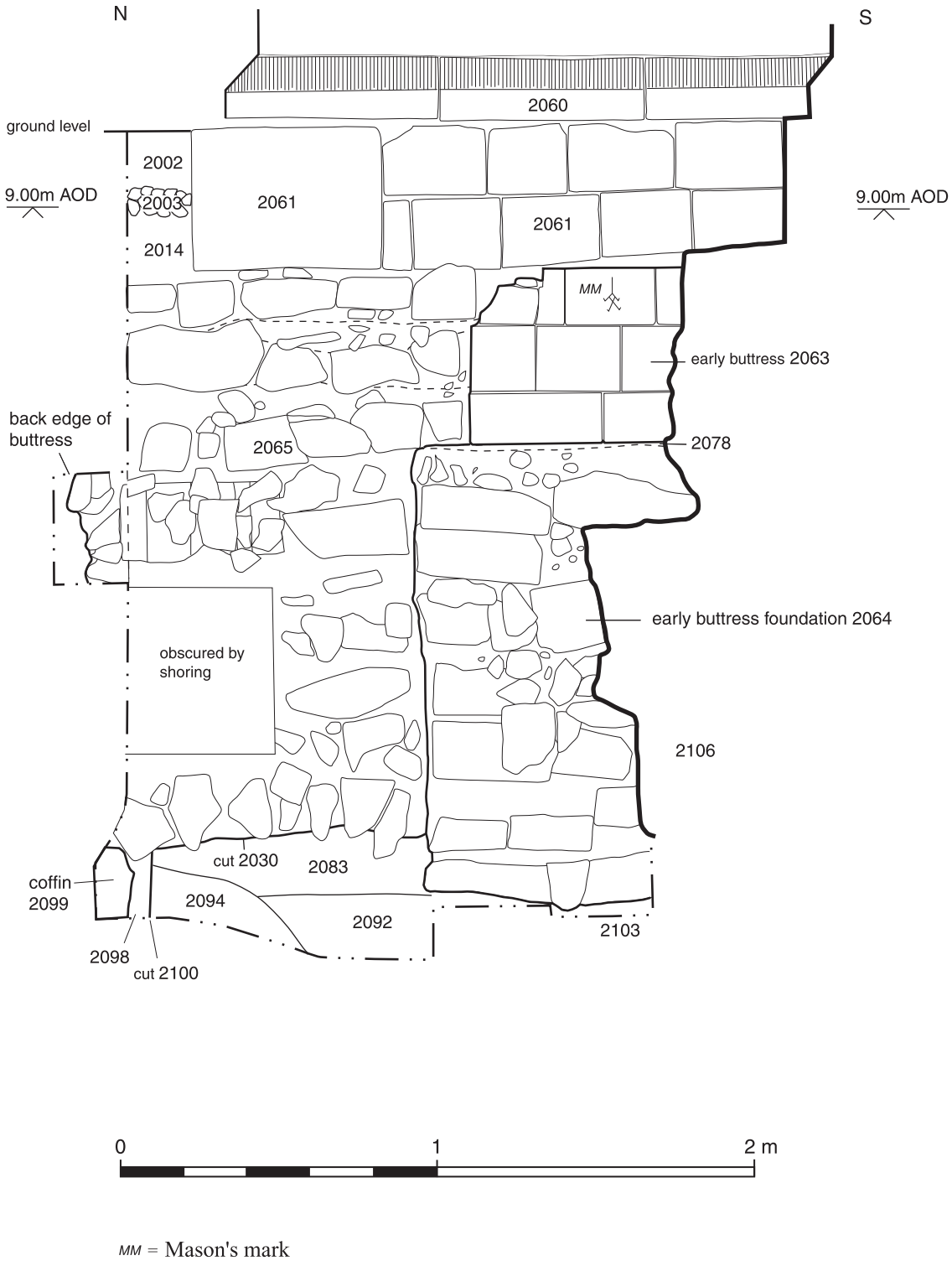


Figure 9: Trench 2, west-facing elevation. Scale 1:20

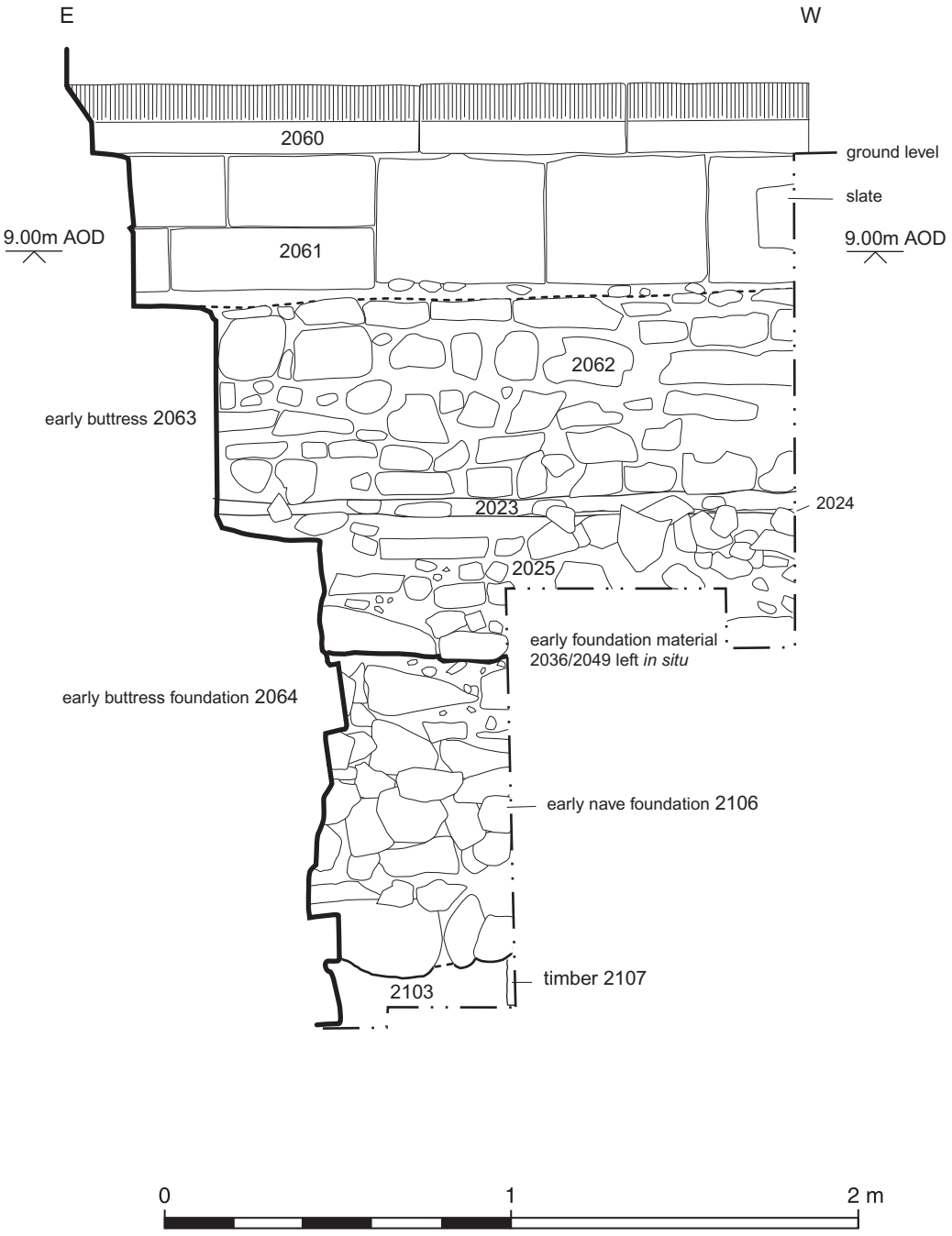


Figure 10: Trench 2, north-facing elevation. Scale 1:20

There is evidence that once construction had reached the stage of placing the foundation material for the nave and buttress within the construction trench, the wider, upper part of the construction cut was backfilled. The lowest deposit here was 2104, a mixture of yellowish-orange and greyish-brown clays that occurred as a small deposit restricted to the eastern part of the cut. This was overlain by 2036/2049, a mass composed predominantly of angular fragments of chalk within a matrix of yellowish-orange clay and silty clay. A single sherd of 12th-century pottery was recovered from this material, in which occasional small voids were noted. A copper alloy dress pin is of Anglian or Anglo-Scandinavian date and is clearly residual.

A thin spread of pale pinkish-coloured sandy lime mortar, 2078, was seen to cap the uppermost parts of the buttress foundation 2064 and to spread over the easternmost part of the construction trench backfill 2036/2049. The buttress proper, 2063, was constructed over this mortar spread. Buttress 2063 was built of well squared blocks of Oolitic Limestone (one or two Magnesian Limestone possibly present) that were tightly jointed and displayed fine diagonal tooling. A mason's mark was visible on one of these blocks (see Figure 9, West-facing elevation). The buttress survived to a height of three courses, with a later 14th-century buttress being built above this. The vertical back edge of the buttress was readily identifiable, though the inner edge at its point of juncture with a contemporary nave wall clearly lies beyond, that is, south of, the outer face of the extant 14th-century nave wall. The tooling on the ashlar blocks of the buttress suggests a 12th- to 13th-century date. It is apparent that the ground surface contemporary with this structural phase was lower than that of the existing 14th-century structure, possibly as low as 8.28m OD (0.95m BGL).

In the north-eastern area of the trench and at a height that mirrored that of the lowest course of buttress 2063, a large rectangular block of Oolitic Limestone laid flat on a bedding of pale pink lime mortar identical to that of 2078 was observed. This block, 2035, which was aligned parallel to the church and was clearly a re-used piece, displayed a chamfer and fine diagonal tooling. Given the stratigraphic horizon of 2035, its relative height, alignment and mortar type of its bedding, it is probable that this feature relates to this structural episode, perhaps functioning as a padstone for a scaffolding system.

### 5.2.6 Build-up/ground raising

Two deposits, 2034 and 2028, that were subsequently much truncated, overlay parts of the structural components of the early building detailed in 5.2.5 above. The lowest of these, 2034, was a ribbon-like deposit of mid grey clayey silt containing some chalk and limestone rubble located in the northern part of the trench. This was overlain by 2028, a light brown sandy clay silt that extended across much of the central and eastern parts of the trench. Although heavily cut away by later features, in places these deposits survived to a thickness of up to 0.40m. It is suggested that 2034 and 2028 may represent remnants of materials deposited in order to raise the ground level for the 14th-century rebuilding of the nave.

### 5.2.7 **Fourteenth-century nave and buttress** (Figures 7, 8, 9 and 10)

*The construction of the nave wall and buttress with their foundations, for the extant building. These were built over, and incorporated, the earlier structural work detailed in 5.2.5.*

The initial element of the building of the early 14th-century nave and buttress was the digging of two construction cuts to house the respective foundation materials. Each cut and its lower foundation material is described below separately, text common to both components commencing at the point at which foundation material common to both occurred.

Cut 2026, which housed the nave walling, was aligned east–west. It extended fully up to the early buttress of 5.2.5 and cut through the northern part of deposit 2028. The bulk of the upper part of this cut and its backfill had been removed by a later grave, though at the extreme western end of the trench virtually all of the southern side of the construction cut was present. These fragments do nonetheless permit the original appearance of cut 2026 to be described. The flat base of this feature cut into the upper parts of the earlier nave foundation material 2106 and rose vertically to a height of around 8.06m OD (1.18m BGL). From this point cut 2026 widened horizontally to the south for a further 0.40m before rising again sharply. The uppermost part of the cut survived up to a height of 8.85m OD, this equating to a depth below existing ground level of only 0.39m.

The lower part of the 14th-century nave foundations, 2025, was composed of angular fragments of chalk up to 0.32m in size together with lesser amounts of limestone. None of this material was in any way coursed and, although it was bonded with a stiff orangey-brown clay, one or two small voids were present. 2025 occupied the full width of the narrower lower part of foundation cut 2026. Once the lower foundation material 2025 was in place, a backfill of yellowish-orange clay, 2024, was placed in the lower part of cut 2026. Some of this clay lapped over 2025. A thin spread of lime mortar, 2023, overlay 2024. Although forming the lowest parts of the construction cut backfill, 2024 and 2023 were also clearly integrated within the foundations. The bulk of the remainder of the 14th-century nave foundations were of crudely coursed unworked blocks and fragments of chalk within a matrix of a cream-coloured lime mortar, 2062. Curiously, this material curved out at the eastern end where it butted up against the earlier buttress 2063. Displaying a vertical outer face of fairly smooth appearance, it is possible that 2062 had been laid within shuttering. The lower of the remaining backfills within foundation trench 2026, was a thin deposit of pale greyish-brown clayey silt, 2022. This was overlain by 2021, a 0.45m deep fill composed almost entirely of small angular fragments, seldom over 0.10m in size, of Magnesian Limestone with lesser amounts of chalk. Nearly all of these were chips from ashlar blocks and displayed claw tooling. Their freshness and sharp edges suggest they were buried rapidly after their creation. This material probably represents working waste from the preparation of blocks for use in the 14th-century nave that had been disposed of as backfill. The uppermost backfill, 2015, was a thin spread of clayey sandy silt.

The 14th-century buttress incorporated the foundation and lower parts of the earlier buttress of 5.2.5, the later foundations effectively forming an extension of the earlier. The

foundation cut, 2030, extended from the northern end of the older buttress in a northerly direction and reached a depth of up to 6.95m OD (2.28m BGL). With the exception of the uppermost surviving 0.25m of the cut, which sloped in at an angle of around 45 degrees, this entire feature had vertical sides. The foundation material within this cut, 2065, was nearly all randomly laid, the only crude attempts at coursing being apparent in the upper 0.55m of the deposit. Nearly all the stone, which had a size range of around 0.10–0.39m was of chalk and limestone, the latter being a mixture of Oolitic and Magnesian types. All the chalk was of unworked angular fragments, some of the limestone showing signs of tooling and some of the Oolitic being re-used architectural fragments. One or two cobbles were also present. There were numerous voids in the lower parts of 2065 where the only bonding material was a loose matrix of sandy clay silt. In the uppermost parts of the foundation a number of weak sandy mortars were noted, their variation probably indicating individual 'lifts' in their laying. In the wider upper part of foundation cut 2030 the single backfill, 2029, was composed exclusively of small fresh angular fragments of Magnesian Limestone, identical to that of 2021 in the nave foundation cut, one of which bore tool marks.

The uppermost parts of the foundations, extending around both nave and buttress, consisted of two courses of tight-jointed blocks of limestone, nearly all Oolitic, 2061. Atop this sat a chamfered course of limestone, 2060, forming the lowest above ground stonework of the present nave and buttress. It is probable that the ground level contemporary with the 14th-century work was the same as today's.

A deposit of light greyish-brown clayey sandy silt, 2027, in the eastern part of the trench above the level of the buttress foundation cut 2030, may relate to a deposition of materials for ground levelling purposes around the time of this episode of construction.

### 5.2.8 Later medieval to post-medieval burials (Figure 12)

*A sequence of four burials, all of post-mid 14th-century to 19th-century date.*

To the north-west of the trench the southern side of the eastern part of a grave, cut 2033, was noted. This contained the right leg and parts of the right hand of skeleton 2032. A single fill of greyish-brown clayey sandy silt containing stone and mortar rubble, 2031, overlay skeleton 2032.

A deep, steep-sided rectangular grave cut, 2020, cut through much of the 14th-century nave foundation trench in the central part of Trench 2. At the base of the cut wood staining, 2018, indicated the former presence of a coffin that had contained skeleton 2019. The presence of tin-dipped iron plate associated with this coffin indicates a date in the late 17th century, or even later. Two fills occupied the remainder of the grave cut above the level of 2018/2019. The lower of these, 2017, was a greyish-brown clayey silt containing large amounts of stone rubble. A silver groat of Mary issued 1553-4, a pin and a buckle were recovered from this fill, as were three sherds of post-medieval pottery. The upper fill, 2016, was composed predominantly of stone rubble and mortar fragments, together with smaller quantities of silty sand. The finds from the lower fill of this grave were all of a post-medieval date and may be contemporary with this burial.

A small deposit of greyish-brown sandy silt located in the extreme north-east corner of the trench, 2014, produced two sherds of 17th-century pottery. This material represents parts of a churchyard soil.

The eastern parts of a further large, deep grave, cut 2006, clipped the northern edge of grave 2020. Disturbed greyish-brown clayey sandy silt containing a single sherd of 18th-century pottery, 2041/2037, was noted at the base of this cut. This disturbed area may have been the result of initial poor digging and a subsequent levelling off at the base of 2006. Wood stains towards the base of this grave, 2005, together with a number of iron fittings of the late 18th century or later, indicated the presence of a coffin. Skeleton 2013, with hands laid across the pelvis, occupied this coffin. A single grave backfill of greyish-brown sandy silt containing small fragments of limestone and residual medieval pottery, 2004, overlay 2005/2013.

The latest of the burials, grave cut 2012, located in the north-western part of the trench clipped graves 2033 and 2006. At the very base of this cut faint traces of wood staining were noted and these together with fragments of tin-dipped iron plate appear signify the former presence of a wooden coffin. The occupant of this grave, skeleton 2011, had lower arms and hands folded across the pelvis. A single backfill of greyish-brown sandy silt, 2010, containing a single sherd of post-medieval pottery, overlay skeleton 2011.

### 5.2.9 Modern

*Existing 20th-century concrete surface, make-up and a drain.*

The southern part of an east–west aligned ceramic drain, 2008, set within a cut with vertical sides and its backfill, 2007, extended across parts of the extreme northern edge of the trench. Above this lay a thin rubbly spread of limestone and chalk fragments in a matrix of greyish-brown silty sand. This was sealed by 2003, a thicker bedding of stone rubble, mostly large fragments of sandstone, with a lesser quantity of brick fragments. The uppermost deposit was the concrete apron 2002, generally around 0.10m thick, which forms the extant ground surface.

## 6. BOREHOLES

A series of five percussion boreholes, each extending to a depth of around 6m BGL, were cut in the open ground surrounding the Minster building by GEA (Geotechnical and Environmental Associates). These were numbered 1–6 (borehole number 3 was abandoned/not cut). Four of the boreholes were monitored by archaeologists from York Archaeological Trust. The locations of these are shown in Figure 1.

### 6.1 **Borehole 1** (ground level at 8.43m OD)

The upper horizon of glacial till (boulder clay) of the natural drift was encountered at a depth of 6.43m OD (2m BGL). Immediately above the drift, and extending to a height of 1.74m BGL, was a deposit of brownish-grey slightly fibrous silt. This may represent part of a relict soil that developed above the drift.

Extending from 1.74m up to 1.28m BGL were light brown clayey silts containing occasional fragments of chalk and flecks of charcoal. These materials appear to represent a series of churchyard burial soils. From 1.28m up to 0.98m BGL large quantities of chalk fragments, together with a lesser amount of limestone fragments, were retrieved from deposits whose matrix was of yellowish sandy silts. The high proportion of stony materials at this depth may have originated from the spreading/dumping of construction (or demolition) materials.

Between 0.98m and 0.17m BGL mid to dark brown sandy silts containing small quantities of chalk, limestone and ceramic building materials were present. These are interpreted as churchyard burial soils. The extant turf and topsoil horizon extended from 0.17m BGL to the ground surface.

**6.2 Borehole 2** (ground level at 9.15m OD)

The uppermost parts of glacial till (boulder clay) were reached at a depth of 5.80m OD (3.35m BGL). Extending from 3.35m to 3.10m BGL a clean, pure sand was noted. This sand probably indicates the fill of a natural hollow at the surface of the drift, possibly a melt-water channel. Between 3.10m and 2.92m BGL a mid to dark grey, slightly organic clayey silt, possibly a relict soil, was encountered.

Extending from 2.92 to 2.20m BGL were a series of yellowish-brown clayey silts representing churchyard soils. Within these, at 2.68m BGL (6.47m OD), there was a thin piece of wood with bone immediately above it. The wood was probably from the base of a coffin, the bone a part of its contents. From 2.20m to 1.40m BGL quantities of chalk and limestone rubble within a matrix of yellowish-brown clayey silt were recorded. The density of stone may point towards the spreading of rubble during an episode of construction or demolition.

Between 1.40m and 0.32m BGL yellowish-brown and brown sandy clay silt representing churchyard burial soils were encountered. The extant turf and topsoil occupied the area between 0.32m BGL and the present ground surface.

**6.3 Borehole 3**

This borehole was not cut.

**6.4 Borehole 4** (ground level at 8.36m OD)

Glacial till (boulder clay) was reached at a depth of 6.26m OD (2.10m BGL). Above the drift and extending from 2.10m to 1.60m BGL were a series of fairly soft yellowish-brown sandy silts, probably burial soils.

Extending from 1.60m to 0.22m BGL were a series of mixed soils, mostly light to mid greyish-brown sandy clay silts. These clearly relate to churchyard burial soils. Between 0.22m BGL and the existing ground surface was the topsoil and turf.

### 6.5 **Borehole 5** (ground level at 9.38m OD)

The upper horizon of glacial till (boulder clay) was reached at a depth of 6.03m OD (3.35m BGL). Between 3.35m and 2.30m BGL mid grey clayey silts containing occasional flecks of charcoal and oyster shell were reached. Fragments of wood, possibly derived from a coffin, were noted mid-way in this sequence. These materials are likely to be churchyard burial soils.

Yellowish-brown and brown sandy clay silts extended from 2.30m to 0.37m BGL. Chalk and limestone fragments together with a small quantity of human bone were recovered from these materials. These soils represent churchyard burial soils. Between 0.37m BGL and the present ground surface lay the extant turf and topsoil.

### 6.6 **Borehole 6**

This borehole was not archaeologically observed, though information supplied by the geotechnical engineers suggests that the drift geology lies at a depth of 3.35m BGL with made ground above this.

### 6.7 **Summary**

Deposits in all the boreholes confirm the presence of archaeologically significant deposits between 2m and 3m deep above the level of the natural drift of glacial till (boulder clay). The majority of these relate to churchyard burial soils, with some evidence from two of the boreholes (2 and 5) for at least partially preserved wooden coffins (and therefore probably other organic materials) between depths of 2m and 3m BGL. This observation is of some significance. Quantities of rubble were encountered at a number of horizons and are likely to relate to the spreading of surplus building debris during various episodes of building work/demolition.

## 7.0 **POTTERY** by Ailsa Mainman

Very little pottery was recovered from the excavations. Much of it comprised small undiagnostic body sherds, so the information on form and chronology which could be obtained was limited. The earliest material was of 12th-century date, as represented by the splashed wares (a possible Stamford ware sherd was unstratified). Beverley-type and Brandsby-type sherds were recovered in very small quantities and the remainder of the material was post-medieval or modern in date.

