

The Archaeology and Conservation
of the
East Front of York Minster

Volume 2 of 2
Figures, Drawings and Appendices

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FIGURES



Figure 1: York Minster, aerial view from the SW (from www.webbaviation.co.uk, Image cb11066)



Figure 2: York Minster, the East Front (York Minster 2005, cover image)

Stages in Conservation-Based Research and Analysis

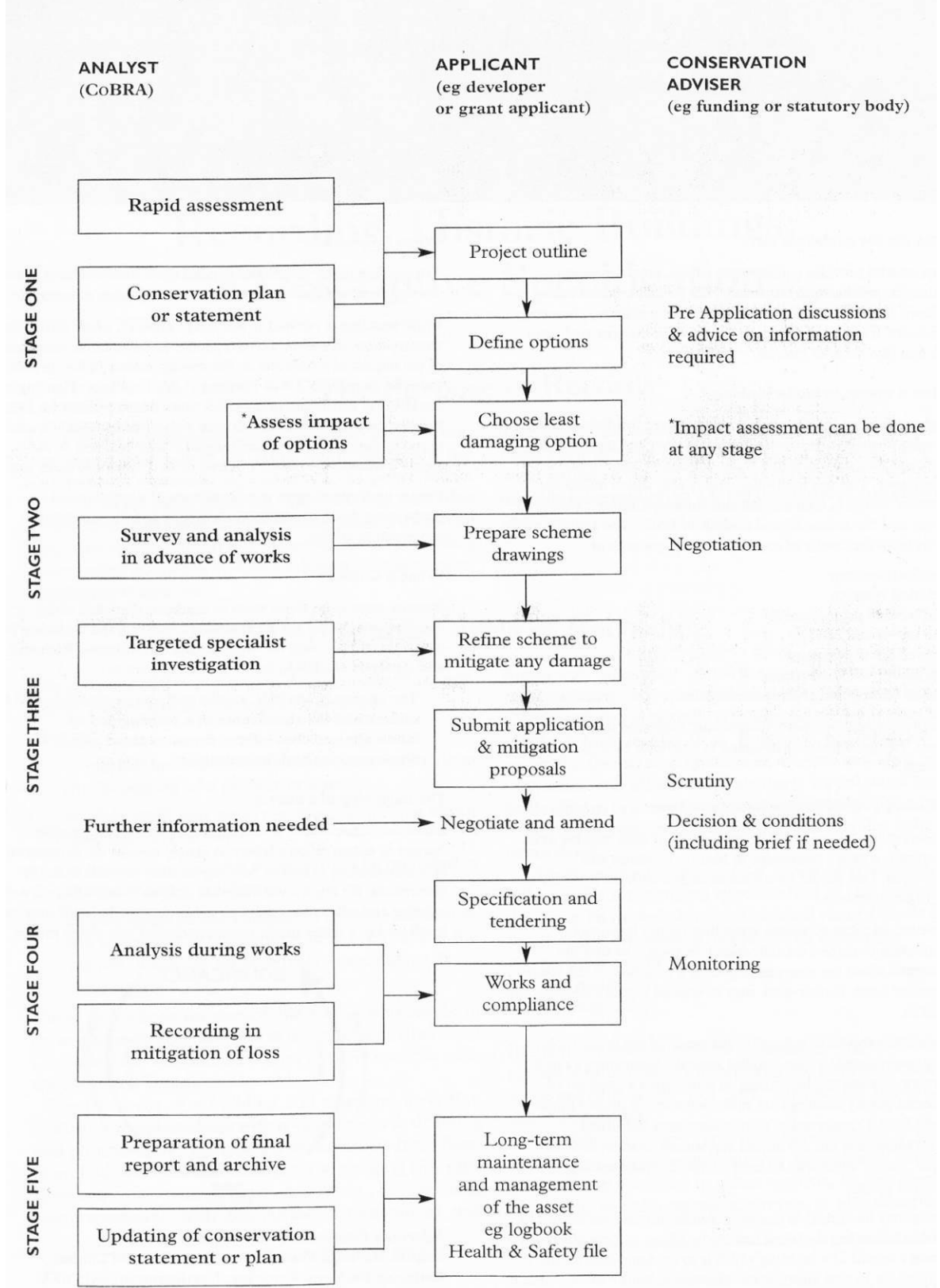


Figure 3: Stages in conservation-based research and analysis (Clarke 2001a, 43)



Figure 4: Example of advanced sheltered decay of magnesian limestone, Newmarket, York



Figure 5: Example of sheltered decay of magnesian limestone, the City Walls, York



Figure 6: Example of sheltered decay at York Minster, nineteenth-century niche-head of south buttress, East Front (landscape)

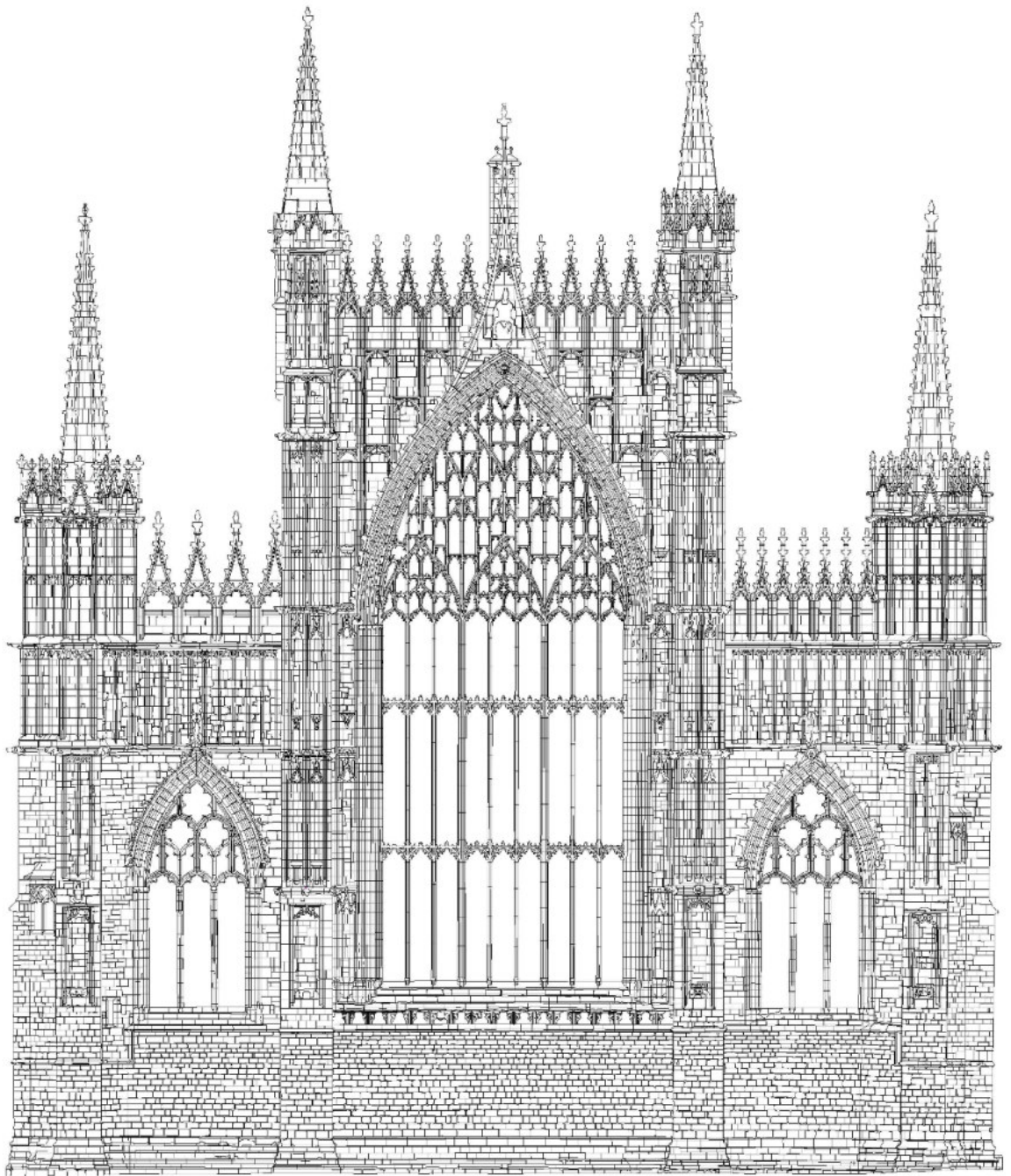


Figure 7: The East Front, 1997 photogrammetric survey (Downland Partnership/Dean and Chapter of York Minster)



- Stone for probable renewal or partial renewal
- Stone which can be re-used in Great East Window

EAST FRONT OF YORK MINSTER

East elevation proposals as at 12.02.05

At full scale this working drawing shows all areas of damage, the types of probable repair required and stonework requiring further inspection.