***Table 1**: Pottery listing*

| CONTEXT | No. of SHERDS | SPOT DATE | DETAILS |
|---|---|---|---|
| 0 | 1 | 10TH/11TH CENTURY? | 1 sherd of possible Stamford ware |
| 1000 | 1 | 13TH/14TH CENTURY | 1 Brandsby-type ware |
| 1002 | 14 | 19TH CENTURY | 1 Cistercian ware sherd<br>1 reversed Cistercian ware<br>1 tin-glazed earthenware<br>11 post-medieval earthenwares |

| | | | |
|---|---|---|---|
| 1009 | 3 | 18TH CENTURY | 2 small sherds of Beverley-type ware<br>1 sherd of Black ware |
| 1019 | 3 | 13TH/14TH CENTURY | 1small sherd of oxidised Beverley-type ware<br>1 splashed ware sherd<br>1 sherd of Brandsby-type ware |
| 1021 | 2 | 19TH CENTURY | 1 sherd of Humber ware<br>1 sherd of tin-glazed earthenware |
| 1025 | 1 | 19TH CENTURY | 1 sherd of Brown-glazed ware |
| 1037 | 2 | 13TH/14TH CENTURY? | 2 small sherd of unglazed oxidised abraded pottery, possibly Humber ware type |
| 1047 | 1 | 12TH/13TH CENTURY | 1 sherd of Beverley-type ware |
| 1055 | 1 | 19TH/20TH CENTURY | 1 porcelain sherd |
| 1057 | 2 | UNCERTAIN | 2 small abraded pale-bodied sherds |
| 1071 | 2 | 12TH/13TH CENTURY | 1 gritty ware<br>1 sherd of Beverley-type ware |
| 2001 | 4 | 19TH CENTURY | 1 post-medieval earthenware<br>1 English stoneware<br>2 Cistercian wares |
| 2004 | 5 | 13TH/14TH CENTURY? | 5 small sherds of unglazed oxidised abraded pottery, possibly Humber ware type |
| 2008 | 1 | POST-MEDIEVAL | 1 sherd of Brown-glazed post-medieval earthenware |
| 2009 (unstrat.) | 3 | POST-MEDIEVAL | 2 sherds of post-medieval earthenware<br>1 splashed ware |
| 2010 | 1 | POST MEDIEVAL | 1 post-medieval earthenware |
| 2014 | 2 | 17TH CENTURY | 1 Purple-glazed sherd<br>1 Brown-glazed sherd |
| 2017 | 3 | POST-MEDIEVAL | 1 Purple-glazed sherd<br>2 post-medieval earthenware |
| 2036 | 1 | 12TH CENTURY | 1 splashed ware |
| 2037 | 1 | 18TH CENTURY | 1 Brown-glazed sherd |
| 2038 | 1 | 12TH CENTURY | 1 splashed ware sherd |
| 2047 | 3 | 12TH CENTURY | 3 splashed ware sherds |
| 2050 | 3 | 12TH/13TH CENTURY? | 3 very abraded pale-bodied sherds with traces of glaze<br>1 splashed glazed ware |
| 2058 | 1 | 13TH/14TH CENTURY? | 1 unglazed jug rim, possibly Beverley-type |

## 8.0 **SMALL FINDS** by Nicky Rogers (coins by Craig Barclay)

### 8.1 Summary

A total of 269 finds were assessed. These represent all the small finds recovered apart from the stone coffin pieces (see architectural fragments report) and also the wooden items (see wood report). Most were associated with burials and come from the early alignment burials, and the later medieval to post-medieval graves.

### 8.2 Anglian to medieval material

The earliest datable objects comprise an Anglo-Saxon polychrome glass bead sf231 found in association with skeleton 2076, which also had a willow wand (sf232), and a copper alloy dress pin sf305, which is Anglo-Saxon or more probably Anglo-Scandinavian, and was found residually in levels associated with the 12th- to 13th-century structures. At least 20 pieces of medieval painted window glass were identified; much of this turned up residually in the post-medieval burial fills, for example sfs283 and 298 in context 2004, sf278 in context 2016, and sf182 in context 1034. Some occurred in medieval levels, however, such as sfs195, 196 and 198, all found in contexts associated with the 14th-century construction of the nave and buttresses.

## 8.3 Material relating to post-medieval burials

Just over 50% of the finds comprise ironwork, and the vast majority is composed of burial fittings, which mainly appear to date from the 18th and 19th centuries. In certain burials, a large part of the iron fittings survived; coffin 1020 in particular produced 44 items, including the remains of at least six tinned iron coffin plates, of a design identical to that advertised in a catalogue of 1783 (Litten 1991). Also found were remnants of handles, nails, screws, decorative tacks and also copper alloy rings, the functions of which are uncertain, but must relate in some way to the burial. Evidence of textiles used and the types of planks employed has also been identified from these objects by the conservator (see Conservation Assessment). Similar but smaller assemblages of coffin furniture came from further burials: 1002, 1014, 1019, 1021, 1037, 2005, 2017. A feature identified as a possible charnel pit, 1055, produced several fragments of coffin plate, which seems rather to indicate an individual's burial. Occasional personal items were also recovered from burials; these include a small pin and a shoe buckle (2017), and a possible cuff-link (2005)

## 8.4 Coins

Context 2017; sf206
Mary; AR groat
1553-54
*Moderate wear for issue. Probably 16th- to early 17th-century loss. No treatment necessary.*

Context 1019; sf27
Elizabeth I; AR threepence
1565
*Light wear for issue. Probably near contemporary loss. No treatment necessary.*

***Table 2** Small finds listing*

(wood) = wood attached; (bone) = bone attached; (textile) = textile attached; (stone) = stone attached; (pot) = ceramic material attached; (tin) = tin plating

| FIND | CONTEXT | DESCRIPTION |
|---|---|---|
| SF00001 | 1014 | Iron coffin nail |
| SF00002 | 1014 | Iron coffin plate fitting |
| SF00003 | 1014 | Iron coffin nail |
| SF00004 | 1014 | Copper alloy ring |
| SF00005 | 1014 | Iron coffin nail |
| SF00006 | 1020 | Iron (wood) coffin fittings fragments |
| SF00007 | 1020 | Iron (wood) coffin nails, screws, tacks |
| SF00008 | 1020 | Iron (wood) screw |
| SF00009 | 1020 | Iron (wood) screw |
| SF00010 | 1020 | Iron (wood) screw |
| SF00011 | 1020 | Iron (wood) screw fragment |
| SF00012 | 1020 | Iron (wood) screw |
| SF00013 | 1020 | Iron (wood) coffin fittings |
| SF00014 | 1020 | Iron (wood) nails, tacks, screw head |
| SF00015 | 1020 | Iron (wood) coffin nails |
| SF00016 | 1020 | Iron (wood) coffin nails, tacks |
| SF00017 | 1020 | Iron (wood) nail, screw |
| SF00018 | 1020 | Iron nail |
| SF00019 | 1020 | Iron (wood) coffin tacks |
| SF00020 | 1020 | Iron (wood) coffin nails, screw, tacks |
| SF00021 | 1020 | Iron (wood) coffin screw nails tacks |
| SF00022 | 1020 | Iron (wood) coffin nails, tacks |
| SF00023 | 1020 | Iron (wood) coffin fittings |
| SF00024 | 1020 | Iron (wood) coffin nails, studs |
| SF00025 | 1020 | Iron (wood) nail tack |
| SF00026 | 1020 | Tin coffin plate fragments |
| SF00027 | 1019 | Silver coin |
| SF00028 | 1020 | Iron (tin) (wood) coffin plate fragments |
| SF00029 | 1020 | Iron (wood) coffin nails |
| SF00030 | 1020 | Iron (tin) coffin plate |
| SF00031 | 1020 | Iron (wood) coffin nails |
| SF00032 | 1020 | Iron (wood) (tin) (textile) coffin plate |
| SF00033 | 1020 | Iron handle |
| SF00034 | 1020 | Iron (tin) (wood) coffin plate |
| SF00035 | 1020 | Iron (tin) (wood) (textile) coffin plate |
| SF00036 | 1020 | Iron (tin) (wood) (textile) coffin fittings |
| SF00037 | 1020 | Iron (tin) coffin plate |
| SF00038 | 1020 | Iron (tin) (wood) (textile) coffin plate |
| SF00039 | 1020 | Iron coffin fittings nails |
| SF00040 | 1020 | Iron (wood) coffin nails |
| SF00041 | 1020 | Iron (wood) coffin screw |
| SF00043 | 1020 | Tin, copper alloy, textile, coffin plate fragments |
| SF00044 | 1020 | Copper alloy rings |
| SF00045 | 1022 | Iron (wood) coffin nails |
| SF00046 | 1022 | Iron (wood) coffin nails |
| SF00047 | 1022 | Iron (wood) (tin) coffin fittings |
| SF00049 | 1022 | Iron (tin) coffin plate fragments |
| SF00050 | 1022 | Iron (wood) nails, screw, tack |

| | | |
|---|---|---|
| SF00051 | 1040 | Iron (wood) nail |
| SF00052 | 1040 | Iron (wood) nails |
| SF00053 | 1040 | Iron coffin nail |
| SF00054 | 1053 | Iron coffin nail |
| SF00055 | 1062 | Copper alloy needle |
| SF00056 | 1062 | Plaster fragment |
| SF00057 | 1071 | Copper alloy pin |
| SF00058 | 1073 | Stone coffin fragment |
| SF00059 | 1073 | Stone coffin fragment |
| SF00060 | 1073 | Stone coffin fragment |
| SF00061 | 1073 | Stone coffin fragment |
| SF00062 | 1073 | Stone coffin fragment |
| SF00063 | 1073 | Stone coffin fragment (architectural fragment?) |
| SF00064 | 1076 | Stone coffin fragment (architectural?) |
| SF00065 | 1076 | Stone coffin fragment |
| SF00066 | 1076 | Stone coffin fragment |
| SF00067 | 1078 | Stone coffin fragment |
| SF00068 | 1082 | Stone coffin fragment (architectural?) |
| SF00069 | 1092 | Stone coffin fragment |
| SF00071 | 1071 | Copper alloy pin fragment |
| SF00072 | 1019 | Fired clay tobacco pipe fragment |
| SF00073 | 1019 | Fired clay tobacco pipe fragment |
| SF00074 | 1002 | Iron coffin nail |
| SF00075 | 1002 | Iron (bone) (wood) nail and fragment |
| SF00076 | 1002 | Iron (tin) coffin plate fragments |
| SF00077 | 1007 | Lead alloy off-cut |
| SF00078 | 1037 | Iron nail |
| SF00079 | 1037 | Iron (wood) coffin nail |
| SF00080 | 1037 | Iron (tin) coffin plate fragment |
| SF00081 | 1037 | Copper alloy wire |
| SF00082 | 1021 | Iron (wood) (tin) coffin fittings |
| SF00083 | 1021 | Iron (wood) coffin nail |
| SF00084 | 1021 | Iron (wood) coffin nail shank |
| SF00085 | 1021 | Iron (wood) (tin) coffin plate fitting |
| SF00086 | 1021 | Window glass fragment |
| SF00087 | 1062 | Iron (wood) nails |
| SF00088 | 1062 | Iron nail |
| SF00089 | 1052 | Flint fragment |
| SF00090 | 1009 | Fired clay tobacco pipe fragment |
| SF00091 | 1009 | Window glass fragment |
| SF00092 | 1021 | Fired clay tobacco pipe fragment |
| SF00093 | 1021 | Iron Wood coffin Nail |
| SF00094 | 1002 | Window glass Fragments |
| SF00095 | 1002 | Iron (wood) nail |
| SF00096 | 1002 | Iron (wood) coffin nail |
| SF00097 | 1002 | Iron tin coffin plate fragment |
| SF00098 | 1002 | Fired clay tobacco pipe fragment |
| SF00099 | 1019 | Fired clay tobacco pipe fragment |
| SF00100 | 1015 | Copper alloy ring |
| SF00101 | 1009 | Iron nail and handle fragment |
| SF00102 | 1009 | Lead alloy run-off |
| SF00103 | 1009 | Unknown miscellaneous fragment |
| SF00104 | 1071 | Iron fragment |
| SF00105 | 2017 | Iron (tin) (wood) coffin fittings |
| SF00106 | 2017 | Iron object |
| SF00107 | 2017 | Iron object |

| | | |
|---|---|---|
| SF00108 | 2017 | Iron coffin handle fragment |
| SF00109 | 2017 | Iron (wood) (tin) coffin fitting |
| SF00110 | 2017 | Iron object |
| SF00111 | 2017 | Iron (wood) (tin) coffin fitting fragments |
| SF00112 | 2010 | Iron (tin) (wood) coffin plate fragments |
| SF00113 | 2010 | Iron coffin handle |
| SF00114 | 2059 | Iron fragment |
| SF00115 | 1004 | Unknown fragment |
| SF00116 | 1020 | Iron coffin nail fragment |
| SF00117 | 1062 | Lead alloy fragment run-off |
| SF00118 | 1019 | Iron (wood) screw |
| SF00119 | 1019 | Iron (wood) coffin fittings, nails |
| SF00120 | 1014 | Iron (tin) (wood) fragments, coffin plate nails |
| SF00121 | 1021 | Lead alloy window came |
| SF00122 | 1009 | Slag |
| SF00123 | 2004 | Iron nail |
| SF00124 | 1002 | Lead alloy fragment run-off |
| SF00125 | 1002 | Iron fragments, strip |
| SF00126 | 1002 | Iron nails |
| SF00127 | 1020 | Iron (wood) nails |
| SF00128 | 1020 | Iron bar |
| SF00129 | 1020 | Iron (wood) fragments, nails |
| SF00130 | 1020 | Iron nail |
| SF00131 | 1020 | Iron (wood) nails, coffin fittings |
| SF00132 | 1020 | Iron (wood) fragments, coffin fittings |
| SF00133 | 1037 | Iron nail |
| SF00134 | 1037 | Iron (wood) (tin) nails, screw, coffin plate fragments |
| SF00135 | 1046 | Iron nail |
| SF00136 | 1046 | Iron (tin) coffin plate fragments |
| SF00137 | 1002 | Iron (tin) (wood) coffin fittings |
| SF00138 | 1002 | Iron (wood) (tin) nails, coffin plate |
| SF00139 | 1002 | Iron (wood) (tin) fragments |
| SF00140 | 1002 | Copper alloy ring |
| SF00141 | 2001 | Iron (wood) nails |
| SF00142 | 2047 | Iron nail |
| SF00143 | 1000 | Window glass fragment |
| SF00144 | 1019 | Fired clay tobacco pipe fragments |
| SF00145 | 1068 | Iron nail fragment |
| SF00146 | 1010 | Window glass fragments |
| SF00147 | 1002 | Fired clay tobacco pipe fragments |
| SF00148 | 2009 | Fired clay tobacco pipe |
| SF00149 | 2004 | Fired clay tobacco pipe fragment |
| SF00150 | 2004 | Iron nail |
| SF00151 | 1031 | Iron (wood) nails |
| SF00152 | 1031 | Window glass fragments |
| SF00153 | 1002 | Iron nails |
| SF00154 | 1002 | Bone one-piece comb fragment |
| SF00155 | 1021 | Lead alloy fragment window came |
| SF00156 | 1021 | Window glass fragment |
| SF00157 | 1025 | Window glass fragments |
| SF00158 | 1025 | Window glass fragment |
| SF00159 | 1071 | Stone fragment |
| SF00160 | 2009 | Lead alloy window came |
| SF00161 | 2009 | Copper alloy button |
| SF00162 | 2009 | Copper alloy button |
| SF00163 | 1025 | Iron (wood) coffin nail shank |

| | | |
|---|---|---|
| SF00164 | 1025 | Iron nail |
| SF00165 | 1000 | Window glass fragment |
| SF00166 | 1000 | Window glass fragments |
| SF00167 | 1000 | Glass bottle fragment |
| SF00168 | 1000 | Fired clay tobacco pipe fragment |
| SF00169 | 1000 | Lead alloy window came |
| SF00170 | 1000 | Lead alloy run-off |
| SF00171 | 1000 | Iron nail |
| SF00172 | 1000 | Iron nail |
| SF00173 | 1000 | Iron sheet fragment |
| SF00174 | 1000 | Iron nail |
| SF00175 | 1000 | Iron nail |
| SF00176 | 1000 | Iron nail fragment |
| SF00177 | 1000 | Painted window glass fragment |
| SF00178 | 2047 | Iron object |
| SF00179 | 2014 | Window glass fragment |
| SF00180 | 1057 | Glass fragments |
| SF00181 | 1007 | Window glass fragment |
| SF00182 | 1034 | Painted window glass fragment |
| SF00183 | 1057 | Painted window glass fragment |
| SF00184 | 1057 | Window glass fragment |
| SF00185 | 2013 | Glass fragment |
| SF00186 | 1006 | Glass fragment |
| SF00187 | 2009 | Painted window glass fragments |
| SF00188 | 2009 | Glass bottle fragment |
| SF00189 | 2009 | Window glass fragment |
| SF00190 | 2009 | Window glass fragment |
| SF00191 | 2009 | Window glass fragment |
| SF00192 | 1037 | Window glass fragment |
| SF00193 | 1037 | Window glass fragments coloured |
| SF00194 | 1000 | Window glass fragments |
| SF00195 | 2015 | Painted window glass fragment |
| SF00196 | 2015 | Window glass fragment |
| SF00197 | 2015 | Window glass fragment |
| SF00198 | 2015 | Window glass fragment |
| SF00199 | 1043 | Window glass fragment |
| SF00200 | 2005 | Iron (wood) (tin) coffin plate nail |
| SF00201 | 2005 | Iron nail |
| SF00202 | 2005 | Copper alloy (wood) nail or tack |
| SF00203 | 2005 | Iron (wood) (tin) coffin plate fragments |
| SF00204 | 2005 | Copper alloy cuff link |
| SF00205 | 2005 | Iron coffin fittings |
| SF00206 | 2017 | Silver coin |
| SF00207 | 2017 | Lead alloy run-off |
| SF00208 | 2017 | Copper alloy pin |
| SF00209 | 2017 | Copper alloy buckle |
| SF00211 | 2035 | Stone architectural fragment |
| SF00212 | 2044 | Stone coffin fragment |
| SF00213 | 2044 | Stone coffin fragment |
| SF00214 | 2044 | Stone coffin fragment |
| SF00215 | 2044 | Stone coffin fragment |
| SF00216 | 2044 | Stone coffin fragment |
| SF00217 | 2044 | Stone coffin fragment |
| SF00218 | 2044 | Stone coffin fragment |
| SF00219 | 2044 | Stone coffin fragment |
| SF00220 | 2044 | Stone coffin fragment |

| | | |
|---|---|---|
| SF00221 | 2052 | Stone coffin fragment |
| SF00222 | 2052 | Stone coffin fragment |
| SF00223 | 2052 | Stone coffin fragment |
| SF00224 | 2052 | Stone coffin fragment |
| SF00225 | 2052 | Stone coffin fragment |
| SF00226 | 2052 | Stone coffin fragment |
| SF00227 | 2052 | Stone coffin fragment |
| SF00228 | 2052 | Stone coffin fragment |
| SF00229 | 2052 | Stone coffin fragment |
| SF00230 | 2052 | Stone coffin fragment |
| SF00231 | 2075 | Glass bead |
| SF00232 | 2077 | Wood rod staff |
| SF00233 | 2052 | Stone coffin fragment |
| SF00234 | 2106 | Limestone fragment |
| SF00235 | 2106 | Stone coffin fragment |
| SF00236 | 2017 | Iron object |
| SF00237 | 2017 | Iron coffin nail |
| SF00238 | 2017 | Iron nail |
| SF00239 | 2008 | Iron nail |
| SF00240 | 2008 | Glass fragment |
| SF00241 | 2016 | Iron object |
| SF00242 | 2050 | Iron nail |
| SF00243 | 2017 | Painted window glass fragments |
| SF00244 | 2004 | Iron nails and fragments |
| SF00245 | 2004 | Iron nails |
| SF00246 | 2004 | Iron concretion |
| SF00247 | 1066 | Iron objects |
| SF00248 | 1043 | Iron (wood) nails |
| SF00249 | 1087 | Iron (wood) coffin nails |
| SF00250 | 1045 | Iron nails |
| SF00251 | 1037 | Lead alloy window came |
| SF00252 | 1041 | Window glass fragment |
| SF00253 | 1041 | Iron nail |
| SF00254 | 1067 | Window glass fragment |
| SF00255 | 1048 | Window glass fragments |
| SF00256 | 1000 | Window glass fragment |
| SF00257 | 1055 | Window glass fragments |
| SF00258 | 1095 | Flint fragment |
| SF00259 | 1067 | Iron nail |
| SF00260 | 1048 | Iron (wood) nail |
| SF00261 | 1098 | Iron (wood) nail |
| SF00262 | 1000 | Lead Alloy Off-cut |
| SF00263 | 1000 | Iron (wood) nails |
| SF00264 | 2010 | Window glass fragments |
| SF00265 | 2010 | Window glass fragment |
| SF00266 | 2010 | Glass fragment |
| SF00267 | 2010 | Glass fragment |
| SF00268 | 1126 | Flint fragment |
| SF00269 | 2000 | Glass fragment |
| SF00270 | 2000 | Window glass fragments |
| SF00271 | 2000 | Window glass fragment |
| SF00272 | 1006 | Glass vessel fragment |
| SF00273 | 1006 | Window glass fragments |
| SF00274 | 1006 | Glass fragment |
| SF00275 | 1010 | Painted window glass fragments |
| SF00276 | 2016 | Window glass fragment |

| | | |
|---|---|---|
| SF00277 | 2016 | Window glass fragments |
| SF00278 | 2016 | Window glass fragments |
| SF00279 | 1009 | Window glass fragments |
| SF00280 | 1000 | Window glass fragment |
| SF00281 | 2001 | Painted window glass fragments, vessel glass |
| SF00282 | 1019 | Window glass fragments |
| SF00283 | 2004 | Painted window glass fragments |
| SF00284 | 1037 | Painted window glass fragments |
| SF00285 | 1021 | Painted window glass fragments |
| SF00286 | 1002 | Painted window glass fragments |
| SF00287 | 1116 | Iron nails |
| SF00288 | 1009 | Window glass fragments |
| SF00289 | 1009 | Glass vessel fragment |
| SF00290 | 1000 | Window glass fragments |
| SF00291 | 1000 | Window glass fragment |
| SF00292 | 2001 | Window glass fragments |
| SF00293 | 2001 | Window glass fragment |
| SF00294 | 2001 | Window glass fragment |
| SF00295 | 1019 | Window glass fragments |
| SF00296 | 1019 | Glass vessel fragments |
| SF00297 | 2004 | Glass vessel fragments |
| SF00298 | 2004 | Painted window glass fragments |
| SF00299 | 2004 | Window glass fragments |
| SF00300 | 1002 | Window glass fragments |
| SF00301 | 1055 | Iron (tin) fragments coffin plate |
| SF00302 | 1055 | Iron (tin) (stone) fragments coffin plate |
| SF00303 | 1055 | Iron (tin) (pot) coffin plate fragment |
| SF00304 | 1075 | Iron (stone) fragment nail |
| SF00305 | 2036 | Copper alloy dress pin |
| SF00306 | 1019 | Textile, metal fragment |

## 8.5 Recommendations

A full study of the possibly Anglian burial and its grave goods (skeleton 2076) would be of great interest, as it is a rare find.

Further research into the 18th- and 19th-century burial fittings, and the bodies they accompany, is also merited; it would certainly provide further information about the status and nature of the individuals within this burial ground, and the burial rite which accompanied them. Tin-plated coffin fittings, for example, of which many survived, would not have been available to all. Further conservation work on some of this material would also provide more information about the organic materials used within the coffins.

## 9.0 ARCHITECTURAL FRAGMENTS by Jane McComish

A large number of stone fragments were submitted for examination and were recorded to a standard YAT methodology. Broadly speaking the material falls into three categories. Firstly there were a number of tiny fragments of worked masonry that were simply allocated to the context number from which they came. Secondly there were a number of fragments used as grave linings which were allocated small find numbers (sf) and finally

there were a number of other larger blocks of stone also allocated sf numbers. The results are summarised in Table 3 below.

## 9.1 The Small Fragments

The small fragments consisted of a mixture of moulded block and ashlar fragments. There were three roll mouldings (context 1002, 2065), a fragment from an annulet (context 2065), part of a small shaft (context 2065) and two fragments that were too eroded for their original form to be determined (contexts 1002 and 1068). All of these moulded fragments were of 13th-century date or later and were cut from either limestone or Oolitic Limestone. The remaining small fragments were all from ashlar blocks made from limestone, Oolitic Limestone or chalk. It is notable that the Oolitic Limestone fragments had both striated tooling (which is in use throughout the medieval period) and claw tooling which tends to be 13th-century or later. The chalk and limestone fragments had only claw tooling.

Of the small fragments those from context 2021 are of particular interest. These fragments all had very sharp breaks suggesting they had been rapidly buried after their creation. Most of the fragments also had clear claw tooling marks suggesting a 13th-century or later date. It is also of interest that none of these fragments were of Oolitic Limestone. This may be of relevance to sourcing the stones used in differing building campaigns on the Minster.

## 9.2 Grave linings

The blocks used for lining graves were all rectangular and were made of chalk with the exception of a single fragment of Oolitic Limestone from context 1073. Some were clearly in their original form as all six faces were worked, but in other cases some of the original faces were missing, implying the fragments were already broken when used to line the graves. The blocks all had striated tooling lines and in many cases this was rather coarse, giving uneven surfaces. The poor quality of the dressing implies that these blocks were never intended to be seen and had perhaps originally been intended for use in foundations, or even that they may have been deliberately cut to line the graves. Six of the blocks had irregularly shaped linear grooves on one surface. In each case the groove was up to 1.5mm wide and 0.05mm deep; they varied in length from 130mm to 315mm. The function of these grooves is unclear; they are too irregular to be setting out lines, and are clearly not banker mason's marks either. One of the blocks (sf220 context 2044) had three linear cuts on one face, which were up to 30mm long and 1.5mm wide and deep. These may be axe marks.

## 9.3 Other Architectural Fragments

The remaining fragments from the site consisted of two ashlar blocks, two chamfered blocks and a block of indeterminate form. These were made of a variety of stones (fossiliferous limestone, Oolitic Limestone and chalk). Most of these blocks had striated tooling, though one (sf230 context 2052) had drag tooling lines. There was also a fragment of engaged column (context 2064) with an 'X' shaped banker mason's mark on the shaft. This fragment had striated tooling only and is of 12th-century date or later.

Sf69 from context 1092 consisted of a group of one small fragment of mortar and eight sandstone fragments. The sandstone fragments clearly originated from a single block, which was roughly rectangular with one straight edge and three more jagged edges. The straight edge had a slight chamfer at the top of the block. The base of the stones had coarse tooling marks while the upper surfaces were heavily worn into a concave surface. The wear patterns may suggest that the stone had been used as a step at some stage or possibly that it had somehow been associated with milling.

## 9.4 Recommendations

If full publication of the site occurs all the tooling marks should be carefully recorded to assess the number of tools used in the production of the blocks. In addition a geologist should be asked to comment in detail on the sources of stone used, and perhaps to compare these with the materials used in the various phases of the standing building.

***Table 3:*** *Summary of Architectural Fragments*

| Context | SF no | Size or weight | Stone type | Number of worked faces | Description |
|---|---|---|---|---|---|
| **Small Fragments** | | | | | |
| U/S | | 40g | Limestone | 0 | Tiny burnt fragment. No tooling. |
| 1002 | | 128g | Limestone | 3 | Roll moulding, rather eroded. Faint striated tooling visible. |
| 1002 | | 405g | Limestone | 2 | Roll moulding, no tooling visible. |
| 1002 | | 600g | Oolitic Limestone | 0 | Slight traces of moulding on a rather eroded block. |
| 1003 | | 215g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on both worked faces. |
| 1068 | | 265g | Oolitic Limestone | 3 | Part of a moulded block. No tooling surviving, surface rather eroded. |
| 1071 | | 245g | Limestone | 2 | Small chip off an ashlar block. One face roughly dressed, the second face with striated tooling. |
| 2021 | | 40g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 30g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 60g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 46g | Limestone | 3 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 70g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 130g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 101g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 140g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 410g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 193g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 80g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked faces. |

| | | | | | |
|---|---|---|---|---|---|
| 2021 | | 65g | Limestone | 2 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 296g | Limestone | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 470g | Limestone | 3 | Small chip off an ashlar block. Claw tooling on worked faces. |
| 2021 | | 150g | Chalk | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 115g | Chalk | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2021 | | 711g | Chalk | 1 | Small chip off an ashlar block. Claw tooling on worked face. |
| 2016 | | 240g | Limestone | 3 | Small chip off an ashlar block. Claw tooling on all worked faces. |
| 2037 | | 60g | Oolitic Limestone | 2 | Small chip off an ashlar block. Striated tooling on both worked faces. |
| 2037 | | 195g | Limestone | 0 | Unworked. |
| 2040 | | 215g | Chalk | 1 | Small chip off an ashlar block. Striated tooling on worked face. Striations 11mm apart. |
| 2040 | | 180g | Oolitic Limestone | 3 | Small chip off an ashlar block. Striated tooling on all worked faces. |
| 2040 | | 160g | Oolitic Limestone | 1 | Small chip off an ashlar block. Striated tooling on worked face. |
| 2065 | | 710g | Limestone | 2 | Part of a column shaft. Both faces with claw tooling. |
| 2065 | | 370g | Oolitic Limestone | 2 | Fragment of roll moulding. No tooling visible. |
| 2065 | | 470g | Limestone | 1 | Fragment of an annulet. No clear tooling. |
| 2065 | | 190 x 130 x 90mm | Oolitic Limestone | 1 | Worked surface with claw tooling. other surfaces very worn. |
| 2106 | | 740g | Limestone | 3 | Small chip off an ashlar block. Claw tooling on all worked faces. |
| **Grave linings** | | | | | |
| 1073 | 58 | 550 x 270 x 72mm | Chalk | 6 | Base roughly dressed, all other faces with striated tooling. |
| 1073 | 59 | 360 x 215 x 86mm | Chalk | 5 | Base not worked. Other faces striated. |
| 1073 | 62 | 280 x 95 x 20mm | Chalk | 6 | Base roughly dressed. Other faces striated. Damage to all edges. |
| 1073 | 60 | 130 x 415 x 213mm | Chalk | 5 | Rectangular block, base not worked, other faces with striated tooling. |
| 1073 | 61 | 210 x 485 x 140mm | Chalk | 5 | Rectangular block, base not worked, other faces with striated tooling. |
| 1073 | 63 | 230 x 170 x 210mm | Oolitic Limestone | 5 | Rectangular block. Faint striated tooling |
| 1076 | 64 | 252 x 195 x 160mm | Chalk | 6 | Rectangular block, striated tooling on 5 faces. |
| 1076 | 65 | 250 x 170 x 70 | Chalk | 4 | Striated tooling on all faces. |
| 1076 | 66 | 255 x 190 x 140mm | Chalk | 4 | Rectangular block, striated tooling on all faces. |
| 1078 | 67 | 310 x 250 x 210 | Chalk | 3 | Rectangular block. Roughly striated on all surviving faces. |
| 2044 | 212 | 210 x 300 x 85mm | Chalk | 6 | Base roughly dressed, other faces striated tooling. Damage to edges and base. |
| 2044 | 213 | 306 x 211 x 70mm | Chalk | 5 | Striated tooling on all worked faces. |
| 2044 | 214 | 330 x 210 x 78mm | Chalk | 5 | Striated tooling on all worked faces. All faces damaged to some degree. |

| | | | | | |
|---|---|---|---|---|---|
| 2044 | 215 | 300 x 210 x 79mm | Chalk | 6 | Base roughly dressed. Other faces striated. Damage to all edges. Groove on upper face 130 x 1.5mm. |
| 2044 | 216 | 235 x 195 x 52mm | Chalk | 6 | Base roughly dressed. Other faces striated. |
| 2044 | 217 | 255 x 210 x 70mm | Chalk | 6 | Base roughly dressed, other faces striated tooling. Damage to edges and base. |
| 2044 | 218 | 292 x 211 x 53mm | Chalk | 6 | Base roughly dressed. Striated tooling on three of the other faces. |
| 2044 | 219 | 325 x 215 x 65mm | Chalk | 6 | Base roughly dressed. Other faces striated. |
| 2044 | 220 | 345 x 210 x 67mm | Chalk | 5 | Striated tooling on all faces, but rather worn. There are also three grooves on one face, up to 30mm long and 1mm wide. Possibly axe marks. |
| 2052 | 221 | 235 x 200 x 70mm | Chalk | 5 | Base very uneven, other faces striated tooling |
| 2052 | 222 | 350 x 240 x 77mm | Chalk | 6 | Base roughly dressed, striated tooling on other faces. Linear groove on one face 315 x 1.5mm. |
| 2052 | 223 | 310 x 230 x 91mm | Chalk | 3 | Striated tooling on surviving faces. Linear groove on one face 260 x 1.5mm. |
| 2052 | 224 | 230 x 277 x 91mm | Chalk | 6 | Base very uneven, other faces striated. Linear groove on upper surface 250 x 1.5mm, slightly curved in shape. |
| 2052 | 225 | 260 x 230 x 76mm | Chalk | 6 | Base roughly dressed, other faces striated tooling. Linear groove on upper surface 260 x 1.5mm. |
| 2052 | 226 | 250 x 210 x 56mm | Chalk | 3 | Striated tooling on all worked faces. Mortar on one face. |
| 2052 | 227 | 230 x 133 x 65mm | Chalk | 4 | Striated tooling on all faces. Mortar adhering to one face. |
| 2052 | 228 | 370 x 220 x 80mm | Chalk | 6 | Base roughly dressed, other faces striated tooling. Damage to all edges and base. |
| 2052 | 229 | 220 x 393 x 90mm | Chalk | 3 | Base roughly dressed, other faces striated tooling. Damage to edges and base. |
| 2052 | 233 | 380 x 225 x 70mm | Chalk | 5 | Possibly ashlar. Four faces roughly worked, one face with striated tooling and an irregular groove 180 x 1mm. |
| **Other** | | | | | |
| 1068 | | 302 x 231 x 130mm | Oolitic Limestone | 6 | Rectangular block of ashlar. Base coarsely striated, edges with finer striations, upper surface with drag tooling. |
| 1082 | | 150 x 150 x 105mm | Oolitic Limestone | 4 | Chamfered block no tooling survives. |
| 1082 | 68 | 220 x 150 x 150mm | Oolitic Limestone | 4 | Ashlar. Faint striated tooling on all worked faces. |
| 1092 | 69 | | Sandstone | | A group of eight fragments of sandstone ranging from 140 x 70 x 50mm to 520 x 280 x 120mm in size. Clearly all originally from one slab. The upper surfaces are heavily worn to a concave surface. Possibly a step or even some kind of millstone. There was also a small fragment of mortar with this group. |
| 2035 | 211 | 360 x 260 x 150mm | Oolitic Limestone | 6 | Chamfered block, chamfer 80mm wide. Striated tooling on all worked faces. |
| 2052 | 230 | 90 x 55 x 40mm | Oolitic Limestone | 3 | Chip of ashlar. Drag tooling on one face. |
| 2064 | | 275 x 220 x 190mm | Oolitic Limestone | 4 | Engaged column fragment. Striated tooling on all worked faces. 'X' shaped mason's mark on shaft. |
| 2106 | 235 | 400 x 420 x 170 | Fossiliferous limestone | 1 | Very abraded striated tooling on the surviving face. |

## 10.0 CERAMIC BUILDING MATERIALS by Jane McComish

### 10.1 Introduction

*A total of 29.634kg of Ceramic Building Material (CBM) was examined from the site. A number of forms were identified including medieval peg, plain, nib and ridge tiles, medieval and post-medieval brick, medieval floor tiles and post-medieval pan tiles. The CBM was recorded following standard YAT procedures.*

### 10.2 Fabrics

A fabric sequence for the site was devised at the time of recording (none of the pan tile was allocated fabric types, it was simply recorded as post-medieval). Fourteen fabrics were noted, which are described in Table 4, and the relative quantities are given in Table 5. Fragments that were too small to classify were listed as BM0.

The fabric types fall into three main groups. The dominant grouping consisted of fabric types BM1, BM3, BM4, BM5 and BM12, which between them accounted for almost 60% of the material found. The second group of fabrics comprised BM2, BM6, BM9, BM10 and BM13, which were coarser and accounted for c.20% of the material recovered. The third grouping consisted of fabrics BM7, BM8, BM11 and BM14, which were very different in terms of colour (being bright orange) and lacked the oolite and limestone content of groups 1 and 2. These made up c.16% of the fragments recovered.

It is of interest that the group 1 fabrics are very similar to fabric M7 in the York fabric series; this almost certainly implies that the York M7 tiles originated from the East Riding of Yorkshire and were the result of regional trade in CBM. The Beverley group 3 fabrics on the other hand were closer to the typical types from medieval York, and this may suggest they originated from sources to the north-west of Beverley.

***Table 4:*** *CBM Fabric descriptions*

| Fabric | Description |
|---|---|
| BM1 | Dark red fine fabric with few visible inclusions. Occasional irregular voids (from limestone). Occasional oolites up to 1 x 0.5mm in size. Tendency to be overfired. |
| BM2 | Mid red fabric. Uncompacted. Occasional sub-rounded oolites. Occasional irregular slightly linear voids (from limestone). Moderate sub-angular quartz grains, too small to measure. Moderate minute oolite grains, far too small to measure, giving a speckled white appearance on the surface of the fabric in places. |
| BM3 | Mid orange-red fabric uncompacted. Frequent minute oolite grains, far too small to measure, giving a speckled white appearance on the surface of the fabric. Occasional sub-angular voids up to 2 x 1mm (from limestone). Occasional oolites up to 1 x 0.5mm in size. Could be a variant of BM1. |
| BM4 | Almost identical to BM2 but slightly finer. With a fewer quartz grains and with occasional linear voids (probably from grass). Could be a variant of BM1. |
| BM5 | Mid red fabric almost identical to BM3, but lacking the larger oolites. |
| BM6 | Dark red fine fabric. Occasional irregular voids (from limestone) and linear voids (from grass). Occasional oolites up to 1.5 x 0.5mm in size. Occasional silty bands. Occasional clay pellets up to 3 x 2mm. |

| | |
|---|---|
| BM7 | Bright orange fabric. Frequent sub-angular quartz up to 0.5 x 0.5mm.Occasional quartzite and very occasional mica. |
| BM8 | Bright orange fabric. Frequent sub-angular quartz up to 0.5 x 0.5mm. Occasional mudstone. Could be a variant of BM7. |
| BM9 | Dark red fine fabric. Occasional irregular voids (from limestone) and linear voids (from grass). Occasional oolites up to 0.5 x 0.5mm in size. Moderate silty bands. Occasional clay pellets up to 3 x 2mm. Could be a variant of BM6. |
| BM10 | Dark red fine fabric. Moderate quartz up to 0.5 x 0.5mm. Occasional irregular voids (from limestone) and ovoid voids (from oolites). Moderate oolites and limestone up to 1.5 x 0.5mm in size. Occasional clay pellets up to 3z2mm. Could be a variant of BM6. |
| BM11 | Bright orange fabric. Moderate sub-angular quartz up to 0.5 x 0.5mm. Occasional irregular voids (from limestone). Could be a variant of BM8. |
| BM12 | Dark red fine fabric with few visible inclusions. Occasional irregular voids (from limestone), moderate linear voids from grass. Occasional oolites up to 0.5 x 0.5mm in size. Could be a variant of BM1. |
| BM13 | Dark red fine fabric. Moderate quartz up to 0.5 x 0.5mm. Occasional irregular voids (from limestone). Moderate oolites and limestone up to 1.5 x 0.5mm in size. Occasional clay pellets up to 3 x 2mm. Could be a variant of BM10. |
| BM14 | Bright orange fabric. Moderate sub-angular quartz up to 0.5 x 0.5mm. Occasional limestone and very occasional mica. Could be a variant of M7. |

***Table 5:*** *Summary of CBM fabrics present*

| Fabric | Weight | Weight as a % of total | Forms present |
|---|---|---|---|
| BM0 | 862 | 2.91 | Brick, plain |
| BM1 | 10272 | 34.66 | Hip, plain, peg, nib, ridge |
| BM2 | 1005 | 3.39 | Nib, peg, plain, floor? |
| BM3 | 350 | 1.18 | Plain |
| BM4 | 735 | 2.48 | Plain |
| BM5 | 6080 | 20.52 | Brick |
| BM6 | 2390 | 8.06 | Brick |
| BM7 | 4045 | 13.65 | Brick, nib |
| BM8 | 565 | 1.91 | Plain, ridge, nib |
| BM9 | 595 | 2.01 | Brick |
| BM10 | 1870 | 6.31 | Brick, plain |
| BM11 | 150 | 0.51 | Nib, plain |
| BM12 | 150 | 0.51 | Floor |
| BM13 | 190 | 0.64 | Floor |
| BM14 | 125 | 0.42 | Floor |
| Post-Med. | 250 | 0.84 | Pan tiles |
| ***Total weight*** | 29634 | | |

## 10.3 Forms

A number of forms were identified ranging from medieval to 16th-/18th-century date.

The medieval roofing tiles (13th- to 16th-century in date) consisted mainly of plain tiles (where the fragment was too small for the method of fixing the tile to the roof to be determined), though there were four fragments of peg tile and five nib tiles. No lengths or breadths survived for any of the plain, peg or nib tiles. The plain tiles ranged in thickness from 10-28mm, though some of the thicker examples were of over-fired tiles which had

blown. The peg tiles were 14-18mm thick. Two of the peg holes were circular and were 9 x 9mm and 10 x 10mm in size and one peg hole seemed irregular in shape, but as this occurred on a broken edge it was impossible to be sure of the original shape. The fourth peg hole had clearly been pecked out after the tile was fired; as it was at the edge of the tile fragment the original size of the peg hole was unknown. The nibs were formed by pulling the side of the tile upwards and then folding the resultant clay over.

There were five fragments of hip tiles that ranged in thickness from 14-19mm and 19 fragments of ridge tiles ranging in thickness from 12-22mm. It must be noted that in the case of both the ridge and hip tiles the identification was sometimes uncertain.

None of the roofing tiles was glazed, though some fragments of plain tile and of ridge tile had finger smoothing on the upper surface which may have been intended to create a decorative effect. There were also a number of fragments of plain and ridge tile with highly uneven upper surfaces, which were either badly made, or were intended to be decorative. A few of the fragments of plain tile may have been decorated with a thin coating of cream-coloured slip.

***Table 6:*** *Forms present as a percentage of the total CBM on site*

| Form | Total weight | Weight as a % of total |
|---|---|---|
| Plain | 9514 | 32.11 |
| Peg | 300 | 1.01 |
| Nib | 550 | 1.86 |
| Ridge | 1905 | 6.43 |
| Hip | 1185 | 4.00 |
| medieval brick | 11650 | 39.31 |
| Floor | 540 | 1.82 |
| Pan | 250 | 0.84 |
| Post-medieval brick | 3740 | 12.62 |
| ***Total weight*** | 29634 | |

Apart from a few isolated structures in Essex/Suffolk there are virtually no examples of the production of brick in England prior to the 14th century. The brick industry in the Hull/Beverly area developed rapidly during the 14th century (largely due to the shortage of suitable building stone in the area). The resultant bricks were largely confined to high-status buildings in the 14th century (e.g. Holy Trinity church in Hull 1315-1370 and North Bar, Beverley, built in 1409), but from the 15th century onwards they were used in a wider variety of buildings. It is of interest that 21 different suppliers provided the 112,300 bricks used in construction of the North Bar (Blair and Ramsay 1991, 212) which clearly shows the large number of producers in the area. The presence of bricks at the Beverley Minster site may reflect their early use in high-status buildings.

Distinguishing between medieval and post-medieval bricks can be difficult, and is normally done on the basis of the size of the bricks. Unfortunately most of the brick fragments from this site were too small to obtain any measurements so could not be closely dated. In addition most of the bricks were too fragmentary to determine if they had been manufactured using a sanded mould or by slop moulding. Two of the medieval

fragments were made in sanded moulds, while 16 were slop moulded. A single fragment of brick was covered all over in thick green glaze. Presumably this was accidental and was the result of the fragment having been fired alongside pottery.

## 10.4 Post-medieval and modern forms

A few fragments of pan tile were recovered which date from the 17th century or later, and there were some fragments of post-medieval bricks which were manufactured from the same fabrics as medieval examples, showing continuity of sources between the two periods. All of the post-medieval fragments were slop moulded.

## 10.5 Conclusion

The CBM from the excavations did not produce any unusual forms. The site is, however, useful for the contribution it can make to building up a picture of brick production in the area. Comparison with material from other sites would help to show the periods of use for each of the fabric groups identified. The collection is also of interest in terms of the evidence it may yield for the regional CBM trade in the later medieval period. There seems to be evidence for tiles being imported into Beverley both from the East Riding and from the area to the north-west of the town, closer to York. They tiles also confirm the East Riding origins of many of the fragments from York itself. If the site is to be more fully published further research into the CBM in relation to other sites in the area would be justified.