Figure 8: East Front repair proposals as at 12 February 2005 (York Minster 2005, 9)

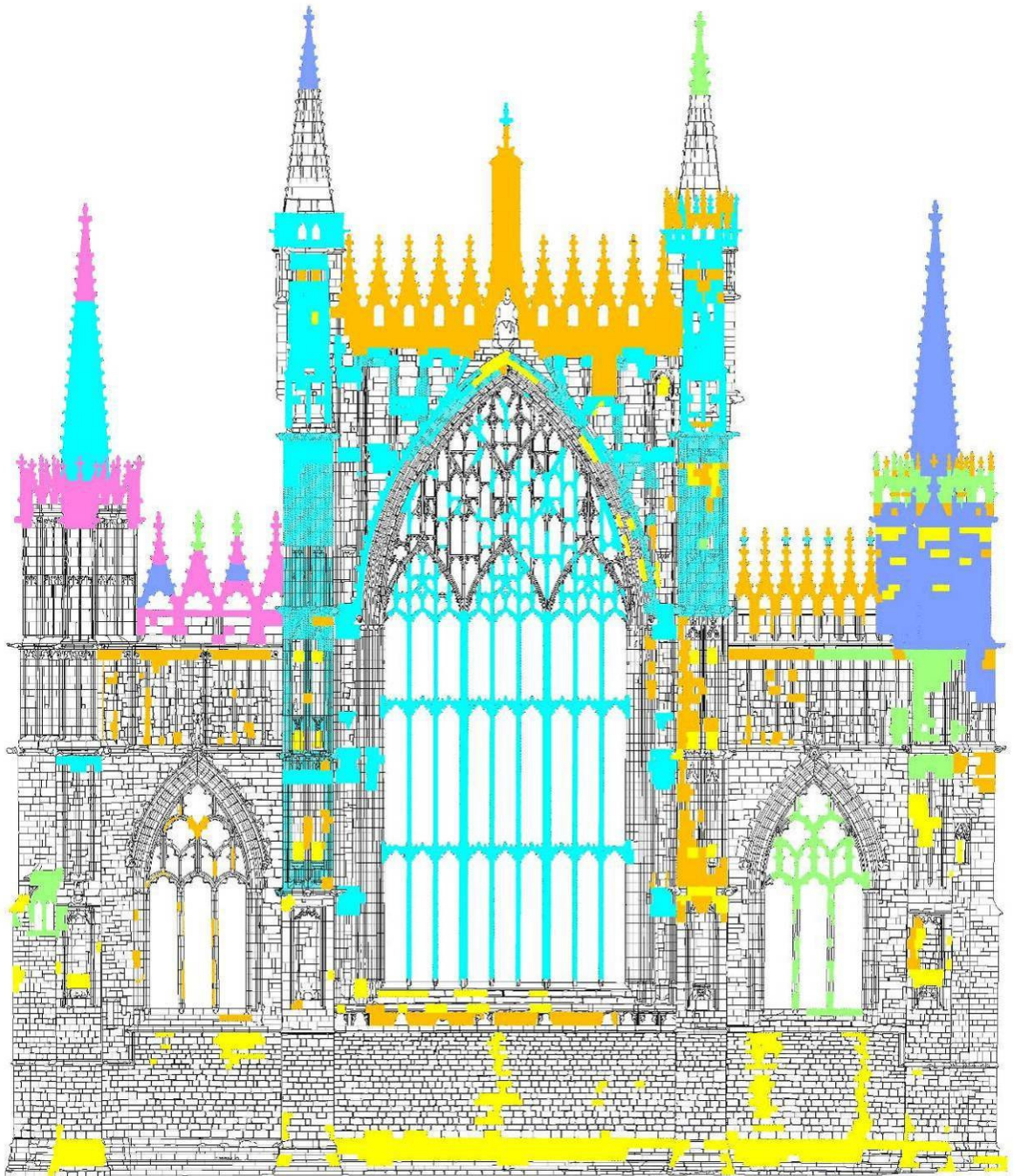


Figure 9: The East Front, historic geology survey as at September 2005 (John David, York Minster Stoneyard)

KEY – Cyan = 1820s and 1830s Tadcaster Blue = 1850s Huddleston

Orange = 1890s New Ketton Green = 1930s Clipsham Yellow = 1970s Cadeby

Magenta = 1980s and 1990s Cadeby

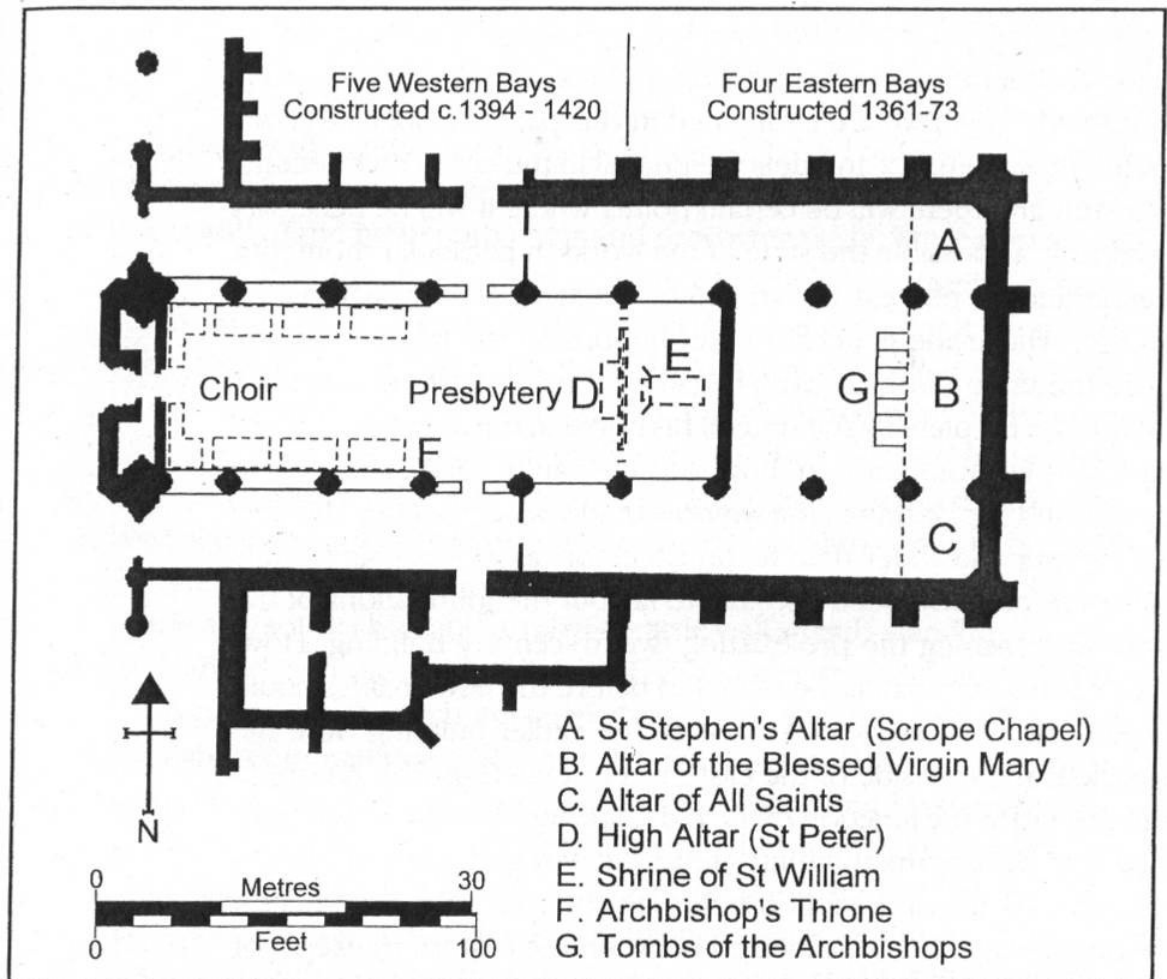


Figure 10: Plan of the Eastern Arm of York Minster, showing principle architectural and liturgical divisions (Norton 2007, 159, Figure 1)