***Table 7:*** *CBM summary*

| CONTEXT | SPOT DATE | DETAILS |
|---|---|---|
| 1002 | 14TH-16TH | Plain, nib, brick, floor |
| 1007 | 14TH-16TH | Brick |
| 1009 | 16TH-18TH | Brick, plain, floor |
| 1019 | 14TH-16TH | Brick, plain, peg |
| 1021 | 14TH-16TH | Brick, plain, floor |
| 1023 | 14TH-16TH | Brick |
| 1025 | 14TH-16TH | Brick, floor, plain |
| 1031 | 14TH-16TH | Brick, plain? |
| 1034 | 14TH-16TH | Brick, plain |
| 1037 | 16TH-18TH | Brick |
| 1041 | 14TH-16TH | Brick |
| 1045 | 13TH-16TH | Plain |
| 1055 | 14TH-16TH | Brick |
| 1062 | 16TH-18TH | Brick |
| 1071 | 13TH-16TH | Plain |
| 1098 | 14-16TH | Brick |
| 2001 | 17TH+ | Plain, peg, floor, brick, nib, ridge, pan, hip |
| 2004 | 17TH+ | Plain, brick, ridge, pan |
| 2008 | 14TH-16TH | Brick, plain |
| 2009 | 14TH-16TH | Brick, plain |
| 2010 | 13TH-16TH | Ridge, plain |

| | | |
|---|---|---|
| 2011 | 14TH-16TH | Brick |
| 2014 | 14TH-16TH | Brick, plain, ridge, peg |
| 2015 | 14TH-16TH | Brick, plain |
| 2016 | 14TH-16TH | Brick, plain, ridge, hip, nib |
| 2017 | 14TH-16TH | Brick, ridge, plain, nib, hip, ridge |
| 2019 | 14TH-16TH | Brick |
| 2021 | 14TH-16TH | Brick |
| 2027 | 13TH-16TH | Ridge |
| 2034 | 13TH-16TH | Plain |
| 2037 | 14TH-16TH | Brick, plain |
| 2047 | 14TH-16TH | Brick |
| 2071 | 14TH-16TH | Brick |

## 11.0 **WOOD** by S.J Allen

### 11.1 Objectives and procedures

This report aims to meet the requirements of MAP2, phase 3, Assessment of Potential for Analysis (English Heritage 1991). The work carried out has involved the cleaning and examination of the recovered wood assemblage, assessment of its condition, potential for further analysis, recording, dating, retention and conservation. Each piece of wood was unwrapped, washed and cleaned under cold running water, then examined for potential further study and sampled for species identification. The material has now been rewrapped and awaits a decision based on the recommendations made below.

### 11.2 Condition

The wood was in a generally good state of preservation. Waterlogged anoxic conditions had evidently been maintained in all contexts in which wood survived up to the time of excavation. This condition may not however have been uniformly maintained during the time of burial. One object (coffin 2082) had been very close to the water table, as evidenced by the deteriorated upper edges of the sides/ends. Most of the wood surfaces had suffered some erosion or decay either before or during burial. The surviving wood was generally quite hard.

### 11.3 Dendrochronology and tree-ring studies

Though all the boards are oak, many of the pieces recovered have little or no dendrochronological dating potential, owing to damage and conversion. However, the south side, base and ends of coffin 2082 are radially faced, with sapwood present, and have been successfully submitted for dendrochronological dating.

### 11.4 Listing and Recommendations

Structural timbers are listed in context and timber number order. There is only one small find. All dimensions are in metres/millimetres. Most of the wood can only be identified to a particular genera. Although, for example, there are many different species of willow,

their wood cannot be differentiated. The following list gives the common names of the scientific identifications used in this report and the database.

*Quercus spp*. Oak
*Salix spp*. Willow

***Table 8:*** *Wood listing and recommendations*

| Context | Timber no. | Comment | Additional record | Draw. | Species | Recommendation |
|---|---|---|---|---|---|---|
| 1122 | 1 | Tangentially faced outer section used as plank. Very knotty, eroded surfaces. No surviving toolmarks. 1. L.228mm, W.265mm, Th.68mm | no | yes, 1:10 | *Quercus spp.* | Discard after drawing unless of special stratigraphic significance |
| 1130 | 2 | Three non refitting parts of a radially faced board. All surfaces very eroded. No surviving toolmarks or sapwood. L.743mm, W.243mm, Th.19mm 2. L.940mm, W.154mm, Th.10mm 3. L.790mm, W.124mm, Th.8mm | no | yes, 1:10 | *Quercus spp.* | Discard after drawing unless of special stratigraphic significance |
| 2074 | 3 | Two non refitting parts of a radially faced board. All surfaces very eroded. No surviving toolmarks or sapwood. 1. L.783mm, W.154mm, Th.12mm 2. L.990mm, W.101mm, Th.8mm1. | no | yes, 1:10 | *Quercus spp.* | Discard after drawing unless of special stratigraphic significance |
| 2079 | 4 | Three sections of radially faced board, two of which refit. Very eroded surfaces, some sapwood present? Underside has impressions of bones of occupant pressed into the surface. Also possible beetle damage to underside. No surviving toolmarks. L.411mm (+193), W.321mm, Th.22mm Coffin lid of 2082 | no | yes, 1:10 | *Quercus spp.* | Dendro sample. Discard unless of special interest to other specialists |
| 2082 | 5 | Base of coffin. Radially faced board with sapwood present. North edge has three peg holes with in situ pegs for attachment of 7. South edge has two peg holes with in situ pegs for attachment of 8. Each end has two peg holes with in situ pegs for attachment of ends. One through peg hole with roundwood peg towards north edge/east end, redundant as found. L.890mm, W.389mm, Th.43mm. | yes, investigation of pegs | yes, 1:10 | *Quercus spp.* | Dendro sample. Conserve if from early or significant context depending on dendro results. |
| 2082 | 6 | North side of coffin. Radially faced board, no sapwood, with three peg holes at steep oblique angle through face towards lower edge for attachment to 5. L.892mm, W.277mm, Th.25mm. | no | yes, 1:10 | *Quercus spp.* | Conserve if from early or significant context depending on dendro results. |
| 2082 | 7 | South side of coffin. Radially faced board, sapwood present but much of sapwood edge lost. Two peg holes, one with in situ peg, one cut at steep oblique angle, for attachment to 5. Truncated remains of single larger peg hole on sapwood edge. Several intersecting marks on outer face. L.889mm, W.277mm, Th.25mm | no | yes, 1:10 | *Quercus spp.* | Dendro sample. Conserve if from early or significant context depending on dendro results. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2082 | 8 | West end of coffin. Radially faced board with sapwood present. Upper edge lost due to erosion/rotting. Two peg holes cut into lower (sapwood) edge for attachment to 5. L.381mm, W.203mm, Th.23mm | no | yes, 1:10 | *Quercus spp.* | Dendro sample. Conserve if from early or significant context depending on dendro results. |
| 2082 | 9 | East end of coffin. Radially faced board with sapwood present. Upper edge lost due to erosion/rotting. Two peg holes cut into lower (sapwood) edge for attachment to 5. L.276mm, W.147mm, Th.22mm | no | yes, 1:10 | *Quercus spp.* | Dendro sample. Conserve if from early or significant context depending on dendro results. |
| 2088 | 10 | Short length of halved roundwood. Sapwood present, very eroded and fissured. Axe hewing marks more than 45mm long on cross cut end. L.187mm, W.170mm, Th.95mm | no | no | *Quercus spp.* | Discard |
| 2077 | Sf232 | Length of roundwood, possibly a 'wand', in five refitting sections. Has dried out in ground slightly resulting in minor splitting. L.464mm, D.10mm | no | yes, 1:2 | *Salix spp.* | Retain and stabilise with p.e.g. polymers followed by freeze drying. |

## 11.5 Summary

Most of the pieces of wood are very eroded and have little potential for woodworking technology study or for dendrochronology. However, as examples of burial practice they are worth recording and retaining as paper records. The exception to this is coffin 2082. This is intact almost to the level of the lid. It has provided a close estimated felling date. A more exact felling date will not be possible owing to the removal of the bark and parts of the sapwood. The construction of the coffin may be of research interest especially given its early date. The coffin would also make a promising subject for display. Dendrochronological sampling need not compromise this as the samples can be returned and conserved at the same time as the rest of the object, and refitted.

The 'wand' is an example of a medieval burial practice which is still not fully understood. As such it is of considerable importance and should be retained for archive, publication and display.

# 12. DENDROCHRONOLOGICAL DATING by Ian Tyers

## 12.1 Introduction

A total of five samples from coffin 2082 were submitted for spot-dating. The samples are from the lid, base, south side and both ends.

A preliminary assessment concluded that all five samples had some dendrochronological potential. Standard dendrochronological methods (see e.g. English Heritage 1998) were applied to the five samples (Table 9). The tree-ring sequences from the five samples were found to cross-match with each other sufficiently strongly that each is clearly derived from the same tree (Table 10). A single composite tree-ring sequence was produced and compared with reference tree-ring chronologies. This sequence was found to strongly correlate with data from Yorkshire and elsewhere in England, dating the sequence from AD 848-992 inclusive (Table 11 and Figure 11).

Three types of dating result are usually obtained by dendrochronological analysis. Firstly, where a sample is complete to bark-edge a precise year of felling is obtained directly from the date of the last ring on the sample. Where there is good survival of this outer ring it is sometimes possible to assign seasons to the felling period, the principal distinctions being early spring, early summer and winter. Where a sample has some sapwood, but is not complete to bark-edge a felling date range is obtained by applying the maximum and minimum numbers of rings of sapwood normally seen in oaks in the relevant region to the end dates of the samples. The range 10-46 has been used in this report. Finally, where no sapwood survives a *terminus post quem* (tpq) date is obtained by adding the minimum number of sapwood rings likely to have been lost to the date of the latest surviving ring. This type of date is very much less useful than the other two since a very great number of rings could have been lost either through ancient carpentry practice or poor site preservation, and thus the felling date of such material may be considerably later than the tree-ring date.

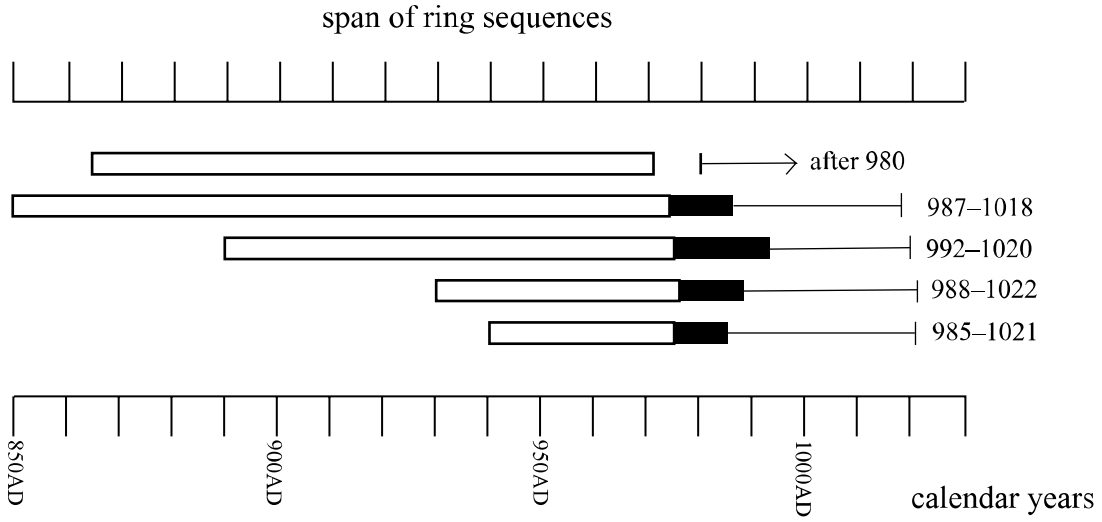


Figure 11: Bar diagram showing the relative and absolute positions of the dated samples from coffin 2082. Each bar is annotated with an interpretation based on the date of the ring sequence and the presence of sapwood.

## 12.2 Results and discussion

A summary of the findings is presented in Table 9 and Figure 11. All five samples were derived from a single fairly fast grown oak felled when it was between 150 and 190 years old. Four of the samples included some sapwood. Close examination of the sample with the latest rings suggests that it was not complete to the original bark-edge. The tree-ring results indicate this tree was felled no earlier than AD 992. Applying standard sapwood allowances also indicates it was felled before c.1018. However, given the close similarity of end date on the four samples with some surviving sapwood (all four end between 984 and 992) and the presence of the same final ring at both surfaces of sample 5, it is conceivable this tree was felled either in or very shortly after 992.

Evidence from other coffin assemblages suggests that it is reasonable to assume such a coffin would be constructed from green oak. Hence unless there is some evidence on the boards to indicate re-use of earlier timber, this coffin is from the pre-Norman period.

***Table 9.*** *Sample details from coffin 2082*

| Sample | Species | Rings | Sapwood | Growth (mm/year) | Sequence date | Interpreted date (AD) |
|---|---|---|---|---|---|---|
| Lid 4 | Oak | 116 | – | 2.68 | 855-970AD | after 980 |
| Base 5 | Oak | 140 | 15 | 2.73 | 848-987AD | 987-1018 |
| South side 7 | Oak | 105 | 18 | 2.57 | 888-992AD | 992-1020 |
| West end 8 | Oak | 60 | 12 | 2.83 | 929-988AD | 988-1022 |
| East end 9 | Oak | 44 | 9 | 3.25 | 941-984AD | 985-1021 |

***Table 10.*** *Correlation t-values (Baillie and Pilcher 1973) between the individual sample sequences from coffin 2082. These series are undoubtedly derived from a single tree.*

| | **5** | **7** | **8** | **9** |
|---|---|---|---|---|
| **4** | 18.78 | 14.64 | 6.84 | 5.78 |
| **5** | | 18.20 | 12.39 | 9.68 |
| **7** | | | 11.31 | 8.83 |
| **8** | | | | 20.80 |

***Table 11.*** *Correlation t-values (Baillie and Pilcher 1973) for the combined sequence of all the samples from Beverley Minster coffin 2082 dated to AD 848-992 inclusive against a series of independently dated chronologies from Yorkshire and elsewhere.*

| | Coffin 2082 |
|---|---|
| Cumbria, Carlisle, The Lanes (Groves 1996) | 4.42 |
| Linclonshire etc, East Midlands regional chronology (Laxton and Litton 1988) | 4.26 |
| Lincolnshire, Barton on Humber coffins (Tyers 2001b) | 5.79 |
| London, Billingsgate (Tyers and Hillam unpubl.) | 4.35 |
| London, Fennings Wharf (Tyers 2001a) | 4.87 |
| Staffordshire, Stafford, St Mary's & Eastgate (Groves 1987a and b) | 5.78 |
| Yorkshire E, Beverley, Eastgate (Groves 1992) | 5.97 |
| Yorkshire N, Queen's Hotel, York (Groves 1993) | 6.00 |
| Yorkshire N, Swinegate coffins York (Bagwell and Tyers 2001) | 6.30 |
| Yorkshire N, Coppergate, York (Groves and Hillam 2003) | 7.92 |

## 13. ENVIRONMENTAL SAMPLES by John Carrott and Kathryn Johnson

### 13.1 Introduction

Eight bulk sediment samples ('GBA'/'BS' *sensu* Dobney et al. 1992), and a further nineteen (mostly small) samples associated with human skeletons, were submitted to PRS for an evaluation of their bioarchaeological potential.

## 13.2 Methods

*samples associated with skeletons*

Brief descriptions of the samples were made.
The samples were examined for the eggs of intestinal parasitic nematodes using the 'squash' technique of Dainton (1992). Assessment slides were scanned at 150x magnification with 600x used where necessary. Although primarily for the detection of intestinal parasitic nematode eggs, the 'squash' technique routinely reveals other microfossil remains, and where present these have also been noted.

*Bulk sediment samples*

Two of the bulk sediment samples were selected for the evaluation, their lithologies were recorded (using a standard *pro forma*) and subsamples were processed, following the procedures of Kenward et al. (1980), for the recovery of biological remains.

The remaining bulk samples were examined and some brief notes made.

## 13.3 Results

*Samples associated with skeletons*

A summary of the organic remains from these samples is given in Table 12.

The samples from within the grave fills had similar lithologies. Most were of moist, light grey-brown (with samples 1 to 3 being darker — mid to dark grey-brown), crumbly to unconsolidated (working soft), slightly sandy, clay silt, with small stones (2 to 20mm) present to common. A few bone fragments were noted in samples 10 and 1, and samples 15 and 16 contained black flecks of rotted charcoal (or other fine charred material). No remains of mineralised body structures or of possible food were seen in the samples.

The general microscopic compositions of the 'squash' subsamples were also very similar. All were primarily inorganic with at most rather small amounts of organic detritus. Fungal spores and hyphae, and other spores/pollen grains were often present.

Parasite eggs were recorded from three (possibly four) of the samples. Poorly preserved *Trichuris* eggs were noted in samples 3, 8 and 9, and an unembryonated *Ascaris* egg was identified (rather more tentatively) in sample 10. With the exception of sample 9 for which two *Trichuris* eggs were recorded, only single eggs were seen in each of these samples.

A small (~1g) lump of sediment from Sample 5 had been bagged separately. It was of a much darker colour than the rest of the sample and apparently quite organic. Examination of this material under a low-power microscope revealed little about its nature but, when a small amount was disaggregated, mounted on a slide and examined at higher magnification, it proved to be composed almost entirely of insect cuticle. Some of the

more identifiable fragments included pieces of compound eye and palp, together with large numbers of cilae, suggesting that they represented the remains of a fly (possibly more than one but perhaps only a single individual).

## 13.4 Bulk sediment samples

Summary notes for those samples not processed are given in Table 13.

The results are presented in context number order. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

**Context 2071** [fill immediately above the lid of the partially preserved wooden coffin of which context 2081 (below) was the fill]
Sample 24/T (1kg sieved to 300 microns with washover; approximately 6 litres of unprocessed sediment remain)

Moist, light brown and light grey to mid to dark grey-brown (in shades of grey-brown between), crumbly (working soft and slightly sticky), clay silt, with stones (2 to 60mm) and some flecks of ?charcoal present.

There was a small washover (10ml) of small fragments of rotted wood and charcoal (both to 5mm), with an occasional leaf fragment and one or two pieces of (unidentified) invertebrate cuticle (possibly a modern contaminant).

The very small residue (dry weight 104g) was mostly sand and small stones (to 20mm), with a few fragments of bone (to 12mm).

**Context 2081** [fill of preserved wooden coffin]
Sample 25/T (1kg sieved to 300 microns with washover; approximately 16 litres of unprocessed sediment remains)

Moist, mid grey-brown to mid to dark grey, crumbly (working soft), clay silt, with stones (2 to 20mm) and rotted wood fragments present.

The large washover (100ml) was almost entirely of rotted wood fragments (to 20mm), with some earthworm egg capsules and fragments of beetle cuticle. The last appeared to be mostly individual body parts of a single, apparently modern contaminant, staphylinid.

The very small residue (dry weight 98g) was of bone and sand, with a few small stones (to 25mm) and flakes of very poorly preserved oyster (*Ostrea edulis* L.) shell. All of the bone was human and included complete phalanges (finger/toe bones) and fragments of larger bones (all returned to YAT).

## 13.5 Discussion and statement of potential

None of the samples associated with skeletons contained more than small amounts of organic material. Where parasite eggs were recorded these were in ones or twos and from samples taken from a range of locations relative to the skeletons—one each from the stomach, chest and neck areas — or as the control (from within the grave fill but away from the skeleton itself). The small numbers and random distribution of the parasite eggs suggest that they represent a 'background' faecal content within the soil rather than remains deriving directly from the bodies within the graves. No other remains of, for example, mineralised body structures or possible food, were seen in the samples.

Where seen, *Trichuris* eggs were very poorly preserved, none retaining even one polar plug and often with the shell itself highly decayed. Comparison of these eggs (via an estimation of their original size from a few spot measurements of the remains) with data for modern trichurids (Ash and Orihel 1984; Kassai 1998) indicated that the eggs seen were probably of either *Trichuris trichiura* (Linnaeus) or *T. suis* (Schrank), the whipworms of humans and pigs respectively, or perhaps of both. Even when well preserved, it is particularly difficult to distinguish these two species purely by visual examination of their eggs as the normal size range for the eggs of *T. trichiura* is a wholly contained subset of that for *T. suis*. When, as here, the trichurid eggs are not measurable, even a statistical approach to their identification, or the determination of the presence of more than one population, is not possible. Similarly, the eggs of the ascarids *Ascaris lumbricoides* (Linnaeus) and *A. suum* (Goeze), the roundworms of humans and pigs respectively (though some parasitologists believe that there is just one species of *Ascaris* that infests both humans and pigs) are morphologically almost identical. Given the situation and archaeological context of these deposits, it is perhaps rather more likely that any parasite eggs detected are a result of trace levels of human faecal material in the soil, rather than from pigs.

Both of the processed bulk subsamples (contexts 2071 and 2081) gave quantities of rotted wood, presumably from the coffin lid which separated these two layers. In view of the generally good state of preservation of the coffin and the date obtained (from the coffin lid) by dendrochronology of AD 992 (or just after), it would perhaps be worth pursuing the identification of other plant (e.g. the leaf fragments in context 2071) and invertebrate remains from these deposits a little further. In particular, the plant remains should be checked to determine (if possible) whether they represent deliberate burial inclusions, and the modernity (or otherwise) of the invertebrate remains confirmed.

## 13.6 Recommendations

No further investigation of the samples from around the skeletons is warranted.

Larger subsamples (of at least 5kg) from contexts 2071 and 2081 should be processed for the recovery of plant and invertebrate macrofossils. The resulting assemblages should be subject to an additional round of assessment and, if appropriate, subsequent full analysis. Any remaining sediment from context 2081 should then be sieved to recover any additional human bone from the coffin fill.

Clearly, some deposits at this site have the potential for good organic preservation (e.g. the wood of the coffin). Any further excavation in this area should certainly take account of this and allow for the targeted sampling and assessment of suitable deposits.

## 13.7 Retention and disposal

The samples from contexts 2071 and 2081, together with the remains recovered from the processed subsamples, should be retained for the present.

The remaining sediment from other samples may be discarded unless required for the recovery of additional human bone, or the study of non-biological remains.

## 13.8 Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

***Table 12**. Beverley Minster, Beverley, East Riding of Yorkshire: notes for the samples asssociated with skeletons. Key: med = medieval; org = approximate amount of 'squash' composed of organic detritus – t = trace (~1%); l = little (<10%); s = some (10-25%); f. spores/hyphae = fungal spores and/or hyphae;* Trichuris *– sub-columns indicate numbers of eggs with 0, 1 or 2 polar plugs intact; f = few (up to 3 individuals); s = some (4 to 20); m = many (21 to 50).*

| Context/ Skeleton | Sample | Skeletal location | Date | org | pollen/ spores | f. spores/ hyphae | diatoms | *Trichuris* | | | ?*Ascaris* | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0 | 1 | 2 | | |
| sk1014 | 1 | stomach | post med | l | m | | | | | | | |
| sk1014 | 2 | chest | | l | m | m | | | | | | |
| sk2019 | 3 | stomach | late med/post med | s | m | | | 1 | | | | |
| 2017 | 4 | control (for sk2019) | | l | m | | f | | | | | |
| sk1015 | 5 | neck | post med probably early 19th century | l | m | | | | | | | fly remains in separately bagged subsample |
| sk1015 | 6 | control | | t | f | f | | | | | | |
| sk1015 | 7 | stomach | | t | m | f | | | | | | |
| sk1015 | 8 | chest | | t | m | f | | 1 | | | | |
| sk1023 | 9 | control | post med | l | f | f | | 2 | | | | |
| sk1023 | 10 | neck | | l | s | m | | | | | 1 | small bone fragments |
| sk1023 | 11 | chest | | l | f | f | | | | | | small bone fragments |
| sk1023 | 12 | stomach | | l | f | f | | | | | | |
| sk2043 | 13 | stomach | med | t | f | f | | | | | | |
| sk2043 | 14 | control | | t | | f | | | | | | |
| sk2051 | 15 | stomach | med | t | f | | | | | | | ?charcoal flecks |
| sk2051 | 16 | control | | l | f | | | | | | | charcoal flecks; soil nematode |
| sk1053 | 17 | control | v late med/ early post med | t | | f | | | | | | |
| sk1053 | 18 | stomach | | t | | f | | | | | | |
| sk1053 | 19 | chest | | t | | f | | | | | | |

***Table 13.** Beverley Minster, Beverley, East Riding of Yorkshire: brief notes regarding the unprocessed bulk samples.*

| Context | Sample | archaeological question/information | Notes |
|---|---|---|---|
| 2075 | 22 | grave fill of limited environmental interest; sample taken for possible small finds recovery | very unpromising for biological remains |
| 2086 | 26 | is this a buried soil? | could not be determined |
| 2087 | 27 | fill of a very early post-hole (possibly Anglo-Saxon/Anglo-Norman) with part of oak timber post surviving | organics apparently all wood fragments from post |
| 2083,2094, 1131 | 28, 29, 30 | samples probably of the 'natural' deposits - can this be confirmed? | all certainly appear to be 'clean natural' |

## 14. HUMAN BONE by Katie Tucker

### 14.1 Introduction

The remains of 32 articulated individuals, fifteen crania from charnel deposits and a large amount of disarticulated bone were analysed by a York Archaeological Trust (YAT) osteoarchaeologist. Twenty-one of the articulated individuals came from Trench 1, while twelve individuals were from Trench 2. The crania from all charnel pits (all from Trench 1) were allocated skeleton numbers: these are SKs 20-5, 27-9, 31, 33-5, 38, 46 and 48. For the purposes of this study the burials are divided into three broad groups: late medieval or post-medieval; 13th-century or earlier (burials from both these periods are aligned approximately parallel to the existing nave alignment); and Anglo-Saxon (these early burials are on a different alignment). All the individuals, with the possible exception of 2039, were buried in a supine, extended position.

### 14.2 Preservation

As the two trenches were small, relatively few complete individuals were recovered. The majority of the burials encountered extended beyond the limits of the trenches and could not be completely exposed, while in other cases burials were truncated by later interments. In the majority of cases, the preservation of the bone was good to excellent, although there were a few recent post-mortem breaks, and the collection of the small bones of the hands and feet was not always complete.

### 14.3 Methodology

As the human bone was to be re-interred soon after analysis, all the articulated individuals and the crania from the charnel deposits were examined in detail after lifting and cleaning by YAT. An inventory of skeletal elements was compiled, and age and sex were attributed to each where possible. Metrical and non-metric data were collected, and pathological changes were recorded and photographed where appropriate. The disarticulated material was rapidly scanned, an inventory of skeletal elements was made and any instances of unusual pathology were described and photographed.

An assessment of age for the adult individuals was determined from, where possible, the changes to the pubic symphysis (Brooks and Suchey 1990), the auricular surface of the ilium (Buikstra and Ubelaker 1994), and the sternal end of the ribs (Işcan and Loth 1986). Immature skeletons were aged from dental development (Brothwell 1981), and long bone length and epiphyseal fusion (Scheuer and Black 2000). The age of immature skeletons can be determined with a much greater degree of accuracy than that of adults, due to the fact that the growth of the bones and development of the teeth follow a relatively predictable course, up to the time when the final epiphyseal fusion takes place, around the age of 25. However, the degeneration of the pelvis, ribs and teeth of adult skeletons depends on the sex, health and lifestyle of each individual, and tends to vary to a greater extent with increasing age. Therefore, age cannot be reliably determined beyond 46+ years.

The age of the individuals was divided into a number of categories, starting with foetus (up to 40 weeks *in utero*), neonate (around the time of birth), infant (newborn to one year), juvenile (1-12 years), adolescent (13-18 years), young adult (19-25 years), young middle adult (26-35 years), old middle adult (36-45 years) and mature adult (46+). There may be overlaps between categories, or a broad category, such as adult, may be used where insufficient evidence was present to age an individual more accurately.

The sex of the adult individuals was determined from, where possible, the assessment of several sexually dimorphic features of the pelvis and skull (as given in Buikstra and Ubelaker 1994). A five sexes classification (female, ?female, undeterminable, ?male, male) was used. Sex cannot easily be determined for immature individuals, as the skeleton only becomes truly sexually dimorphic during puberty. There have been several methods devised to try to sex the immature skeleton (for example, Weaver 1980, Schutkowski 1993, Molleson et al. 1998), but, during this analysis, no attempt was made to sex immature individuals.

The statures of the adult individuals were calculated, where possible, from long bone lengths, which were placed into the regression formulae developed by Trotter (1970). The cranial index, which records the shape of the head, was also calculated, where possible, as given in Brothwell (1981).

The dentition, where it could be analysed, is recorded as follows (permanent and deciduous dentition respectively):

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Upper left |
| Lower right | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | Lower left |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | Upper left |
| Lower right | 70 | 69 | 68 | 67 | 66 | 65 | 64 | 63 | 62 | 61 | Lower left |

/ tooth lost post-mortem
X tooth lost ante-mortem
--- jaw and teeth not present
np tooth not present
c caries in tooth
a abscess
e tooth erupting
u tooth unerupted

## 14.4 Catalogue of burials

The preservation, completeness, age, sex, stature and cranial index of each individual analysed, as well as any non-metric traits and pathologies observed, are catalogued below. The information is summarised in Table 14.

**SK1 (2011) late medieval/post-medieval**

Age: mature adult (46+)
Sex: female
Stature: 170 ± 3.55cm (femur + tibia)
Cranial index: -
Preservation: moderate
Completeness: most bones inferior of midshaft of humerus and T12 are present.
Non-metric traits: none
Pathology: OA (osteoarthritis) of the spine, hands and right knee. DJD (degenerative joint disease) of the right elbow, left knee and feet. Areas of striated compact bone, indicative of a healed non-specific infection (NSPI) on the distal, medial shaft of the right femur, medial shafts of both tibiae, and on the shafts of both fibulae. There is an area of localised compact bone on the lateral side of the shaft of the right femur that is possibly indicative of a leg ulcer. Enthesophyte development on the medial epicondyle of the right humerus and the linea aspera of the left femur. Marked muscle attachment sites for adductor pollicis on both third metacarpals.

**SK2 (1015) late medieval/post-medieval**

Age: old middle adult (36-45)
Sex: ?male (the cranial traits suggested a female and the pelvis a male)
Stature: 162 ± 2.99cm (femur + tibia)
Cranial index: 77.7
Preservation: moderate to good
Completeness: majority of bones present apart from thoracic vertebrae and ribs
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Upper left |
| Lower right | X | X | X | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | X | X | X | X | Lower left |
| | | | | | a? | | c | a | | c | | | | | | | |

Dental pathology: calculus (9/9), caries (2/9), two buccal abscesses, severe periodontal disease, enamel hypoplasia
Non-metric traits: flattened head of first metacarpal
Pathology: OA of spine and left foot. DJD of spine, temporomandibular joint, shoulders, right wrist, hands, knees and right foot. Possible button osteoma on the frontal. Fusion of C5 and C6 related to DJD. Flattening and bowing of both femorae, tibiae and fibulae that seems to be a case of healed rickets. Unusual shaft expansion of a foot phalanx. Enthesophytes of the right ischial tuberosity and iliac crest. Marked muscle attachment site for latissimus dorsi on the right humerus.

**SK3 (2013) late medieval/post-medieval**

Age: old middle/mature adult (40+)
Sex: male
Stature: 167 ± 2.99cm (femur + tibia)

Cranial index: -
Preservation: good
Completeness: most bones inferior of the proximal humerus present
Non-metric traits: none
Pathology: Schmorl's Nodes of T10 and T11. OA of the spine with fusion of T10 and T11, and of the right elbow. DJD of the knees. Striated compact bone, indicative of healed NSPIs, on the lateral shaft of the right humerus, the medial surfaces of the left tibia and fibula, and the distal shaft of the right tibia and fibula and the superior of the right talus. Porous woven bone, indicative of a NSPI that was still active at the time of death, on the lateral shaft of the right tibia. Probable osteoid osteoma (a type of benign bone tumour) of the proximal and medial right fibula. Enthesophyte development at the attachment sites for the common flexors and pronator teres on the left humerus, biceps on the left radius, and triceps on the left ulna.

**SK4 (1014) late medieval/post-medieval**

Age: old middle adult (36-45)
Sex: ?male
Stature: 163 ± 3.27cm (femur)
Cranial index: -
Preservation: good
Completeness: most bones present, except right arm and pelvis, and inferior of midshaft of the tibiae
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | X | X | X | X | 5 | 6 | 7 | 8 | / | / | / | X | - | - | - | - | Upper left |
| Lower right | X | X | X | - | - | - | - | - | - | - | / | X | / | X | X | X | Lower left |

Dental pathology: calculus (2/4), enamel hypoplasia
Non-metric traits: none
Pathology: Schmorl's Nodes of thoracic vertebrae. OA of the spine. DJD of the left shoulder and the hands. Two fused thoracic vertebrae, possibly congenital, with subsequent scoliosis of the spine. Neoplastic disease of the cranium that is possibly osteolytic metastatic carcinoma, which is malignant. Enthesophyte development at the attachment sites for semimembranosus, semitendinosus and biceps femoris on the left os coxa.

**SK5 (2019) late medieval/post-medieval**

Age: mature adult (46+)
Sex: female
Stature: -
Cranial index: -
Preservation: moderate
Completeness: majority of the bones inferior of the distal humerus are present.

Non-metric traits: none
Pathology: OA of the spine. DJD of the right wrists, the hands and the knees. Striated compact bone, indicative of a healed NSPI, on the posterior proximal shaft of the left tibia. Well healed fracture of the distal right radius. Well developed muscle attachment sites on the metacarpals especially in the attachment area of adductor pollicis on the third metacarpal, and of the extensors and pronator quadratus, supinator and anconeus on the ulnae and flexor pollicis longus on both radii.

**SK6 (1023) late medieval/post-medieval**

Age: adolescent/young adult (15-20)
Sex: female
Stature: 166 ± 3.66cm (tibia)
Cranial index: 73.3
Preservation: good
Completeness: majority of bones except the feet present
Dentition: c c e

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | / | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Upper left |
| Lower right | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | np | 18 | 17 | Lower left |

U u c
e

Dental pathology: caries (3/27), enamel hypoplasia, lower left first molar is either congenitally absent or lost many years before death
Non-metric traits: lambdoid wormians (right), mastoid foramen exsutural (left), vastus notch on patellae
Pathology: Schmorl's Nodes of 7 thoracic vertebrae associated with antero-posterior wedging of the bodies indicates a case of Scheuermann's disease. Flaring of the left clavicle at the attachment site for deltoid.

**SK7 (1035) late medieval/post-medieval**

Age: adult
Sex: ?
Stature: 157 ± 3.72cm (femur)
Cranial index: -
Preservation: good
Completeness: only the right radius, ulna, femur, patella and some of the bones of the left hand present.
Non-metric traits: none
Pathology: Slight DJD of the right knee. Enthesophyte development at the attachment for the quadriceps tendon on the right patella, and very slight on the linea aspera of the right femur. The femoral head seems small when compared to the length of the femur, and the femoral neck appears to be shorter and has a shallower angle than is normal.

**SK8 (1027) late medieval/post-medieval**

Age: old middle adult (36-45) although this is based on the auricular surface which may be affected by pathology.
Sex: female
Stature: 163 ± 3.66cm (tibia)
Cranial index: -
Preservation: good
Completeness: the majority of the bones of the right arm and hand, the right os coxa, the right femur, and both tibiae and fibulae are present
Non-metric traits: tibial squatting facet (left)
Pathology: posterior and superior dislocation of the right hip (possibly congenital, certainly of long standing) with subsequent OA of the femoral head and acetabulum, slight atrophy of the right tibia, and a possible unusual ankle articulation.

**SK9 (1029) late medieval/post-medieval**

Age: middle adult (26-45)
Sex: ?
Stature: 163 ± 3.27cm (femur)
Cranial index: -
Preservation: good
Completeness: the majority of the bones of the left arm and hand, the left os coxa, and the left femur and patella are present
Non-metric traits: none
Pathology: Slight DJD of the left shoulder, elbow and knee. Lytic foci on the left lunate and the lesser tubercle of the left humerus

**SK10 (2032) late medieval/post-medieval**

Age: adult
Sex: ?
Stature: -
Cranial index: -
Preservation: good
Completeness: some bones of the right hand, and the right femur, tibia and bones of the foot are present
Non-metric traits: none
Pathology: none observed

**SK11 (2039) 13th century or earlier**

Age: juvenile
Sex: ?
Preservation: good
Completeness: only parts of both femorae, tibiae and fibulae are present

Pathology: none observed

**SK12 (1033) late medieval/post-medieval**

Age: juvenile (4-6 years)
Sex: ?
Preservation: good
Completeness: only fragments of the cranium, and the left humerus, radius, ulna and some bones of the hand present
Pathology: none observed

**SK13 (2051) 13th century or earlier**

Age: old middle adult (36-45)
Sex: female
Stature: 166 ± 3.66cm (tibia)
Cranial index: -
Preservation: good
Completeness: majority of the bones inferior of the midshaft of the humerus are present
Non-metric traits: transitional vertebrae (thoracic/lumbar type), flattened heads of the first metacarpals
Pathology: Schmorl's Nodes on T12. OA of the spine and the right hand. Striated compact bone, indicative of healed NSPIs, on the lateral shaft of the right tibia and on the shaft of the left fibula. There is a groove proximal of the distal joint surface on one proximal hand phalanx. This is a possible indicator that the finger has been held in flexion, which may be congenital in nature. Both humeri have well developed lateral supracondylar ridges and the right has enthesophytes on both epicondyles at the attachments for the common flexors and extensors of the arm. There is marked muscle scarring on the linea aspera of both femora and on the greater trochanter of the right in the attachment area for gluteus medius and minimus. There is enthesophyte development on the posterior of both calcanei at the attachment for tendo calcaneus (Achilles tendon). Both fifth metacarpals show marked muscle attachments for opponens digiti minimi.

**SK14 (1053) late medieval/post-medieval**

Age: old middle/mature adult (40+)
Sex: male
Stature: 172 ± 2.99cm (femur and tibia)
Cranial index: -
Preservation: good
Completeness: the majority of the bones of the left side, and the right hand, os coxa, femur and fibula are present
Non-metric traits: transitional vertebrae (thoracic/lumbar type), flattened heads of first metacarpals

Pathology: Schmorl's Nodes of the thoracic vertebrae. OA of the spine. DJD of the left shoulder, and slight of the left wrist. Destruction of the distal joint surface of the right second metacarpal with subsequent DJD of that joint, which could possibly be evidence for a traumatic joint destruction. Lytic foci in some of the bones of the left hand. Both fibulae exhibit marked mediolateral bowing, which could be possible evidence for a healed case of rickets. Enthesophyte development at the attachment site for triceps on the left arm.

**SK15 (2080) Anglo-Saxon**

Age: young/young middle adult (19-35)
Sex: ?male
Stature: 172 ± 4.32cm (radius)
Cranial index: -
Preservation: moderate to good
Completeness: majority of the bones of the body are present, except for some bones of the hands and feet, and the right patella
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | / | 2 | 3 | / | / | / | / | / | / | / | 11 | / | 13 | 14 | 15 | 16 | Upper left |
| Lower right | 32 | 31 | 30 | 29 | 28 | 27 | 26 | / | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | Lower left |

Dental pathology: calculus (21/22)
Non-metric traits: parietal foramen (left), mastoid foramen exsutural, posterior atlas bridge, 6 lumbar vertebrae.
Pathology: Bilateral spondylolysis of the 6th lumbar vertebra. Schmorl's Nodes of the thoracic and lumbar vertebrae, the large number of successive vertebrae affected by these may indicate a case of Scheuermann's disease. Porosity of the cranial vault that is probably indicative of healed cranial lesions due to anaemia. There are areas of striated compact bone, indicative of healed NSPIs on the medial shafts of both tibiae, the lateral shaft of the left tibia and the lateral shaft of the left femur. There is a lytic focus on the distal joint surface of the left first metacarpal and a similar focus on the proximal joint surface of the proximal phalanx though it is less marked. This could possibly indicate some form of subchondral cyst or defect that has disrupted the joint surface. There is marked muscle scarring on both humeri in the areas of teres major and latissimus dorsi, with the attachment for teres major being especially marked on the left side, on both femorae in the area of attachment of gluteus maximus, and on the right tibia in the area of soleus.

**SK16 (1058) late medieval/post-medieval**

Age: young middle adult (26-35)
Sex: ?female

Stature: 163 ± 3.72cm (femur)
Cranial index: -
Preservation: good
Completeness: the cranium, the majority of the bones of the left side superior of the knee, and some bones of the right hand, the right os coxa, femur and patella are present.
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | - | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 17 | Lower left |

Dental pathology: enamel hypoplasia
Non-metric traits: lambdoid wormians, parietal foramen (right), mastoid foramen exsutural (left), flattened heads of first metacarpals
Pathology: DJD of the spine. Unformed neural arch of the first cervical vertebra. Small area of striated compact bone, indicative of a healed NSPI, on the distal, posterior shaft of the right femur. The left clavicle has a cortical defect at the attachment site for the costoclavicular ligament. The sternal end has a plaque of porous woven bone, indicative of an active NSPI, covering it. The manubrium has a cortical defect on the right anterior surface at the attachment site for sternocleidomastoid. The left humerus has flaring at the attachment site for brachioradialis.

**SK17 (2076) Anglo-Saxon**

Age: old middle adult (36-45)
Sex: ?male
Stature: -
Cranial index: -
Preservation: moderate
Completeness: the majority of the bones inferior of the proximal humerus are present
Non-metric traits: distal septal aperture on the humerus (left), transitional vertebrae (thoracic/lumbar type), 6 lumbar vertebrae
Pathology: Schmorl's Nodes of the thoracic and lumbar vertebrae, vertebral osteochondrosis, which probably reflects anterior herniation of the intervertebral disc, of T11 and T12. Slight DJD of the spine. Areas of striated compact bone, indicative of healed NSPIs on the lateral and medial shaft of the right femur and medial of the lesser trochanter, on the lateral and proximal shaft of the right tibia, the midshaft and distal end of the right fibula, and on the medial and lateral shafts of the left tibia and fibula.

**SK18 (1038) late medieval/post-medieval**

Age: old middle adult (36-45)
Sex: ?male

Stature: 171 ± 3.37cm (tibia)
Cranial index: -
Preservation: moderate
Completeness: the cranium, and the majority of the bones of the left side, except for the foot, are present
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | X | 2 | 3 | 4 | / | 6 | X | 8 | / | / | 11 | 12 | 13 | 14 | 15 | 16 | Upper left |
| Lower right | np | 31 | 30 | 29 | 28 | / | 26 | / | / | 23 | 22 | 21 | 20 | 19 | 18 | np | Lower left |

Dental pathology: calculus (19/22), enamel hypoplasia, possible broken crown of upper left 4th premolar
Non-metric traits: metopism, ossicle at lambda
Pathology: porosity of the cranial vault, probably indicative of healed cranial lesions due to anaemia, cranial asymmetry, deformation of the dens of C2 and of the left mandibular condyle

**SK19 (1072) 13th century or earlier**

Age: old middle adult (36-45)
Sex: male
Stature: 183 ± 2.99cm (femur + tibia)
Cranial index: -
Preservation: excellent
Completeness: the majority of the bones inferior of the proximal radius and ulna are present
Non-metric traits: flattened heads of first metacarpals
Pathology: OA of the right foot. DJD of the spine, wrists and hands. Torsion of both tibiae with the distal ends twisted posteriorly and medially. There is a groove proximal of the distal joint surface of a hand phalanx that may indicate the finger was held in flexion, possibly of a congenital nature. The right foot shows unusual articulations, and there is destruction of the distal joint surface of a proximal phalanx, and fusion of a medial and distal phalanx.

**SK20 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: sagittal wormians, lambdoid wormians (left), parietal foramen (right), mastoid foramen exsutural (right)

Pathology: there is an area of compact bone on the endocranial surface of the frontal. There is a button osteoma, which is a type of benign bone tumour, on the frontal. There are some old cut marks on the right parietal and frontal that are, presumably, the result of disturbance through grave digging.

**SK21 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: mastoid foramen exsutural
Pathology: the vault has an unusual shape with obliterated sutures, and with the lines of the sutures being sunken. The occipital is also protruding and appears unusually thick.

**SK22 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | - | - | - | - | 6 | 7 | - | - | - | - | - | - | - | - | - | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

Dental pathology: calculus (2/2), enamel hypoplasia
Non-metric traits: ossicle at lambda, lambdoid wormians (left)
Pathology: porosity of the cranial vault that is probably indicative of healed cranial lesions due to anaemia, unusual tooth wear that is possibly activity related. There is smooth compact bone on the endocranial surface of the occipital.