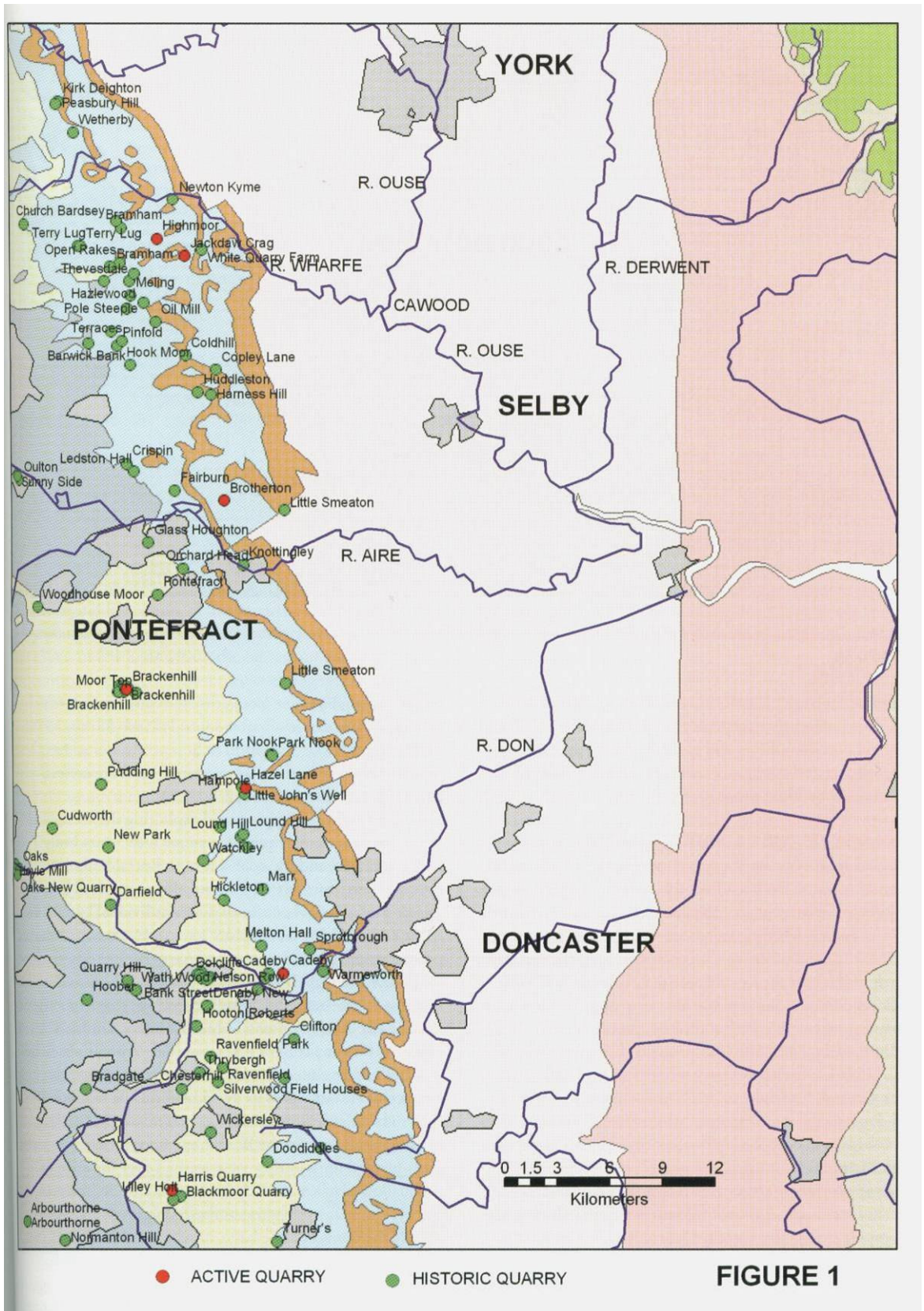


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Figure 12: Burials adjacent to the Lady Chapel altar beneath the Great East Window (YMEX1968/YM962, 21 November 1968)

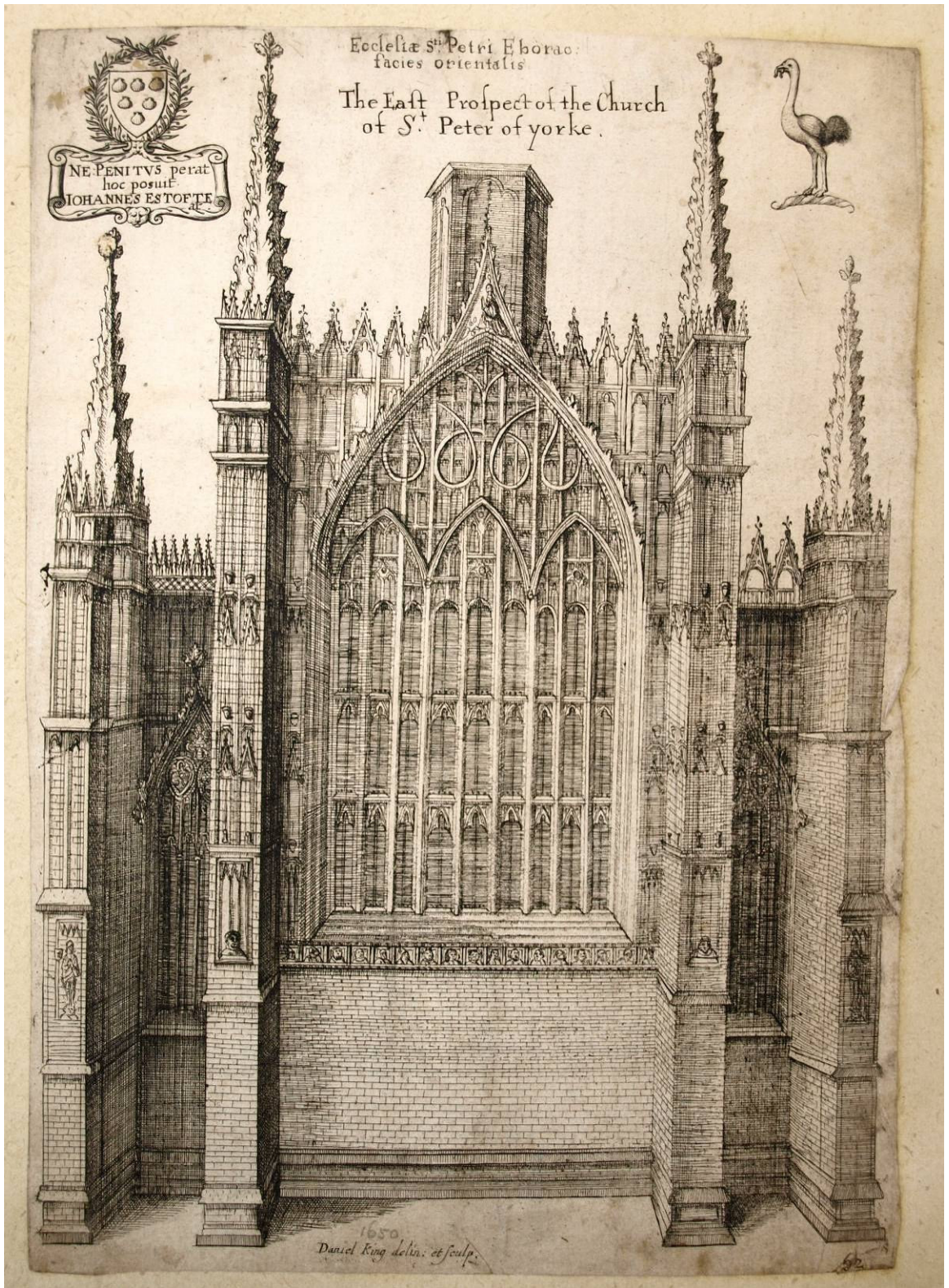


Figure 13: East Prospect of the Cathedral Church of York by Daniel King, 1650 (YML, Print Volume)



Figure 14: Early nineteenth century pen and ink drawing of Ingram House showing close proximity of coal-burning dwellings to the Minster (Bowler and Brimblecombe 1990b, Figure 1)

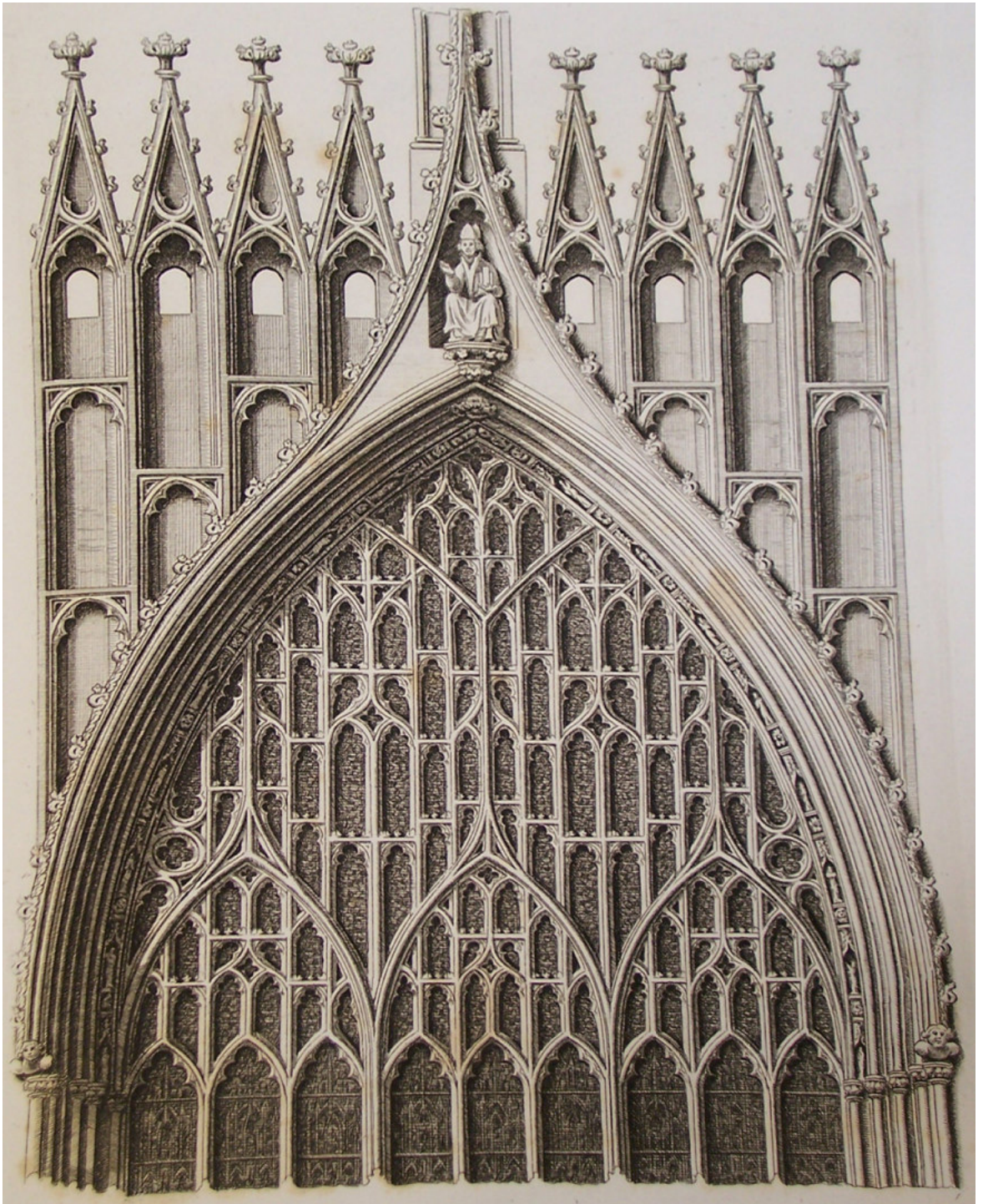


Figure 15: Engraving of the ornament surrounding the Great East Window by Joseph Halfpenny (Halfpenny 1795, Plate 97)



Figure 16: View of the East Front by Charles Wild (Wild 1809, Plate 12)

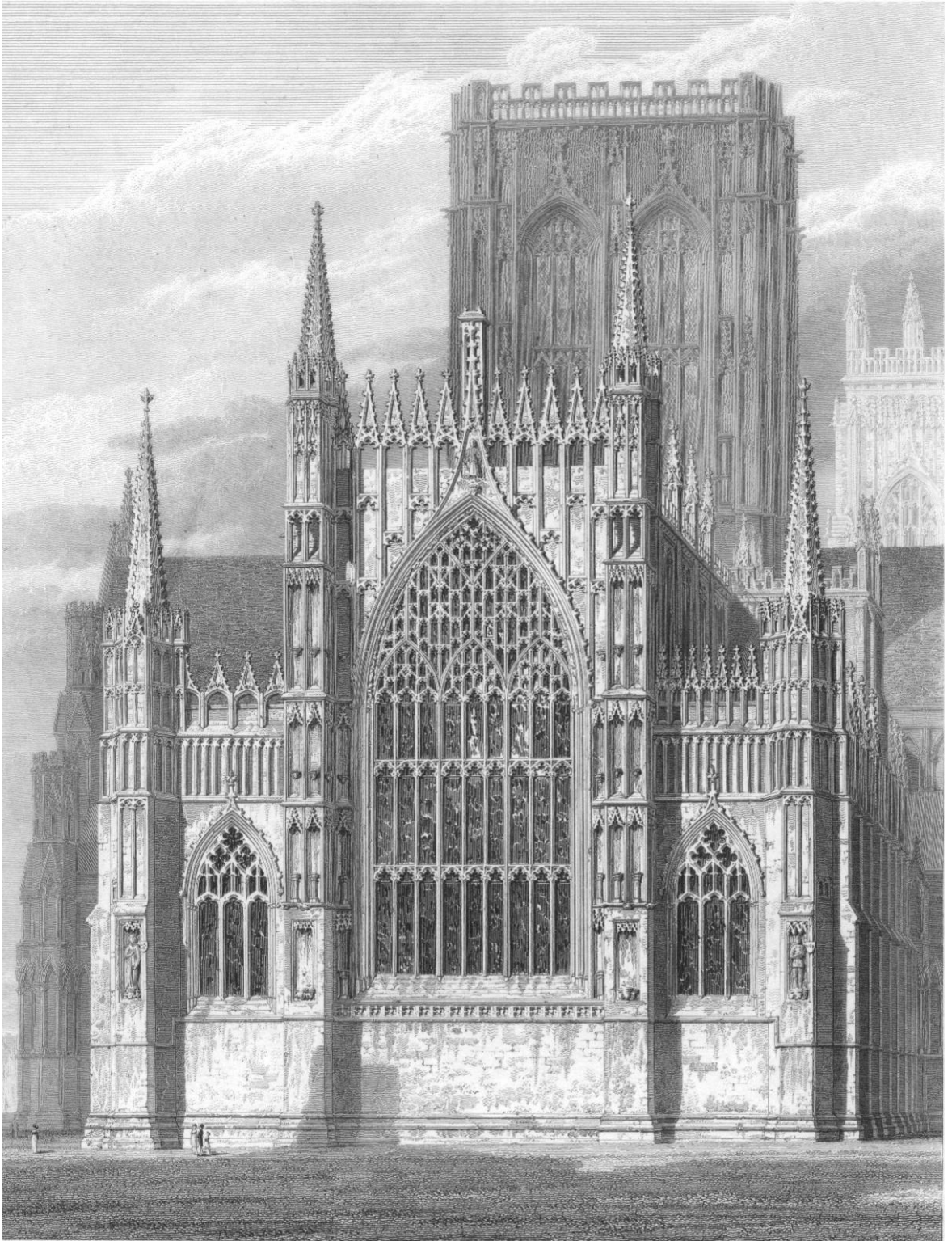


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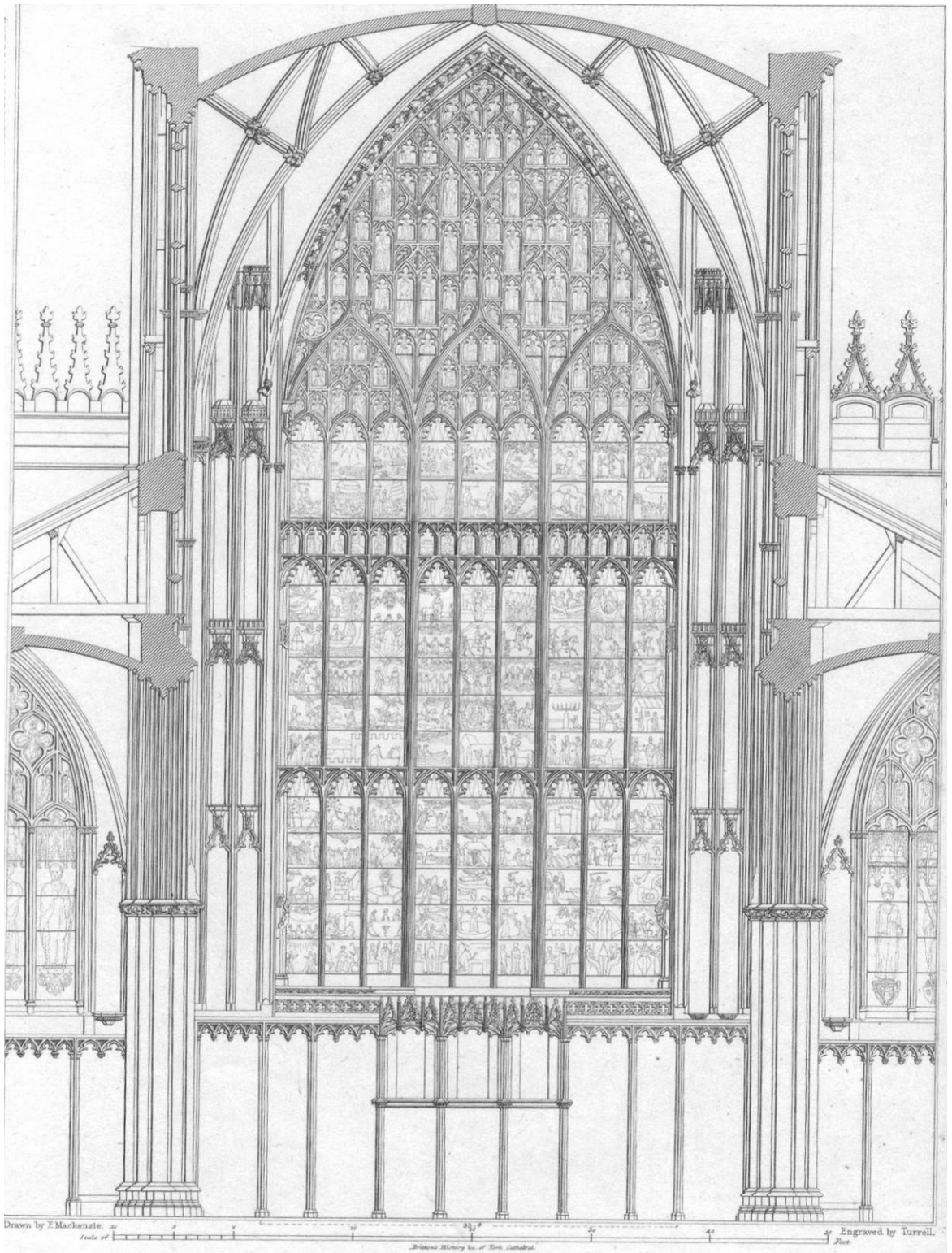