**SK23 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: parietal foramen (left)

Pathology: DJD of the temporomandibular joints. There are plaques of compact bone on the endocranial surface of the temporals. There is evidence for neoplastic disease of the cranial vault and base that is possibly metastatic carcinoma, which is a malignant form. Possible healed depressed fracture of the frontal.

**SK24 (1057) late medieval/post-medieval charnel**

Age: older juvenile/adolescent (11-16 years)
Sex: ?female
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: parietal foramen
Pathology: cribra orbitalia (porosity) in the roof of the left orbit that is probably an indicator of some form of anaemia. There is an old cut mark on the frontal that is probably a result of disturbance through grave digging.

**SK25 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: ?male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | - | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

Dental pathology: calculus (1/1)
Non-metric traits: coronal wormians, parietal foramen
Pathology: DJD of the temporomandibular joints. There is a round hole in the right parietal with bevelling of the internal edges and two radiating fractures. This is certainly not recent damage, and there is possible evidence for some healing, which would preclude the injury being a result of disturbance through grave digging. It appears to have been caused by some sort of sharp force, possibly a projectile.

**SK26 (2057) 13th century or earlier**

Age: juvenile (4-5 years)
Sex: -
Preservation: good

Completeness: the majority of the bones of the body are present
Dentition:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 51 | 52 | 53 | 54 | 55 | / | 57 | 58 | / | 60 | Upper left |
| Lower right | 70 | 69 | 68 | / | / | / | / | / | 62 | 61 | Lower left |

Dental pathology: calculus (5/13)
Pathology: there is slight cribra orbitalia (porosity) in the roof of the left orbit that is probably an indicator of some form of anaemia. There is development of the muscle attachment site for deltoid on the right clavicle.

**SK27 (1063) late medieval/post-medieval charnel**

Age: adult
Sex: female
Stature: -
Cranial index: 86.3
Preservation: moderate
Completeness: only the cranial vault is present
Non-metric traits: parietal foramen
Pathology: none observed

**SK28 (1055) late medieval/post-medieval charnel**

Age: adult
Sex: female
Stature: -
Cranial index: 72.3
Preservation: good
Completeness: only the cranium present
Dentition:

| | | | | a | | c | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | X | X | X | X | X | 6 | / | X | / | X | / | X | X | X | X | X | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

Dental pathology: calculus (1/1), caries (1/1), severe periodontal disease, enamel hypoplasia
Non-metric traits: mastoid foramen exsutural (left)
Pathology: DJD of the temporomandibular joints

**SK29 (1062) late medieval/post-medieval charnel**

Age: adult
Sex: ?

Stature: -
Cranial index: -
Preservation: moderate
Completeness: only the cranial vault is present
Non-metric traits: none
Pathology: the cranial vault is small, but thickened with sclerotic bone, the nuchal crest is very large, whereas the mastoids are very small, and one of the temporal bones is hypoplastic. These features are possibly indicative of some form of congenital condition. In addition, the left mastoid has a perforation, which is likely to be a sinus to drain an infection of the mastoid.

**SK30 (1050) late medieval/post-medieval**

Age: infant (5-7 months)
Sex: -
Preservation: good
Completeness: only the bones of the left arm and hand, the left ilium, the manubrium and some ribs are present
Pathology: none observed

**SK31 (1052) late medieval/post-medieval charnel**

Age: adult
Sex: female
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranium is present
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | * | 2 | 3 | 4 | 5 | 6 | / | / | / | 10 | 11 | 12 | 13 | 14 | 15 | * | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

* - there is no socket and no space for a socket for these teeth and therefore they are presumably congenitally absent

Dental pathology: calculus (8/11), enamel hypoplasia
Non-metric traits: parietal foramen (left)
Pathology: there is slight porosity of the cranial vault that is probably indicative of healed lesions resulting from anaemia.

**SK32 (2043) 13th century or earlier**

Age: mature adult (46+)
Sex: male

Stature: 170 ± 2.99cm (femur + tibia)
Cranial index: -
Preservation: good
Completeness: the majority of the bones inferior of the midshaft of the humerus are present
Non-metric traits: none
Pathology: OA of the spine. DJD of the right elbow, left hip, right ankle and both feet. Lytic foci in the right hand, on the right patella, and in the left foot. Areas of striated compact bone, indicative of healed NSPIs, on the lateral and proximal shaft of the right fibula and on the lateral and superior shaft of the left tibia with associated changes to the medial and superior shaft of the fibula. Extension of the distal joint surfaces of both first metatarsals onto the plantar surface, which may be related to unusual flexion of the toes.

**SK33 (1063) late medieval/post-medieval charnel**

Age: juvenile (probably under 6 years)
Sex: -
Preservation: good
Completeness: only the cranial vault is present
Pathology: none observed

**SK34 (1063) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: parietal foramen (right), mastoid foramen exsutural (right)
Pathology: none observed

**SK35 (1063) late medieval/post-medieval charnel**

Age: adult
Sex: ?female
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranial vault is present
Non-metric traits: none
Pathology: there are plaques of striated compact bone on the endocranial surface of the frontal that is a possible case of hyperostosis frontalis interna, a condition probably caused by altered pituitary gland secretion of hormones that is found in pregnant and post-menopausal women.

**SK36 (1106) 13th century or earlier**

Age: adolescent/young adult (15-20)
Sex: ?male
Stature: 175 ± 2.99cm (femur + tibia)
Cranial index: -
Preservation: excellent
Completeness: the majority of the bones inferior of the midshaft of the humerus are present
Non-metric traits: transitional vertebrae (thoracic/lumbar), flattened heads of the first metacarpals
Pathology: Schmorl's Nodes on the lumbar vertebrae. Slight spina bifida. There is a defect in the body of L1 with wedging of the body, vertebral osteochondrosis, and woven bone and striated bone on the arches and bodies of the vertebrae. This could be a case of atypical tuberculosis or some form of bacterial infection. This could also account for the areas of striated compact bone on both ilia, both ulnae shafts just inferior of the semilunar notch, the anterior shaft of the left humerus just superior of the deltoid tuberosity, the lateral shaft of the right tibia, the anterior shaft of the left tibia, and the anterior shafts of both fibulae, and the areas of porous woven bone on the posterior and anterior midshaft of the right tibia, and the medial and lateral shaft of the left fibula. However, these could also just be due to healed and active NSPIs. There are also destructive lesions of two foot phalanges with subsequent OA, which may also be due to TB or a bacterial infection, but could be a case of something like chronic juvenile arthritis. Both tibiae are bowed medially, which could be a case of rickets. There are exostoses of bone on the superior of the linea aspera of the right femur, and the proximal shaft of the left tibia.

**SK37 (1101) 13th century or earlier**

Age: neonate/infant (0-2 months)
Sex: -
Preservation: moderate
Completeness: part of the occipital and mandible, the right scapula, clavicle, humerus and radius, some ribs and vertebrae, and both femorae, tibiae, and the left fibula are present
Pathology: possible healed greenstick fracture of the right clavicle. Porosity of the majority of the shafts of the long bones, the suprascapular fossa of the scapula and the ribs. There is an area of porous woven bone on the endocranial surface of the occipital. These lesions could be evidence of scurvy, rickets or some form of anaemia, although all these are rare in infants of this age.

**SK38 (1108) 13th century or earlier charnel**

Age: adult
Sex: female
Stature: -

Cranial index: 90.6
Preservation: good
Completeness: only the skull, right clavicle, right ulna and manubrium are present
Dentition:

| | c | c | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 1 | 2 | 3 | / | 5 | / | 7 | 8 | - | 10 | - | - | - | - | - | - | Upper left |
| Lower right | 32 | 31 | 30 | 29 | 28 | / | 26 | 25 | 24 | 23 | 22 | 21 | 20 | X | X | X | Lower left |
| | | | c | c | | | | | | | | | | a | | | |

Dental pathology: calculus (19/19), caries (4/19), one buccal draining abscess, enamel hypoplasia, unusual occlusion of upper right central and lateral incisor
Non-metric traits: parietal foramen (right)
Pathology: none observed

**SK39 (1117) 13th century or earlier**

Age: old middle adult (36-45)
Sex: female
Stature: -
Cranial index: -
Preservation: moderate
Completeness: the majority of the bones inferior of the proximal humerus are present, except for the bones of both feet
Non-metric traits: none
Pathology: Schmorl's Nodes on the thoracic and lumbar vertebrae. Severe OA and degeneration of the spine, with wedging of the vertebrae and possible scoliosis. Possible osteoporosis. OA of both elbows and the right hand. Development of the gluteus maximus attachment on both femorae. The left tibia and fibula are severely flattened, and the right tibia appears slightly flattened, though not as severe as the left. The flattening of the tibia and fibula could be of an atrophic nature, possibly related to the severe spinal changes. The OA of the elbow joints could be evidence of stress on those joints, possibly from use of a crutch or walking stick necessitated by the atrophy of the lower leg and the severe spinal degeneration.

**SK40 (2096) 13th century or earlier**

Age: adult
Sex: ?
Stature: 168 ± 3.27cm (femur)
Cranial index: -
Preservation: excellent
Completeness: only both femorae are present
Non-metric traits: none
Pathology: slight DJD of both knees

**SK41 (1095) 13th century or earlier**

Age: juvenile
Sex: -
Preservation: moderate to good
Completeness: the cranium, some ribs and vertebrae, most of the bones of the right arm and hand, the right os coxa, femur, patella and talus, and the left femur, patella, tibia and talus are present
Pathology: Areas of woven bone, indicative of active NSPIs, on the superior of the left femur between the head and the greater trochanter, around the nutrient foramen of the shaft of a lower arm bone, the posterior of the proximal end of the ulna, and the lateral shaft of the left tibia. There are enthesophytes on the left patella at the attachment for rectus femoris, and on the lower part of the linea aspera of the left femur at the attachment for the adductor muscles.

**SK42 (1127) possibly Anglo-Saxon**

Age: adult
Sex: ?
Stature: -
Cranial index: -
Preservation: good
Completeness: the right femur, the left patella, both tibiae, fibulae and feet are present
Non-metric traits: none
Pathology: Slight DJD of the feet. Enthesophyte development at the attachment for rectus femoris on the left patella. Exostosis of bone on the anterior and medial of the left second metacarpal just proximal of the distal joint surface.

**SK43 (1120) 13th century or earlier**

Age: middle adult (26-45)
Sex: male
Stature: 170 ± 3.27 cm (femur)
Cranial index: -
Preservation: moderate to good
Completeness: the majority of the bones inferior of the proximal radius and ulna are present
Non-metric traits: none
Pathology: OA of the spine, the left hand, and the right foot. DJD of the right hip, and the hands. Both tibiae are greatly flattened and bowed. The fibulae are very flattened and triangular in cross section. The femorae also appear to be slightly bowed. The metatarsals seem flattened with little trabecular bone. This seems to be a case of healed rickets.

**SK44 (1111) 13th century or earlier**

Age: adult
Sex: ?
Stature: -
Cranial index: -
Preservation: moderate
Completeness: only part of the cranium, the manubrium, and the left clavicle, scapula and humerus are present.
Non-metric traits: none
Pathology: Area of porosity on the greater tubercle of the humerus in the area of attachment of infraspinatus. The attachment site for the costoclavicular ligament on the clavicle is massive but smooth. The right humerus has a smooth edged, large cortical defect on the superior, anterior shaft in the area of attachment of pectoralis major and latissimus dorsi. All of these defects probably reflect particularly powerful arm movements in this individual.

**SK45 (2069) 13th century or earlier**

Age: infant (3-6 months)
Sex: -
Preservation: moderate to good
Completeness: the cranium and mandible, the right scapula and humerus, some ribs and vertebrae, and both ilia, femorae and tibia are present.
Pathology: There is porous woven bone on both temporals, on the exterior surface of the mandible, in the roof of the orbits, on the posterior surface of the scapula, and on the posterior surface of the greater sciatic notch of both ilia. This seems consistent with a diagnosis of scurvy, the woven bone being caused by bleeding in areas of muscle movement associated with chewing and other movements. There are small areas of smooth compact bone, indicating healed NSPIs, on the posterior shaft of the right tibia and on the lateral shaft of the left tibia.

**SK46 (1057) late medieval/post-medieval charnel**

Age: adult
Sex: male
Stature: -
Cranial index: 78.6
Preservation: excellent
Completeness: only the cranium is present
Dentition:

| | | | | | | | | | | | | | | a | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | X | X | 4 | / | 6 | / | 8 | / | / | 11 | 12 | 13 | 14 | - | - | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

Dental pathology: calculus (6/7), severe periodontal disease, one abscess draining into the maxillary antrum with subsequent sinusitis.
Non-metric traits: parietal foramen (left), mastoid foramen exsutural

Pathology: DJD of the left temporomandibular joint. The endocranial surface of the parietals and occipital is covered with small sharp edged round perforations, which is possible evidence for neoplastic disease. There is a small button osteoma, a benign type of bone tumour, on the frontal.

**SK47 (1089) 13th century or earlier**

Age: adult
Sex: male
Stature: -
Cranial index: -
Preservation: good
Completeness: only the cranium and the first cervical vertebra are present
Dentition:

| | | | | | | | | | | | | | a | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | / | X | 4 | 5 | 6 | 7 | / | 9 | 10 | 11 | 12 | X | X | 15 | 16 | Upper left |
| Lower right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Lower left |

Dental pathology: calculus (5/10), one buccal draining abscess
Non-metric traits: palatine torus, parietal foramen
Pathology: OA of the facet for the dens on C1. DJD of the right temporomandibular joint. There is spiculated compact bone on the internal surface of the maxillary antrum, which indicates a case of sinusitis. There is porosity of the cranial vault, probably indicative of healed lesions resulting from anaemia. The cranial vault is thickened with the majority of the diploe being replaced by cortical bone. There are tiny spicules of compact bone growth on the endocranial surface of the frontal.

**SK48 (1100) 13th century or earlier** (this appears to be the remains of one individual, but was recovered on site as a series of disarticulated bones within a deposit)

Age: middle adult (26-45)
Sex: male
Stature: 172 ± 3.27cm (femur)
Cranial index: -
Preservation: excellent
Completeness: the mandible, right scapula, both humeri, bones from both hands, one cervical vertebra, both os coxae, both femorae, both tibiae, the right fibula, and bones of the right foot are present
Dentition:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | Upper left |
| Lower right | 32 | 31 | 30 | 29 | / | / | / | / | / | / | / | / | - | - | - | - | Lower left |

Dental pathology: calculus (1/4), slight periodontal disease
Non-metric traits: mandibular torus

Pathology: Schmorl's Nodes on the cervical vertebra. Some DJD of the spine. There is an old cut mark on the superior of the body of the cervical vertebra, presumably caused through disturbance by grave digging as this burial appears to be very disturbed. The metacarpals appear to show unusual tapering of the proximal ends of the shafts, but the joint surfaces are normal. The distal end of the right femur appears to be twisted medially and the medial condyle seems to be displaced distally. When articulated with the tibia, the right tibia is angled more laterally than normal. Both tibiae also seem to be bowed although they are incomplete and so this is difficult to confirm. There is ankylosis of the right tibia and fibula at the end just distal of the articular facets, and the fibula is flattened and bowed. The changes to the femur could be related to the ankylosis of the tibia and fibula, though it is difficult to tell whether this is congenital or traumatic due to the bones being incomplete. There are areas of striated compact bone, indicative of healed NSPIs on the medial and lateral shafts of the left tibia, and on the medial shaft of the right tibia.

## ***Table 14*** *Summary table of all skeletons*

| SK No. | Context No. | Age | Sex | Pathology | Dentition | Stature | Cranial index |
|---|---|---|---|---|---|---|---|
| 1 | 2011 | mature adult | F | OA, DJD, NSPI, leg ulcer?, muscle markings | no | 170cm | - |
| 2 | 1015 | old middle adult | ?M | Calculus, caries, EH, periodontal disease, abscess, OA, DJD, button osteoma, vertebral fusion, rickets, muscle markings | yes | 162cm | 77.7 |
| 3 | 2013 | old middle/mature adult | M | SN, OA, DJD, vertebral fusion, NSPIs, osteoid osteoma, muscle markings | no | 167cm | - |
| 4 | 1014 | old middle adult | ?M | Calculus, EH, SN, OA, DJD, vertebral fusion, scoliosis, metastatic carcinoma, muscle markings | yes | 163cm | - |
| 5 | 2019 | mature adult | F | OA, DJD, NSPI, radius fracture, muscle markings | no | - | - |
| 6 | 1023 | adolescent/ young adult | F | Caries, EH, Scheuermann's disease, muscle markings | yes | 166cm | 73.3 |
| 7 | 1035 | adult | ? | DJD, muscle markings | no | 157cm | - |
| 8 | 1027 | old middle adult | F | Hip dislocation with OA | no | 163cm | - |
| 9 | 1029 | middle adult | ? | DJD, lytic foci | no | 163cm | - |
| 10 | 2032 | adult | ? | - | no | - | - |
| 11 | 2039 | juvenile | - | - | no | - | - |
| 12 | 1033 | juvenile | - | - | no | - | - |
| 13 | 2051 | old middle adult | F | SN, OA, NSPI, finger flexion, muscle markings | no | 166cm | - |
| 14 | 1053 | old middle/mature adult | M | SN, OA, DJD, joint destruction, lytic foci, rickets?, muscle markings | no | 172cm | - |
| 15 | 2080 | young/young middle adult | ?M | Calculus, spondylolysis, Scheuermann's disease?, NSPIs, lytic foci, muscle markings | yes | 172cm | - |
| 16 | 1058 | young middle adult | ?F | EH, DJD, unformed neural arch, NSPI, muscle markings | yes | 163cm | - |
| 17 | 2076 | old middle adult | ?M | SN, vertebral osteochondrosis, DJD, NSPIs | no | - | - |
| 18 | 1038 | old middle adult | ?M | Calculus, EH, dental trauma, porosity of cranial vault, cranial asymmetry, deformations | yes | 171cm | - |
| 19 | 1072 | old middle adult | M | OA, DJD, tibial torsion, finger flexion, unusual foot articulations, joint destruction, fusion of phalanges | no | 183cm | - |
| 20 | 1057 | adult | M | Button osteoma | no | - | - |
| 21 | 1057 | adult | M | Unusual cranial shape | no | - | - |
| 22 | 1057 | adult | M | Calculus, EH, porosity of cranial vault, unusual tooth wear | yes | - | - |
| 23 | 1057 | adult | M | DJD, metastatic carcinoma, healed depressed fracture | no | - | - |
| 24 | 1057 | older juvenile/ adolescent | ?F | Cribra orbitalia | no | - | - |
| 25 | 1057 | adult | M | Calculus, DJD, sharp force trauma | yes | - | - |
| 26 | 2057 | juvenile | - | Calculus, cribra orbitalia, muscle markings | yes | - | - |
| 27 | 1063 | adult | F | - | no | - | 86.3 |
| 28 | 1055 | adult | F | Calculus, caries, periodontal disease, EH, DJD | yes | - | 72.3 |
| 29 | 1062 | adult | ? | Mastoid infection, congenital condition? | no | - | - |
| 30 | 1050 | infant | - | - | no | - | - |
| 31 | 1052 | adult | F | Calculus, EH, porosity of cranial vault | yes | - | - |
| 32 | 2043 | mature adult | M | OA, DJD, lytic foci, NSPI, unusual toe flexion? | no | 170cm | - |
| 33 | 1063 | juvenile | - | - | no | - | - |
| 34 | 1063 | adult | M | - | no | - | - |
| 35 | 1063 | adult | ?F | Hyperostosis frontalis interna? | no | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 36 | 1106 | adolescent/ young adult | ?M | SN, spina bifida, TB or bacterial infection? NSPIs?, exostoses | no | 175cm | - |
| 37 | 1101 | neonate/infant | - | Healed clavicle fracture?, scurvy/rickets/anaemia? | no | - | - |
| 38 | 1108 | adult | F | Calculus, caries, abscess, EH, unusual occlusion | yes | - | 90.6 |
| 39 | 1117 | old middle adult | F | SN, OA, scoliosis?, osteoporosis?, disuse atrophy?, muscle markings | no | - | - |
| 40 | 2096 | adult | ? | DJD | no | 168cm | - |
| 41 | 1095 | juvenile | - | NSPIs, muscle markings | no | - | - |
| 42 | 1127 | adult | ? | DJD, exostosis, muscle markings | no | - | - |
| 43 | 1120 | middle adult | M | OA, DJD, rickets | no | 170cm | - |
| 44 | 1111 | adult | ? | Muscle markings | no | - | - |
| 45 | 2069 | infant | - | Scurvy, NSPIs | no | - | - |
| 46 | 1057 | adult | M | Calculus, periodontal disease, abscess, sinusitis, DJD, neoplastic disease?, button osteoma | yes | - | 78.6 |
| 47 | 1089 | adult | M | Calculus, abscess, OA, DJD, sinusitis, porosity of cranial vault, thickened cranial vault | yes | - | - |
| 48 | 1100 | middle adult | M | Calculus, periodontal disease, SN, DJD, ankylosis of tibia and fibula, femoral changes, NSPI, tapering of shafts | yes | 172cm | - |

EH=enamel hypoplasia, OA=osteoarthritis, DJD=degenerative joint disease, SN=Schmorl's Nodes, NSPI=non-specific infection

## 14.5 Discussion

Although the individuals examined in this report are only a very small sample of the total cemetery population, and the intercutting and overlying of burials means that there are many different phases of burial, they can still be divided into three distinct periods (late medieval/post-medieval; 13th-century and earlier; possibly Anglo-Saxon) and some general observations concerning these three groups of burials can be made.

Of the 33 articulated individuals, fifteen belong to the late medieval/post medieval group, fifteen to the 13th-century or earlier group, and three to the possibly Anglo-Saxon group. Of the fifteen disarticulated crania, fourteen belong to the late medieval/post-medieval group, and the other one to the 13th-century or earlier group.

The age distribution of the individuals, and the crania, from the three groups are given in Table 15, below. More specific ages are given in the text of the catalogue and the summary table, but they have been simplified for this table.