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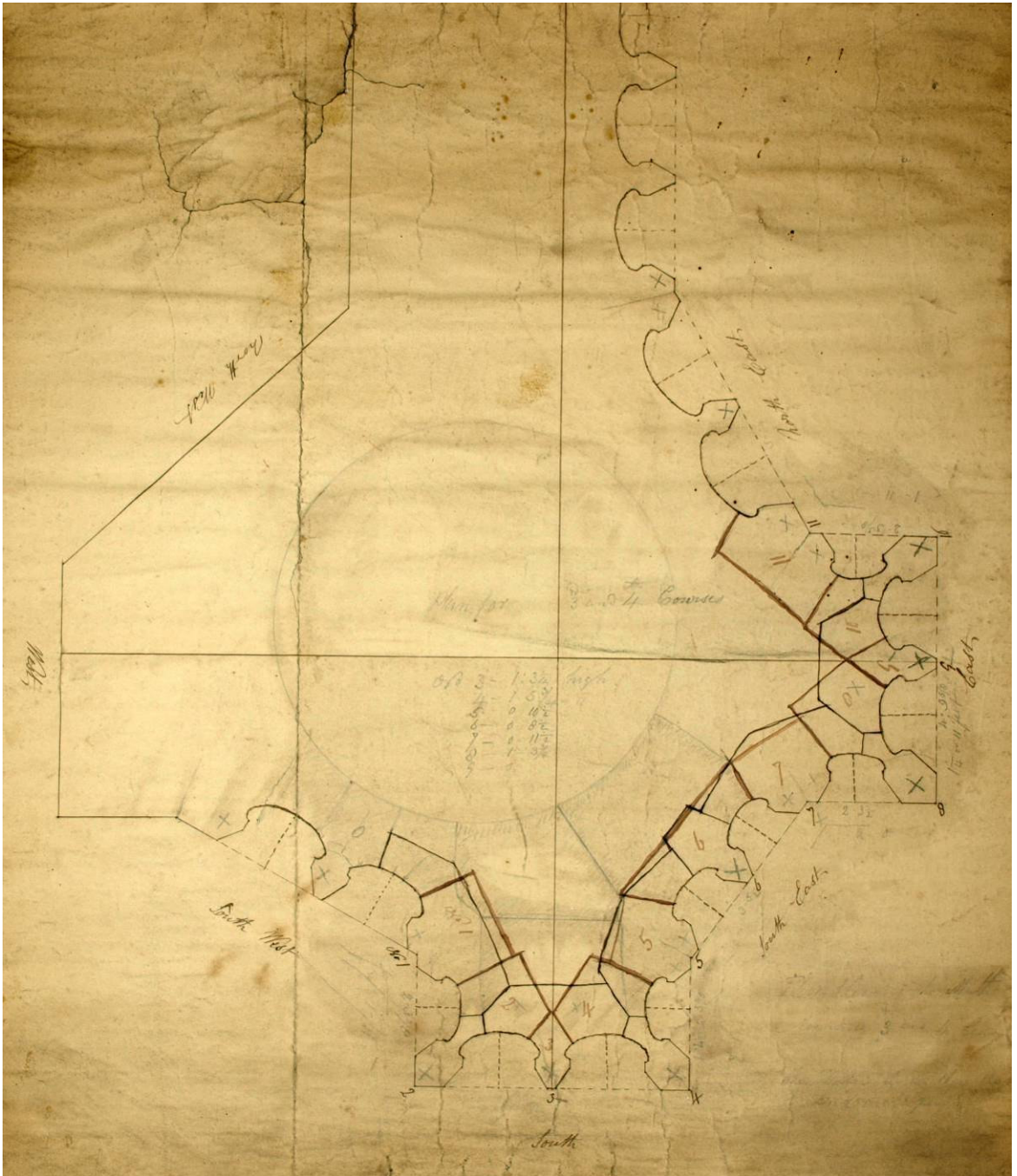


Figure 19: Section through south-east turret at parapet level, 1820s (YML/3/5)

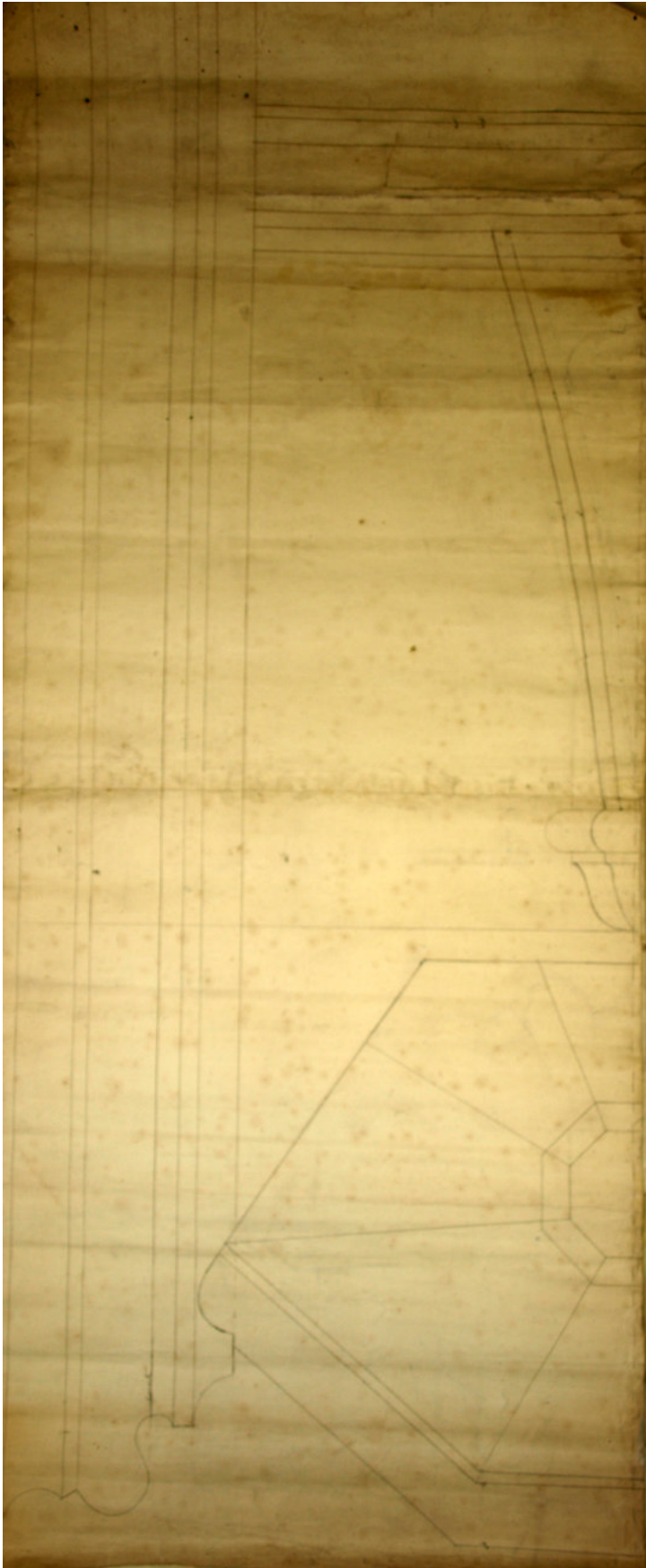


Figure 20: Full-size drawing of a buttress console, East Front, 1820s (YML/3/9)



Figure 21: Canopy detail for renewal, East Front buttress, 1820s (YML/3/13)