***Table 15*** *Age distribution of burials*

| | Late medieval/post-medieval | 13th-century or earlier | Possibly Anglo-Saxon |
|---|---|---|---|
| Neonate | | | |
| Neonate/infant | | 1 | |
| Infant | 1 | 1 | |
| Juvenile | 2 | 3 | |
| Juvenile/adolescent | 1 | | |
| Adolescent | | | |
| Adolescent/young adult | 1 | 1 | |
| Young adult | | | |
| Young/middle adult | | | 1 |
| Middle adult | 6 | 5 | 1 |
| Middle/mature adult | 2 | | |
| Mature adult | 2 | 1 | |
| Adult | 14 | 4 | 1 |

In normal cemetery populations, one would expect a higher number of deaths in infancy and among the elderly. It can be seen that there are both immature and adult individuals present in both the late medieval/post-medieval and 13th-century or earlier groups, but not in the possibly Anglo-Saxon group. This does not mean that immature individuals were not being afforded burial in the earlier period, because the excavated area was very small, and there may be immature burials elsewhere in the cemetery. In the other periods, there does seem to be an under-representation of immature individuals, particularly the very young, which is something that is a common occurrence in archaeological populations. However, young individuals are being afforded burial in both of these periods as there are foetal, neonate and infant bones in the disarticulated material, and they are probably just being buried in other areas of the cemetery. For the adult individuals, there seems to be a peak in mortality not in the mature adult category, but amongst the middle adults. This can possibly be explained by the very small excavation areas and the large number of individuals who could only be aged as 'adult'.

Of the 40 individuals for whom an assessment of sex could be made, both males and females could be identified. The details of the age and sex of the individuals within the three groups are given in Table 16.

***Table 16*** *Sex composition of burials*

| | Late medieval/post-medieval | | | | | 13th-century or earlier | | | | | Possibly Anglo-Saxon | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | ?F | ? | ?M | M | F | ?F | ? | ?M | M | F | ?F | ? | ?M | M |
| Juvenile/adolescent | | 1 | | | | | | | | | | | | | |
| Adolescent | | | | | | | | | | | | | | | |
| Adolescent/young adult | 1 | | | | | | | | 1 | | | | | | |
| Young adult | | | | | | | | | | | | | | | |
| Young/middle adult | | | | | | | | | | | | | | 1 | |
| Middle adult | 1 | 1 | 1 | 3 | | 2 | | | | 3 | | | | 1 | |
| Middle/mature adult | | | | | 2 | | | | | | | | | | |
| Mature adult | 2 | | | | | | | | | 1 | | | | | |
| Adult | 3 | 1 | 3 | 1 | 6 | 1 | | 2 | | 1 | | | 1 | | |

It can be seen that there are no female individuals in the earlier group, but this is probably just due to the very small areas excavated, and does not mean that females were not being buried in this cemetery during the earlier period.

The stature of individuals can be calculated from long bone lengths, and these were sufficiently well preserved to calculate the stature of nine individuals of known sex from the later group, six individuals from the medieval group, and one individual from the earlier group. For the later group this gave a female height range (n=4) of 163-170cm with a mean of 165.5cm, and a male range (n=5) of 162-172cm with a mean of 167cm. For the medieval group, the stature could only be calculated for one female, whose height was 166cm. The male range (n=5) was 170-183cm with a mean of 174cm. For the earlier group, the stature could only be calculated for one male, whose height was 172cm.

The cranial index, which records the shape of the head, could be calculated for seven individuals, six from the later group, and one from the medieval group. The range for the

later group was 72.6-86.3, which means that there were individuals with crania ranging from the dolichocephalic (narrow headed) to the hyperbrachycephalic (very broad headed). The individual from the medieval period had a cranial index of 90.6, which places her well into the hyperbrachycephalic category.

It would be expected that a large amount of disarticulated human bone would be recovered from a church graveyard that had obviously been in use for hundreds of years as earlier burials are disturbed. At Beverley Minster, disarticulated bones were recovered from grave fills and a number of specially dug charnel pits, and this material was submitted for assessment. Estimating minimum numbers of individuals and other demographic data from disarticulated human bone in cemetery soils is problematic and is of little use, but the material was rapidly scanned to determine ages and sexes of the elements, where possible, and in order to identify any unusual pathological conditions that were not present in the articulated individuals. Both adults and immature individuals, including foetal and neonate, were recognised in the disarticulated material, and there were examples of a healed sharp-force trauma to the cranium, as well as fused vertebrae, possible Paget's syndrome, possible cranial tuberculosis, and some elements that may show evidence for autopsy, as well as many other interesting examples of pathology. An inventory of the disarticulated material, as well as photographs of any interesting specimens, was compiled and is held in the archive.

A number of pathologies were observed on the skeletons and have been described in the catalogue of burials, above. Although the bone preservation was generally good, for the majority of burials a complete skeleton could not be analysed. The small areas of the excavation meant that for many of the individuals only the upper or lower half of the burial was exposed, the remainder lying outside the limit of the excavation. This obviously restricts the number of pathologies that can be observed, and makes the differential diagnosis of some conditions more difficult as important elements were often missing. However, some general observations can be made about the pathologies encountered in the three groups.

Dental disease is one of the most common pathologies encountered in archaeological populations. Of the 48 individuals, only fifteen had any surviving dentition. Of these, ten were from the later group, four (three adults and one juvenile) from the medieval group, and only one from the early group. With such small numbers, calculating the prevalence of dental disease would not be meaningful, but some general comments can be made. Slight to heavy deposits of calculus were found on the teeth of many of the individuals from all periods (including on the deciduous teeth of the immature individual from the medieval period), and caries (cavities), periodontal disease, and abscesses were recorded in the teeth of individuals from the later and medieval periods. This suggests poor dental hygiene throughout life, and the caries probably reflect a diet that included sugary foods. Enamel hypoplastic lines (defects in the tooth enamel) were also found on the teeth of a number of individuals from the medieval and later groups. These reflect periods of illness during childhood when the tooth enamel was forming.

Joint disease is one of the most common post-cranial pathologies recorded in both archaeological and modern populations, and many of the individuals from the later and the medieval group exhibited changes characteristic of osteoarthritis. The most

commonly affected area of the body was the spine, although the knees, elbows, hands and feet were also affected. Osteoarthritis is a condition caused by damage to the cartilage and it is more frequent in older individuals. In this sample, middle and mature adults from both groups were affected.

Schmorl's Nodes, which probably represent herniation of material from the intervertebral discs into the vertebral body, were found in a number of individuals from adolescents to mature adults from all three groups. Spondylolysis (the separation of the neural arch from the vertebral body) was recognised in one of the individuals in the early group. The condition is believed to be a result of the inter relationship between genetic tendency and trauma; an individual may be genetically predisposed to the fracture that is attributed to strain on the lower back. It is interesting to note that this individual also had an extra lumbar vertebra, something that was also found in another individual from the same group. There is a strong genetic tendency for such developmental defects of the spine, which may suggest that the two individuals were related to each other. Transitional vertebrae (vertebrae combining characteristics of two vertebral types) were also found in two individuals from the medieval group and one from the later group, which may also suggest further family links. This could also be indicated by three individuals from the later group and three from the medieval group who had flattened first metacarpal heads, a characteristic that appears to be congenital rather than pathological.

Fractures were identified in three individuals, two from the later group (a healed fracture of the radius, and a healed depressed fracture to the frontal), and one in the medieval group (a healed greenstick fracture of the clavicle in an infant). In addition, there was an example of sharp force cranial trauma in the later group, which was probably caused by a projectile. One individual from the later group exhibited a hip dislocation that could have been congenital or traumatic in origin.

New bone formation, indicative of non-specific infection, was recorded in a number of individuals from all three groups. There were a few instances of porous, woven bone indicating infections that were still active at death, but the majority of individuals exhibited striated or smooth compact bone formations that indicates the infections were not active and the bone was remodelling.

An interesting observation is the number of individuals from the later group who exhibit bone tumours, of both the benign and malignant form. Three individuals had benign button osteomas on their crania, one had a benign osteoid osteoma on the fibula, and two had probable metastatic carcinoma of the cranium, which is a malignant form of tumour.

One individual from the medieval group exhibited an unusual collection of pathologies that could suggest an atypical case of tuberculosis, or could be due to some other form of infection, possibly bacterial in origin, although, without further research, it is impossible to make a firm conclusion.

There were a number of conditions observed in individuals from both the medieval and later groups which suggested periods of environmental and nutritional stress during childhood. Three individuals (two from the later, and one from the medieval group) exhibited changes to their long bones indicative of rickets, which is caused by a lack of

vitamin D, usually because of crowded living conditions devoid of sunlight. Five individuals (three from the later, one from the medieval, and one from the early group) exhibited porosity of the cranial vault, while two individuals (one from the later, and one from the medieval group) had lesions in the orbits, known as cribra orbitalia. Both of these are probably related to iron deficiency anaemia, whether through inadequate diet, malabsorption of dietary iron or parasitic infection. In addition, one immature individual from the medieval group exhibited lesions characteristic of scurvy, a condition caused by lack of vitamin C through inadequate diet. The enamel hypoplasia recognised on the teeth of a number of individuals adds to this evidence for childhood stress.

In conclusion, the dental disease of many of the individuals in the medieval and later group indicates poor dental hygiene throughout life, while there seems to be evidence for environmental and nutritional stress in childhood in both of these groups. In addition, there is possible evidence for family relationships between individuals in all three periods.

## 15. ANIMAL BONE by Katherine Bearcock, Simon McGrory and Rebecca Griffin

Small quantities of animal bone, much of it fragmentary, were recovered during the course of the excavation of both trenches. The bone was present in contexts of all dates, from Anglo-Saxon to later post-medieval, and was found mostly, but by no means exclusively, in the backfills of graves. Positively identified species of animal represented in the assemblage were sheep/goat, pig, cow, chicken — all domestic stock. A number of the bone fragments were not identifiable to species. Cut and butchery marks were present on a number of bone pieces.

***Table 17*** *Animal bone listing*

| CONTEXT | CONTENTS |
|---|---|
| 1000 | 1 rib fragment<br>1 sheep/goat scapula fragment<br>1 mandible fragment, possibly sheep/goat<br>3 unidentified fragments |
| 1002 | 1 horn core fragment<br>2 phalanges, probably pig<br>1 skull fragment<br>1 3rd phalanx, possibly sheep<br>3 vertebrae fragments<br>1 sheep/goat metacarpal<br>1 sheep/goat metacarpal fragment<br>1 metacarpal, possibly cow, butchered<br>1 tarsometatarsus (with spur) male chicken<br>6 unidentified fragments |
| 1006 | 1 phalanx, unidentified species, but probably 2nd phalanx |
| 1009 | 1 distal tibia fragment, butchered, probably cow<br>1 coracoid fragment<br>1 distal metapodial, unfused epiphysis, possibly sheep/goat<br>1 rib fragment<br>1 vertebra fragment |

| | |
|---|---|
| | 1 diaphysis fragment<br>2 unidentified fragments<br>1 battered fragment, possibly calcaneum<br>1 carpal/ tarsal |
| 1014 | 1 unidentified fragment |
| 1015 | 1 sheep/ goat 2nd phalanx |
| 1019 | 1 distal sheep/goat tibia<br>1 distal humerus, unfused epiphysis, probably cow, butchery marks<br>1 pig phalanx<br>1 proximal metacarpal, sheep/goat<br>1 proximal metatarsal, sheep/goat<br>3 vertebrae fragments<br>2 metapodials, sheep/goat<br>2 rib fragments<br>1 skull fragment<br>5 unidentified fragments<br>5 diaphysis fragments |
| 1034 | 2 fragments cow scapula, butchery |
| 1046 | 1 skull fragment |
| 1047 | 1 molar tooth bud, possibly pig M3 |
| 1057 | 1 rib fragment<br>1 distal humerus, cow |
| 1068 | 1 bird bone fragment<br>1 coracoid fragment<br>4 diaphysis fragments<br>1 unidentified fragment |
| 1071 | 1 rib fragment<br>1 fragment, possibly vertebra<br>1 diaphysis fragment, badly worn, epiphysis not fused, possibly tibia |
| 1100 | 1 rib fragment |
| 1106 | 1 rib fragment |
| 1128 | 1 unidentified fragment with cut marks |
| 2001 | 1 sheep/goat tibia fragment with cut mark<br>4 diaphysis fragments<br>1 distal radius fragment, probably sheep/goat, with cut marks<br>1 skull fragment<br>1 phalanx, probably sheep/goat<br>1 scapula fragment<br>1 calcaneus, pig<br>1 sheep/goat tibia fragment<br>1 bird bone fragment<br>1 cow molar |
| 2004 | 1 diaphysis fragment, probably sheep/goat metapodial<br>11 diaphysis fragments<br>2 unidentified fragments<br>2 vertebrae fragments<br>1 sheep/goat metacarpal<br>1 distal tibia probably sheep/goat<br>1 proximal end sheep/goat ulna<br>1 distal end sheep/goat humerus |
| 2008 | 1 proximal end metatarsal, probably sheep/goat |
| 2009 | 1 rib fragment<br>1 proximal end sheep/goat metcarpal<br>1 cow sized rib, proximal end<br>1 sheep/goat metapodial fragment |
| 2010 | 1 unidentified fragment<br>1 cow molar |

| | |
|---|---|
| | 1 3rd phalanx, probably pig<br>1 molar, probably cow<br>1 sheep/goat radius, proximal fragment, numerous cut marks |
| 2011 | 1 unidentified fragment<br>1 sheep/goat astragalus<br>1 diaphysis fragment with cut marks |
| 2013 | 1 sheep/goat 1st phalanx |
| 2015 | 1 diaphysis fragment |
| 2016 | 1 sheep/goat metatarsal<br>1 sheep/goat radius<br>1 rib fragment<br>1 (bird) tarsometatarsus<br>1 diaphysis fragment |
| 2017 | 2 rib fragments<br>10 diaphysis fragments<br>1 cow 2nd phalanx<br>1 skull fragment<br>1 proximal fragment<br>1 mandible fragment possibly goat<br>1 scapula fragment possibly sheep/goat<br>1 unidentified fragment<br>1 bird diaphysis fragment |
| 2027 | 1 unidentified fragment |
| 2028 | 2 sheep/goat tibia fragment<br>1 diaphysis fragment, possibly sheep goat tibia |
| 2031 | 2 rib fragments |
| 2032 | 3 diaphysis fragments, probably an animal smaller than a sheep |
| 2034 | 1 rib fragment |
| 2036 | 1 humerus fragment distal end, probably cow |
| 2037 | 1 proximal end cow ulna<br>1 distal end sheep/goat metapodial<br>1 diaphysis fragment |
| 2038 | 1 femur fragment<br>1 rib fragment, cow sized, cut marks<br>3 unidentifed fragments, one of which with cut marks |
| 2040 | 2 rib fragments, one of which with cut marks |
| 2047 | 1 lumbar vertebra fragment |
| 2050 | 7 rib fragments<br>1 distal end tibia, probably sheep/goat<br>1 scapula fragment<br>1 cow molar from maxilla<br>1 diaphysis fragment |
| 2056 | 1 proximal end sheep/goat metatarsal<br>2 unidentifed fragments |
| 2059 | 1 fragment cow pelvis |
| 2071 | 1 rib fragment<br>1 diaphysis fragment |
| 2073 | 1 pelvis fragment, probably sheep/goat<br>2 proximal end radius fragments, possibly sheep/goat<br>1 unidentified fragment |

## 16. CONSERVATION ASSESSMENT by Erica Paterson and Julie Jones

This report aims to meet the requirements of MAP2 (English Heritage 1991) to produce a stable site archive (Phase2: Fieldwork). This has involved X-radiography and an assessment of the condition, stability and packaging of the finds. Urgent first-aid treatments have been undertaken as required, to enable safe storage in the long term.

The potential of the assemblage for further analysis and research is also discussed (MAP2 Phase 3: Assessment). The condition of the various classes of material is summarised and indicators of unusual preservation are noted. There are recommendations for investigative conservation, for additional specialist support, and topics for further research are raised.

### 16.1 Procedures

Two conservators contributed to this assessment: Erica Paterson assessed the glass and Julie Jones assessed the remainder of the finds.

All metal finds were X-rayed using standard YAT procedures and equipment. Two sheets of film were used to produce a duplicate for archive purposes, and given a reference number in the YAT Conservation Laboratory series. The X-ray number was written on the packaging for each object X-rayed. Each image on the X-ray was labelled with its small find number. The plates were packaged in acid-free archival envelopes. The plate number was added to the YAT online photo archive and linked to the IADB find record for each object.

All finds were examined under a binocular microscope at x20 magnification alongside the X-radiograph. The material identifications were checked and observations made on the condition and stability of the finds. Remedial conservation treatments were carried out where appropriate in order to stabilise the material for long-term storage. Assessment and treatment details were recorded for each find in the Conservation Work Record area on IADB, the information can be printed out through SQL Query.

### 16.2 Quantification

A total of 265 small finds were assessed and 29 X-rays produced. The number of objects in each material category (after assessment) is listed below in descending order of frequency:

| | |
|---|---|
| Iron | 137 |
| Glass | 77 |
| Copper alloy | 15 |
| Lead alloy | 12 |
| Fired clay/tobacco pipe | 10 |
| Flint | 3 |
| Silver | 2 |
| Textile | 1 |
| Tin | 2 |
| Unknown | 2 |
| Slag | 1 |

| | |
|---|---|
| Stone | 1 |
| Bone | 1 |
| Plaster | 1 |

## 16.3 Assessment

**Iron**
The iron was in fair to poor condition, heavily corroded and from well-aerated deposits. Many of the funerary fittings may have surface coatings which are not visible (black paint, and tin, silver or gold plating). The iron corrosion had, however, mineralised adjacent organic materials, wood and textiles in particular, which form an assemblage which might be of interest to researchers interested in 18th- to 19th-century burial practice and ritual.

**Non-ferrous Metals including Coins**
Silver: Both coins are thin and worn. One silver coin was covered with halide corrosion, the other just with black sulphide tarnish; both should remain stable if stored correctly.

Tin and lead: The stamped decorative soft white metal coffin plates are tin. Documentary evidence shows that coffin plates towards the end of the 18th century were made from pewter and pure tin. Stamped iron plates, tin-dipped, appeared at the end of the 17th century (Litten 1991, 108-9). These plates are fragile, the tinned iron totally corroded and brittle, the pure tin soft and easily bent and damaged, even by the weight of its iron handle; store flat and well-supported.

Non-ferrous metal globules were noted in corrosion of finds on all x-ray plates. This could indicate a high-temperature event, such as fire (or possibly debris from continual repair and re-leading of windows).

**Organic Materials**
See separate report on the wood by S.J. Allen.

The bone comb fragment sf154 is in good condition and stable.

Several small fragments of pale-coloured, finely woven textile sf306 were found adhering to the brow area of skull in context 1019. The textile fragments are covered in a thin layer of black material; textile specialist P. Rogers suggests this may be a metal. No identifiable organic structure is visible under magnification which would identify it as leather for example. Its surfaces are covered in a thin iridescent layer which gives it a slightly shiny appearance when viewed at x20 magnification. Both the textile and the black layer are in poor condition. They are degraded and fragile, being soft and mushy to touch. The textile was removed from the skull with the black layer still attached using a fine flexible spatula. It was then allowed to air dry and was repackaged between acid-free tissue sheets in a foam-filled bag. They are now dry and stable and should require no further treatment prior to long-term storage.

**Glass**
Seventy-seven glass small finds were assessed, many of them with multiple fragments under one small find number. Seventeen small finds were waterlogged and arrived at the lab in a wet-packed condition. The remaining 60 small finds were dry on arrival, and showed some signs of flaking. This has resulted from the embrittlement of altered surface layers. Those in the worst condition, approximately 60% of the total, have been selected for stabilisation treatment to consolidate flaking surfaces and make stable for further study and long-term storage.

The condition of the glass varies from fair to very poor, depending upon its composition. Approximately 40% of the fragments are lightly corroded, with only thin brittle iridescent surface layers having formed. When wet the colour of the glass can be clearly seen, and is mainly either colourless or more commonly a pale bluish-green colour. Approximately 35% of fragments have corroded more extensively, with thicker dark brown altered surfaces having formed, obscuring more of the original glass core. This type of glass tends to be either a pale to dark yellow colour or a yellowish-green and is best seen when the fragments are placed on a light box. Approximately 25% is heavily corroded medieval window glass with significant alteration of the glass to form dark brown to black surfaces. In most cases the original colour of the glass cannot be seen when the fragments are placed on a light box. The corrosion has entered well into the body of the glass, leaving only thin, eroded glass cores surviving. In some cases, freshly broken cross-sections allow one to examine the core and gauge the original colour of the glass.

Sf193 appears to be a fragment of multi-layered ruby glass, with approximately half the thickness colourless glass and the other half made up of thin layers of alternating red and colourless glass (Newton and Davison 1989). At least nine small finds contain painted fragments (sfs177, 182, 183, 195, 243, 281, 283, 284, 286 and 298). In all cases the paint is opaque dark reddish-brown enamel. It varies in condition, some being brittle, cracked and flaking whilst other areas are smooth, thick layers which adhere well to the surface of the glass. Other features of medieval window glass are evident such as grozed edges and environmental weathering in the form of pitting on the reverse or outside surfaces of the glass (Graves 2000). Several fragments have rounded ‘thumb’ edges (for example sf243), which may indicate their manufacture using the cylinder process, where the top and bottom edges of the cylinder become rounded in the flame (Newton and Davison 1989).

**Inorganic non-metals**
The flint, plaster and tobacco pipes are all robust and stable.

## 16.4 Statement of Potential

*Indicators of preservation*
Although the burial conditions were well aerated and resulted in heavy corrosion of the iron coffin fittings, adjacent organic materials were often mineralised in the corrosion, and remains of coffin planks and textile coverings were preserved.

*Dating evidence*
Coins: The silver coin sf27 is dated 1565, Elizabeth I; sf206 is Mary, 1553-4; Craig Barclay suggests 16th- to early 17th-century loss.

Industrial activity
Non-ferrous globules were noted in corrosion of metal finds from all contexts.

Coffin fittings: The coffin fittings can provide useful dating evidence. This assemblage includes:
Coffin plates
Stamped iron plates, tin-dipped, first appeared at the end of the17th century (Litten 1991, 107). This type comprised the following finds: sfs2, 28, 49, 76, 80, 97, 105, 109, 111–12, 120, 136, 139, 203, 205 and 301–3.

Pewter (sf134?) and pure tin (sfs6, 26, 30, 32–38, 46–7, 82, 85, 119, 137 and 200) coffin plates were introduced at the end of the 18th century (Litten 1991, 109).

Grip plates similar to sfs30, 32, 34–5 and 37–8, with the stamped inscription MORIOR IN SPE, are pictured in a trade catalogue from 1783 (see Litten 1991, 107, fig.55); these finds all came from context 1020.

Upholstery nails (which may have been painted or plated) indicate velvet-covered coffins. Black-headed are nails noted in the 17th century (Litten 1991, 97-99), white-headed and gilt-headed nails in the 18th century (Litten 1991, 87, 100). The domed nails from this site are all heavily corroded and surface coatings are not visible. There is some evidence on the X-radiographs of plated nails. Context 1020 produced 274 of these domed upholstery nails (also the grave with six inscribed grip plates).