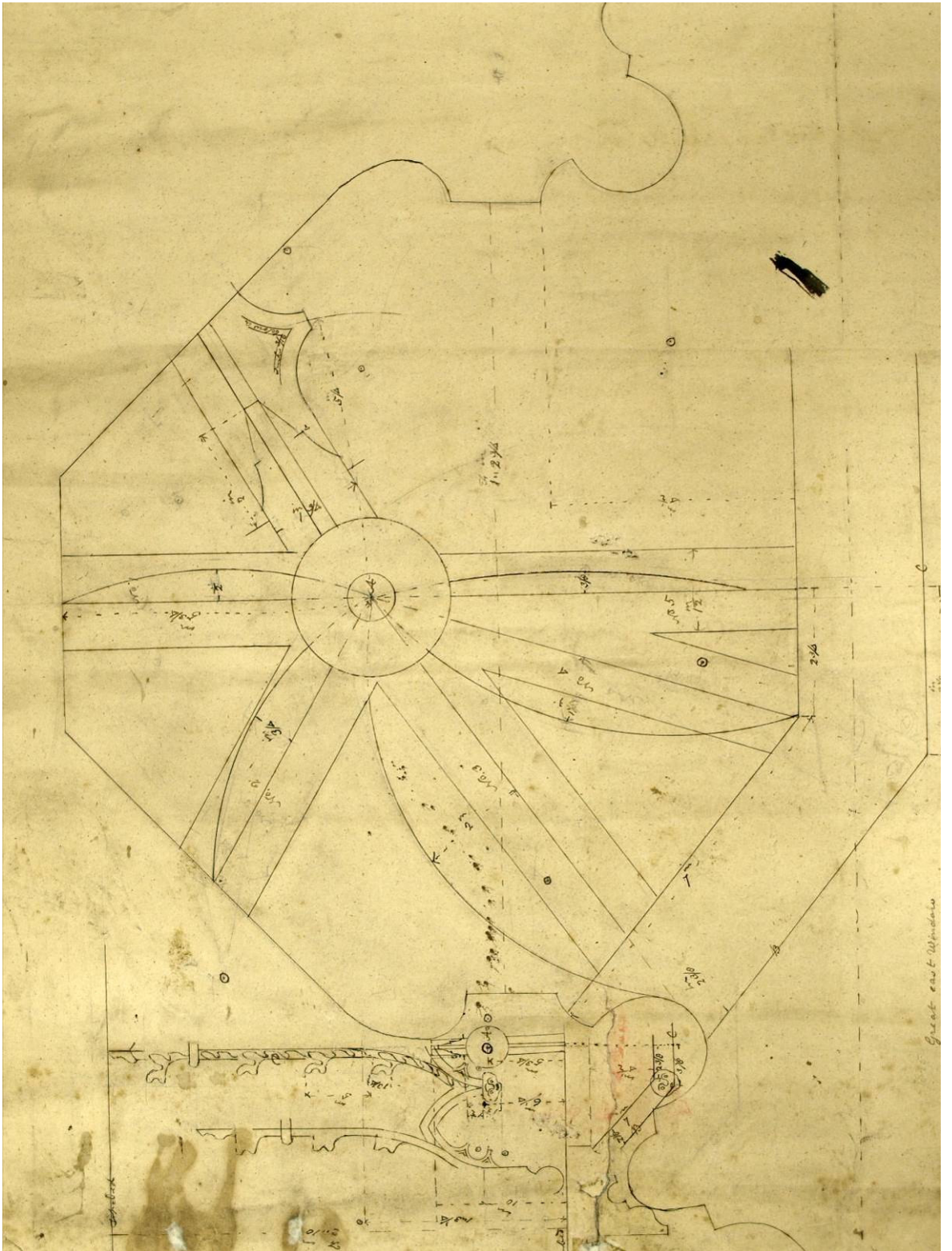


Figure 22: Third canopy from the Great East Window sill, south buttress, William Shout 1825 (YML/31/276)

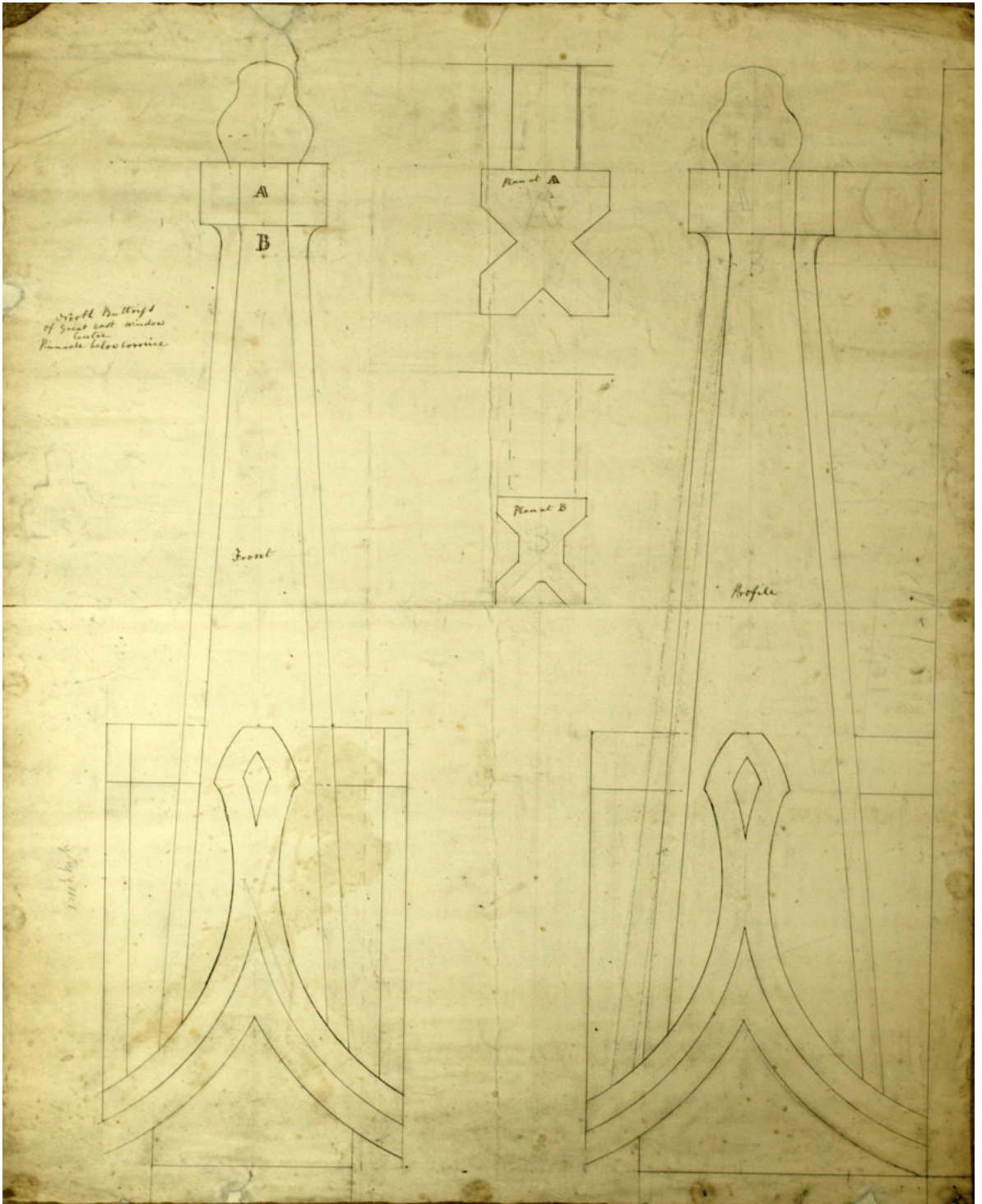


Figure 23: Setting-out detail, East Front north buttress (YML/31/279)