Screws were found in contexts 1019, 1020 (fourteen from this grave) and 1022. They provide some dating evidence. The lathe cutting machine was developed by Clement in 1818; standard UK screw fittings were developed by Whitworth in 1841. An advertisement for a studded coffin with patent screw fittings dated 1810 (see Litten 1991, fig.58) shows that screws were used not only for strength of construction but also to prevent anatomists from ‘grave robbing’.

*Window Glass*
A large assemblage of window glass was recovered which varies considerably in condition and composition. Some datable features have already been noted such as the medieval multi-layered ruby glass fragments sf193. Further study of the glass is likely to be recommended, particularly because of its connection with Beverley Minster. Examination of the painted fragments of medieval glass and other technological features by a glass specialist may help to decipher the designs and date the glass.

## 16.5 Recommendations

*Further Investigative Conservation*
Full corrosion removal and stabilisation of one find, a copper alloy pin sf305, has been recommended. Investigation to expose the possible gilding on sf161 could be carried out if required.

*Analysis and specialist Support*
Suggestions for further analysis and specialist support have been made, but should only be undertaken if the contexts merit this.

a. Wood remains were noted on many coffin nails, fittings or screws, but preservation is not extensive, and unless species identifications are required for these 18th- and 19th-century coffins they do not need to be referred to a specialist.

b. Textile remains (fragmentary) were found on some items (along with remains of leather or skin below buckle sf209). If details of textiles on the 18th- and 19th-century coffins is of interest, these could be referred to Penelope Rogers for further study. Sf306, the textile and black ?metal layer from the skull from context 1019 may merit further study by Penelope Rogers now they are dry. The black layers should be X-rayed to confirm their identification as metal and possibly help identify their purpose.

c. Bone was noted on some items. These were only tiny fragments, and do not need to be referred to the human bone specialist. The bone comb sf154 could be referred for species identification if required.

d. XRF: Could be carried out if it is important to know the exact composition of the non-ferrous coffin plates or plating. Black paint was noted, and could be analysed if required, on coffin plates sfs30, 32-38, 137 and 138.

*Storage (Packaging)*
The finds have been packaged appropriately for long-term storage. All materials used are archive stable and acid-free. Plastic bags have been pierced to allow airflow within microclimates, reducing the risk of condensation and mould growth. 'Jiffy' (polythene) foam inserts have been added to the bags to provide additional support and protect against mechanical damage during transit. Any replacement of packaging materials should be carried out in consultation with a conservator. Avoid paper or card labels in association with metals, especially lead and lead alloys. Acid vapours will cause active corrosion (Cronyn 1990).

*Storage Environment*
Metals and slag are packed in polythene 'Stewart' boxes with silica gel to provide dry microclimates of less than 15% relative humidity which will halt any further corrosion (Knight 1990). Each standard oblong box should contain at least 6 x 100g bags of silica gel and a humidity indicator strip. It is necessary to monitor the indicator strips regularly; if any part of the strip turns pink the gel will need to be regenerated.

The glass is currently undergoing stabilisation and will be repacked in foam-filled grip-top bags and cardboard boxes once treatment is completed. Stable temperatures and relative humidity between 50 and 55% RH are recommended for long-term storage.

## 16.6 Publication
A conservation element should be included in the final publication.

## 17. TEXTILE ANALYSIS by Penelope Walton Rogers

A small piece of textile was preserved on the upper forehead of skull 1015. This lay in two layers and covered an area of approximately 45 x 40mm. It proved to be a tabby weave with 14-16 x 12 threads per cm and S-spun yarn in warp and weft. Microscopy of the fibre showed it to be poorly preserved white wool.

This textile is typical 'shrouding flannel' of the late 17th to early 19th century. From 1660 onwards a series of parliamentary acts demanded that only wool should be used in burials (Litten 1991, 74) and examination of textiles in dated coffins shows that linen shrouds had disappeared by about 1690. The acts were repealed in 1814/15 and analysis of textiles from burials at Spitalfields, London, has shown wool being replaced immediately by other fibres, especially cotton (Janaway 1993, 118). A similar process can be seen in northern and midland counties, although some wool textiles, in particular wool unions (textiles in which wool yarn is combined with cotton or linen), seem to have continued into the Victorian period at St Martin-in-the-Bull Ring, Birmingham (Walton Rogers forthcoming), while the *Workman's Guide* was still advising readers on how to make flannel shrouds in 1838 (Litten 1991, 82).

The textile on the skull therefore places the burial most probably in the period c.1690–1820, although a later date in the 19th century cannot be excluded. The textile is likely to represent the remains of a cap, a face cloth (the square piece of fabric placed over the face) or a winding sheet.

## 18. CONCLUDING DISCUSSION

The archaeological investigation at Beverley Minster described above has revealed sequences of deposits from the level of natural clays of the drift geology up to that of existing ground surfaces. The deposits examined have a date span from the Anglo-Saxon period through to the 20th century. The overwhelming bulk of the archaeological contexts were burials ranging in date from at latest the 10th century through to the 19th century. Far more burials occurred in Trench 1 than in Trench 2; this is likely to reflect a common preference for burial on the south sides of churches. The remaining features at the site were of a structural nature and serve to add new information to our understanding of the development of the church.

The ground conditions in the upper parts of the sequences did not permit the preservation of organic materials, but waterlogged conditions, facilitating the preservation of timber, were encountered in both the trenches and boreholes, just above the level of natural deposits. Examination of the sequences of both archaeological trenches shows that correlation of contemporary deposits can be made between the two in a number of instances.

The heights of natural deposits in both boreholes and trenches confirm that the Minster sits atop a high point. In Boreholes 1, 2, 4 and 5 (those boreholes for which accurate heights in relation to OD can be expressed) the upper horizon of the drift occurs at heights of between 6.03m OD and 6.43m OD. In all cases these deposits were of glacial

till (boulder clay). The same materials were reached in Trench 1 at 6.95m OD and in Trench 2 at 6.93m OD, i.e. generally over 0.5m higher than the surrounding boreholes. This factor is perhaps more likely to relate to the original profile of natural deposits across the site than to truncation of areas surrounding the Minster. Curiously, the brighter-coloured clays above glacial till that were encountered in both trenches (in Trench 1 at 7.35m OD, in Trench 2 at 7.28m OD), and are thought to be of natural origin, were not observed in the boreholes.

Non-funerary features cutting into natural deposits were revealed only in Trench 2. These are likely to be of Anglo-Saxon date and pre-date the burials of this trench; they may also pre-date the earliest burials in Trench 1. These features were only seen within a restricted area so interpretation is difficult; however, at least one, and possibly all three, were of a structural nature. It may be that all three features were related and collectively formed a part of a structure.

The earliest burials in both trenches (highlighted red in Figure 12) were on a different alignment from the later burials and from the alignment of the existing church. They proved to be of Anglo-Saxon date. Three of the four burials of this group were within wooden coffins, two of which were very well preserved; one of these provided a dendrochronological date in the later 10th century. The remains of the occupant of one of these coffins were in a jumbled state, though whether this was as a result of 'translation' or of animal disturbance is uncertain. The fourth burial was also unusual in that the body had been laid on the base of a grave cut that had been dusted with chalk flecks. This was the only burial (of all dates) known to have been deliberately buried with grave goods; it was accompanied by a willow rod and a glass bead. This burial had then been overlain by a wooden board. Exactly what factor determined the alignment of these early graves is open to some speculation, though any explanation must take account of the fact that the burials of Trenches 1 and 2 are separated by a distance of around 25m. One possible explanation is that the alignment was determined by the presence of an Anglo-Saxon church. If so, then such a church was standing until at least the late 10th century. It may also be more than coincidence that two of the pre-burial features in Trench 1 lie parallel to this early alignment.

A series of burials in both trenches succeeded those on the early alignment (those highlighted blue in Figure 12). These are likely to have had a date range from the 11th century to late 12th–early 13th century. Although the alignment of this group is indistinguishable from that of later burials, it is clear that they pre-date the earliest stone structural remains found during the excavation. They presumably accompanied a church of the Norman period of which no structural remains were found indicating that it was narrower than the existing nave. Significantly, fragments and flecks of lime mortar were noted in many of the 11th – early 13th century contexts, suggesting the presence of a stone-built structure or structures in the vicinity.

The earliest stone structural remains uncovered were part of a buttress in Trench 1 and parts of a buttress and nave wall in Trench 2. In both trenches these remains occurred at similar heights and had been constructed to a ground level that was lower than that of the existing 14th-century nave. It is suggested that these remains are contemporary, related, and once formed part of an earlier buttressed nave that was slightly narrower than the

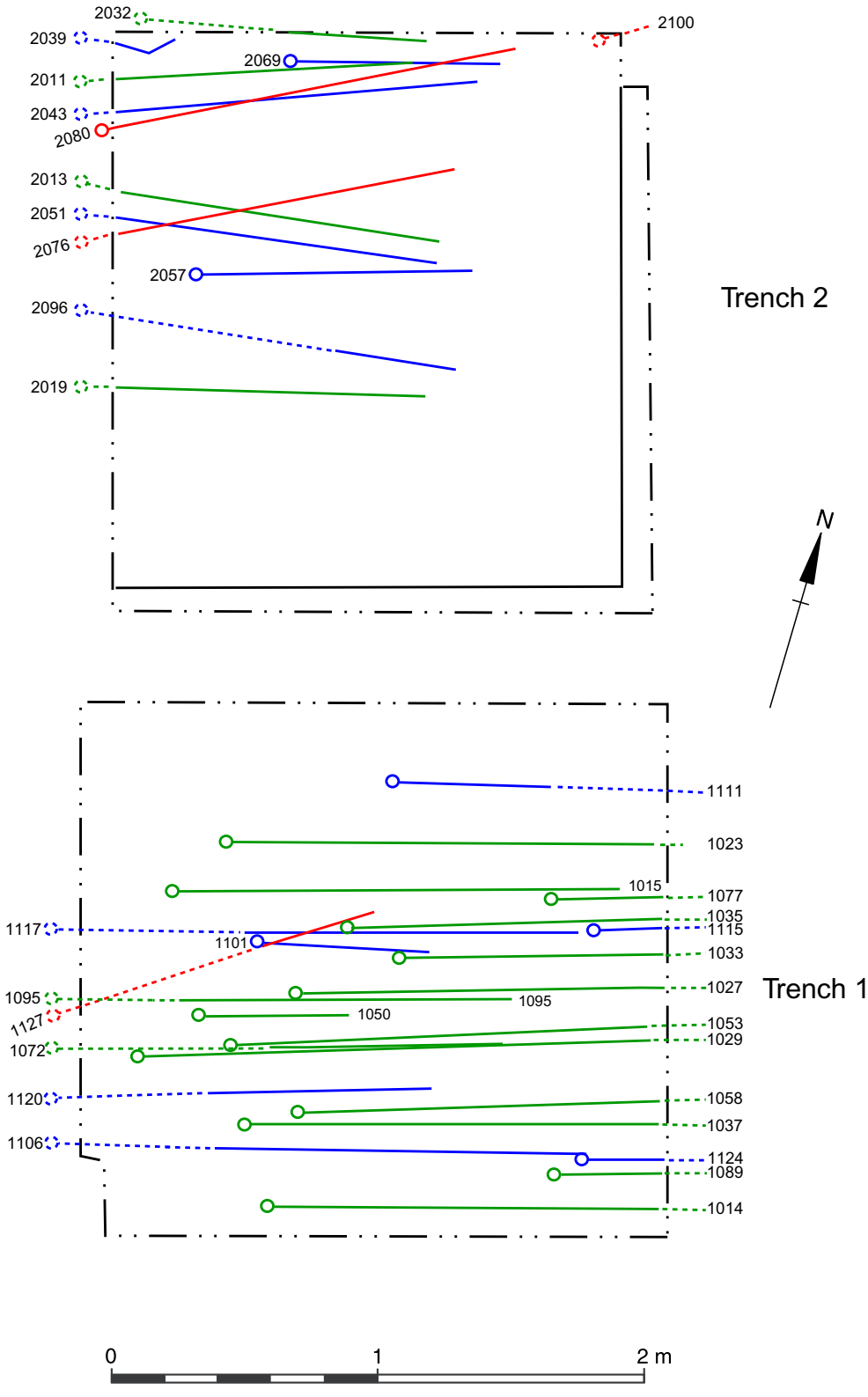


Figure 12: Diagrammatic plan of Trenches 1 and 2 showing alignment of burials. Scale 1:25
o = head end of burial. --- = lies beyond limit of excavation
— = earliest burials — = burials pre-dating 12th- to 13th-century stone structure
— = medieval and post-medieval burials

existing nave. It is believed that the nave wall was not seen in Trench 1 because it was obscured by 14th-century fabric. Whether this early nave was ever completed is uncertain. What dating evidence there is for this episode of building points towards the later 12th to 13th century. It was noted that the foundations of this early nave were of chalk and Oolitic Limestone (incorporating some re-used fabric of probable 12th-century date) and the upstanding walls, with the possible exception of a very small and unconfirmed number of Magnesian Limestone blocks, were exclusively of Oolitic Limestone.

There were few burials belonging to the short period of time between the earliest stone structural episode and the 14th-century rebuilding, four occurring in Trench 1 and none in Trench 2.

The effect of the 14th-century rebuilding of the nave was almost entirely to obscure the earlier structural episode. These later nave foundations in Trench 2 sat squarely over the earlier foundations (although not over the upstanding walls which occupied a narrower footprint), whilst in Trench 1, on the south side, it appears that they fully overlapped the earlier wall/foundations. The earlier buttresses were extended to support the later, mostly with foundation material that was both loose and full of voids. The foundation material of the 14th-century work was largely of chalk with some re-used Oolitic Limestone pieces. Ashlar fabric of this episode for the first time employed large quantities of Magnesian Limestone.

A large number of 14th- to 19th-century burials were present in the excavated areas, particularly in Trench 1 (those highlighted green in Figure 12). A significant proportion of these were originally in wooden coffins.

Early modern features were restricted to three post-holes, probably part of a scaffolding system, in Trench 2.

Save for the existing concrete apron around the Minster, no features of 20th-century date, or later, were encountered.

## 19. RECOMMENDATIONS FOR PUBLICATION & DISSEMINATION

The excavations at Beverley Minster have provided much new and significant archaeological information about the history of the building. Structurally, this concerns the present nave, an earlier nave, and based on early burial alignments the inferred presence of at least two other earlier ecclesiastical structures. A number of the burials are themselves of particular interest, especially those of Anglo-Saxon date. These were seen to represent a variety of burial customs and contained excellently preserved wooden coffins.

With reference to paragraph 11.1.2 of the Specification, we believe that the assessment has produced results of sufficient significance to merit publication to wide audience, probably in an academic journal such as *Medieval Archaeology* or *Archaeological*

*Journal*. However, for the archaeological information to be fully appreciated in the context of its regional and national setting some further analysis would also be desirable, incorporating comparison with related material from other sites.

The preparation of a report for publication will not take place until it is known whether or not further archaeological work will be required at the Minster in the immediate future. Once this has been established, detailed proposals for analysis, report preparation and dissemination can be made.

## 20. ACKNOWLEDGEMENTS


| | |
|---|---|
| Excavation Team | Howard Gill, Mark Johnson, Ben Reeves, Simon Underdown |
| Pottery | Ailsa Mainman |
| Architectural fragments | Jane McComish |
| Ceramic building materials | Jane McComish |
| Wood | Steve Allen |
| Dendrochronology | Ian Tyers |
| Environmental | John Carrott, Kathryn Johnson |
| Human bone | Katie Tucker |
| Animal bone | Katherine Bearcock, Simon McGrory, Rebecca Griffin |
| Conservation assessment | Julie Jones, Erica Patterson |
| Illustrations | Mark Johnson, Lesley Collett |
| Report Production | Lesley Collett |
| Report Text | Mark Johnson |
| Editor | Frances Mee |

Information, assistance and advice were kindly tendered to the fieldwork team by Ross Allenby and the two Steve's of the Minster staff.

## 21. BIBLIOGRAPHY

Armstrong, P., Tomlinson, D. and Evans, D.H., 1991. *Excavations at Lurk Lane, Beverley 1979-82,* Sheffield Excavation Reports **1**

Ash, L.R. and Orihel, T.C., 1984. *Atlas of Human Parasitology (2nd edition)* (Chicago)

Bagwell, T. and Tyers, I., 2001. *Dendrochronological Analysis of a Coffin Assemblage from Swinegate, York, North Yorkshire,* ARCUS rep.

Baillie, M.G.L. and Pilcher, J.R., 1973. 'A simple cross-dating program for tree-ring research', *Tree Ring Bulletin* **33**, 7-14

Blair, J. and Ramsay, N., 1991. *English Medieval Industries*

Brooks, S.T. and Suchey, J.M., 1990. 'Skeletal Age Determination based on the Os Pubis: A Comparison of the Acsádi-Nemeskéri and Suchey-Brooks Methods', *Human Evolution* **5**, 227-238

Brothwell, D.R., 1981. *Digging Up Bones* (New York)

Buikstra, J.E. and Ubelaker, D.H., 1994. *Standards for Data Collection from Human Skeletal Remains* (Fayetteville)

Cronyn, J.M., 1990. *The Elements of Archaeological Conservation*

Dainton, M., 1992. 'A quick, semi-quantitative method for recording nematode gut parasite eggs from archaeological deposits', *Circaea, the Journal of the Association for Environmental Archaeology* **9**, 58-63

Dobney, K., Hall, A.R., Kenward, H.K. and Milles, A., 1992. 'A working classification of sample types for environmental archaeology', *Circaea, the Journal of the Association for Environmental Archaeology* **9**, 24-6

English Heritage, 1991. *Management of Archaeological Projects*

English Heritage, 1998. *Dendrochronology: Guidelines on Producing and Interpreting Dendrochronological Dates*

Evans, D.H., 2000. 'The Archaeological Origins of Beverley Minster' in R. Horrox (ed.), *Beverley Minster: an Illustrated History*

Geological Survey. 1957. *Geological Survey of Great Britain, Sheet 2, Ten-Mile Map*

Graves, C.P., 2000. *The Window Glass of the Order of St Gilbert of Sempringham: A York-based Study,* The Archaeology of York 11/3

Groves, C., 1987a. *'Tree-ring Analysis of Timbers from Eastgate Street, Stafford, 1982-84'*, AML Rep. **135**/87

Groves, C., 1987b. *'Tree-ring Analysis of Timbers from St Mary's Grove, Stafford, 1982-84'*, AML Rep. **132**/87

Groves, C., 1992. 'Tree-ring analysis of timbers' in D.H. Evans and D.G. Tomlinson, *Excavations at 33-35 Eastgate, Beverley, 1983-86*, Sheffield Excavation Report **3**, 256-65

Groves, C., 1993. *' Tree-ring Analysis of Oak Timbers from Queen's Hotel, York, Yorkshire 1988-89, part 2'*, AML Rep. **38**/93

Groves, C., 1996. (unpublished) *Dendrochronological analysis of medieval oak timbers from the northern area of 'The Lanes', Carlisle, Cumbria, 1978-82: Volume 3*

Groves, C. and Hillam, J., 2003.' Tree-ring analysis of timbers excavated at York Coppergate: Periods 3-5', in R.A. Hall and K. Hunter-Mann, M*edieval Urbanism at Coppergate: Refining a Townscape,* The Archaeology of York 10/6

Horrox, R., 2000. 'The Later Medieval Minster' in R. Horrox (ed.), *Beverley Minster: an Illustrated History*

Işcan, M.Y. and Loth, S., 1986. 'Estimation of Age and Determination of Sex from the Sternal Rib' in Reichs, K.J. (ed.), *Advances in the Identification of Human Remains* (Springfield), 68-89

Janaway, R.C., 1993. 'The Textiles' in J. Reeve and M. Adams, *The Spitalfields Project, Vol I: Across the Styx, CBA Research Report* **85** (London), 93-119

Kassai, T., 1998. *Veterinary Helminthology* (Oxford)

Kenward, H.K., Hall, A.R. and Jones, A.K.G., 1980. 'A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits', *Science and Archaeology* **22**, 3-15

Knight, B., 1990. 'A Review of the Corrosion of Iron from Terrestrial Sites and the Problem of Post-Excavation Corrosion', *The Conservator* **14**, 37-43

Lamburn, D.J., 2000. 'The Minster and the Reformation' in R. Horrox (ed.), *Beverley Minster: an Illustrated History*

Laxton, R.R. and Litton, C.D., 1988. *An East Midlands Master Tree-ring Chronology and its Use for Dating Vernacular Buildings*, University of Nottingham, Dept. of Classical and Archaeological Studies, Monograph Series **3**

Litten, J., 1991. *The English Way of Death, The Common Funeral since 1450* (London)

Molleson, T., Cruse, K. and Mays, S., 1998. 'Some Sexually Dimorphic Features of the Human Juvenile Skull and their Value in Sex Determination in Immature Juvenile Remains', *Journal of Archaeological Science* **25**, 719-728

Newton, R. and Davison, S., 1989. *Conservation of Glass*

Palliser, D.M., 2000. 'The Early Medieval Minster' in R. Horrox (ed.), *Beverley Minster: an Illustrated History*

Pevsner, N. and Neave, D., 1997. *The Buildings of England, Yorkshire: York and the East Riding*

Scheuer, L. and Black, S., 2000. *Developmental Juvenile Osteology* (London)

Schutkowski, H., 1993. 'Sex Determination of Infant and Juvenile Skeletons: 1. Morphognostic Features', *American Journal of Physical Anthropology* **90**, 199-205

Smith, A.H., 1970. 'The Place-names of the East Riding of Yorkshire and York', *English Place-name Society* **14** (Cambridge)

Trotter, M., 1970. 'Estimation of Stature from Intact Limb Bones' in T.D. Stewart (ed.), *Personal Identification in Mass Disasters* (Washington D.C.), 71-83

Tyers, I., 2001a. 'Appendix 2 Tree-ring analysis of the Roman and medieval timbers from medieval London Bridge and its environs' in B. Watson, T. Brigham and T. Dyson, *London Bridge: 2000 years of a river crossing,* MoLAS Monograph Series **8**, 180-90

Tyers, I., 2001b. *The Tree-ring Analysis of Coffin Timbers Excavated at the Church of St Peter, Barton on Humber, North Lincolnshire*, Centre for Archaeol. Rep. **48**/2001

Weaver, D.S., 1980. 'Sex Differences in the Ilia of a Known Sex and Age Sample of Fetal and Infant Skeletons', *American Journal of Physical Anthropology* **52**, 191-195