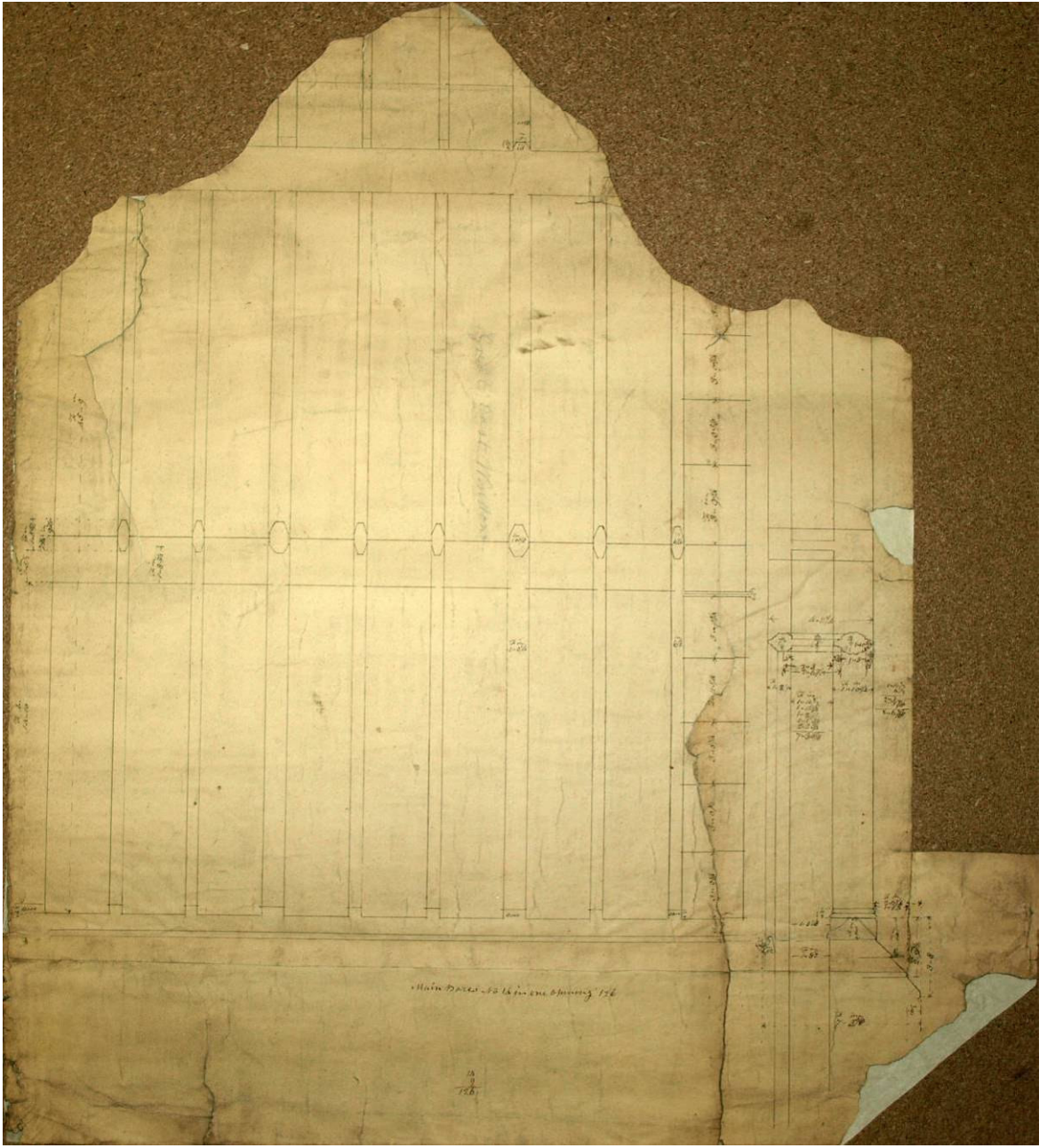


Figure 24: Elevation and sections of sill, mullions and transoms of the Great East Window, William Shout c.1825 (YML/31/290)

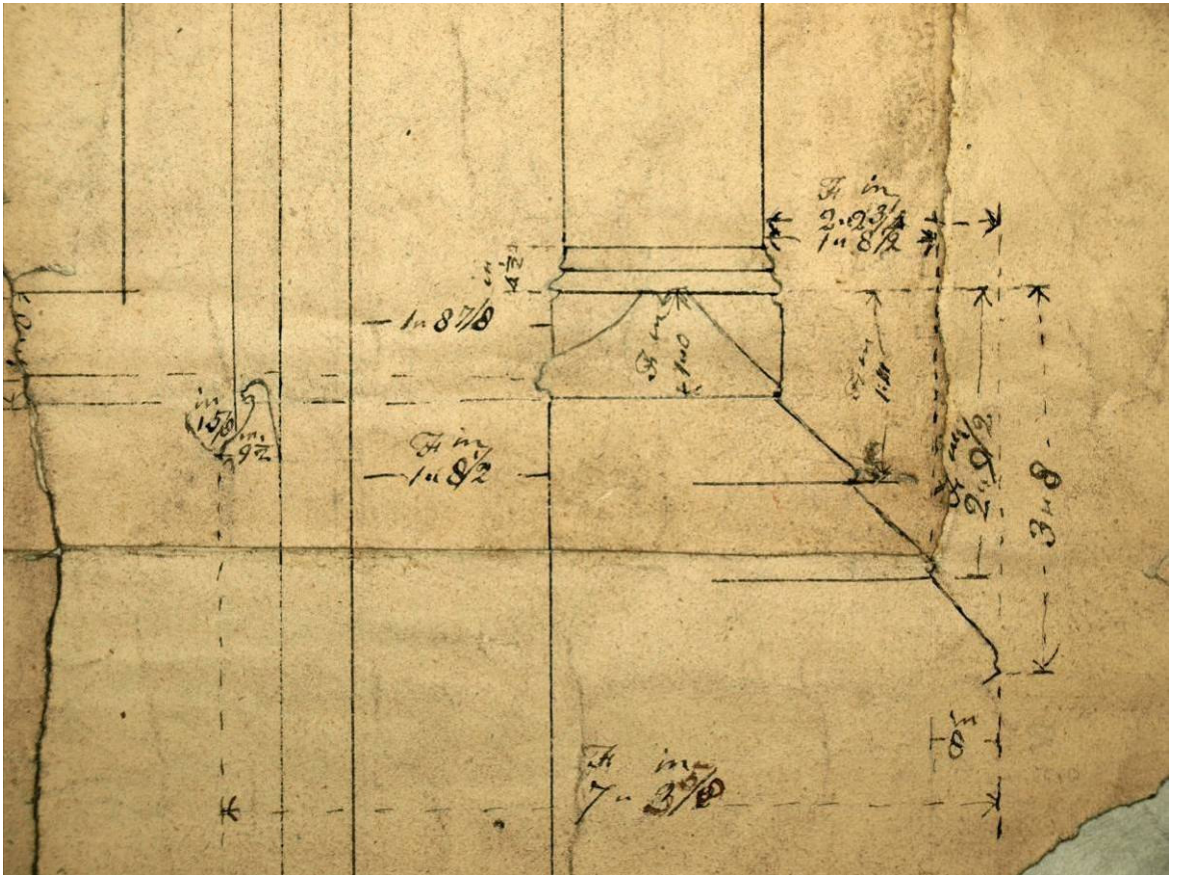


Figure 25: Detail of section through Great East Window sill, William Shout c.1825 (YML/31/290)

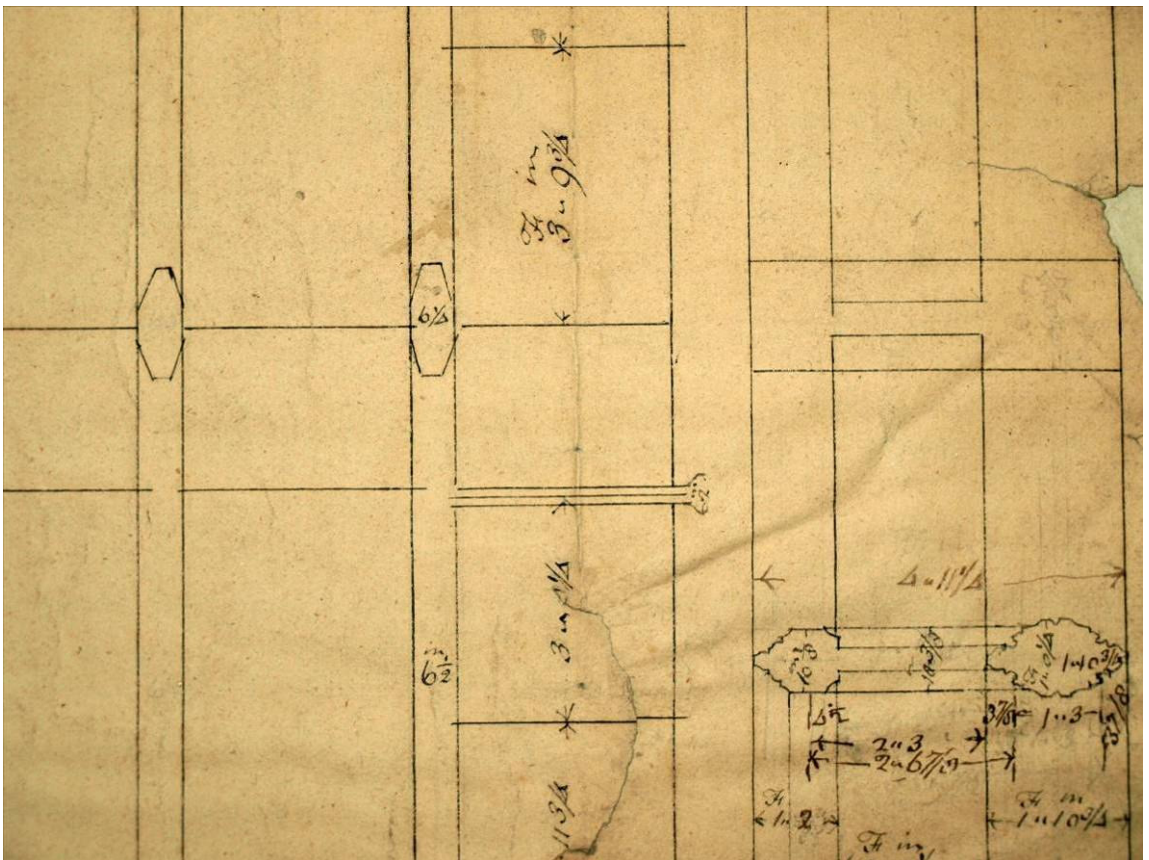


Figure 26: Detail of elevation and sections through transoms and trabeations of Great East Window, William Shout c.1825 (YML/31/290)

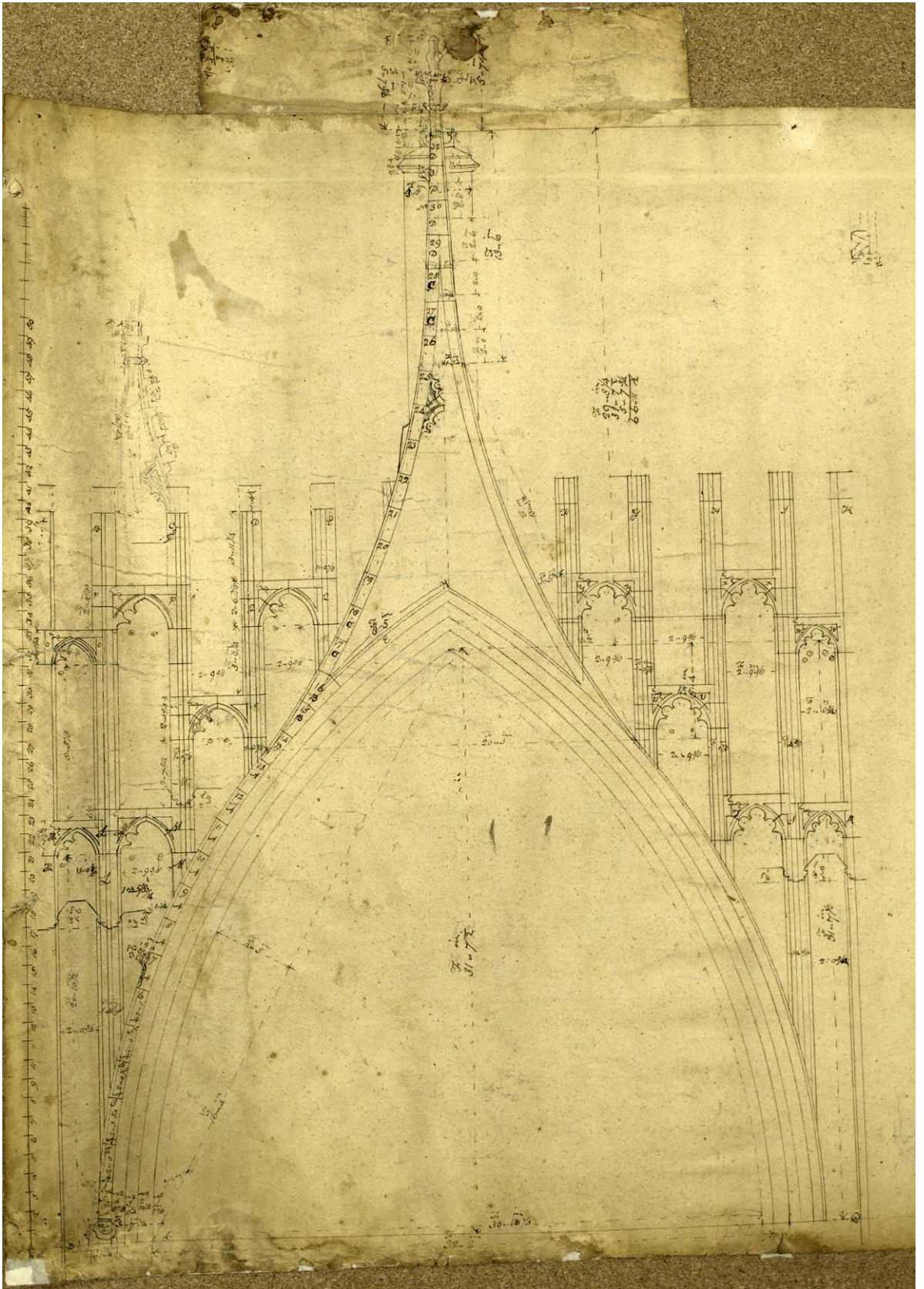


Figure 27: Elevation of the head of the Great East Window, William Shout c.1825 (YML/3/16)

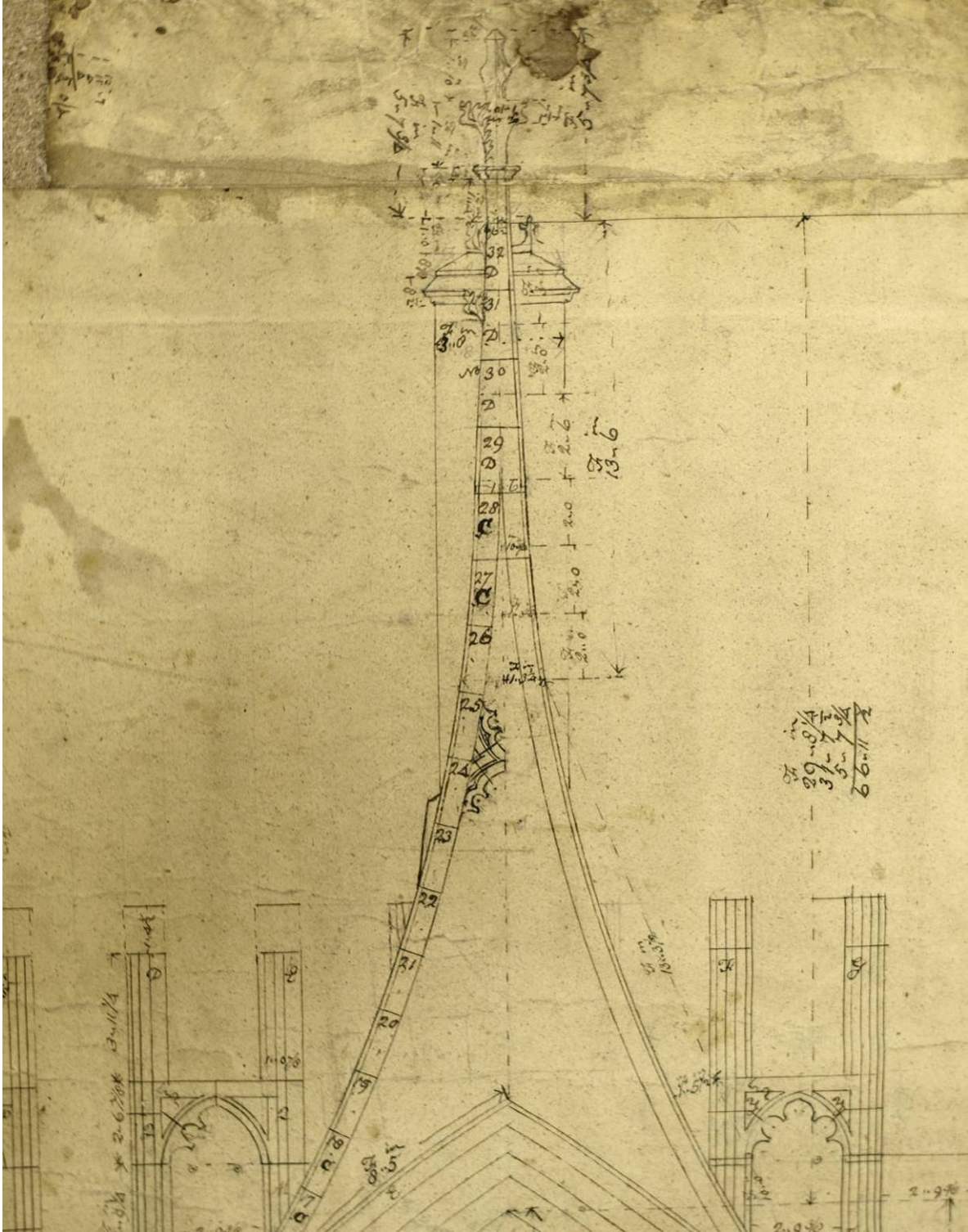


Figure 28: Detail of elevation of the head of the Great East Window, William Shout c.1825 (YML/3/16)

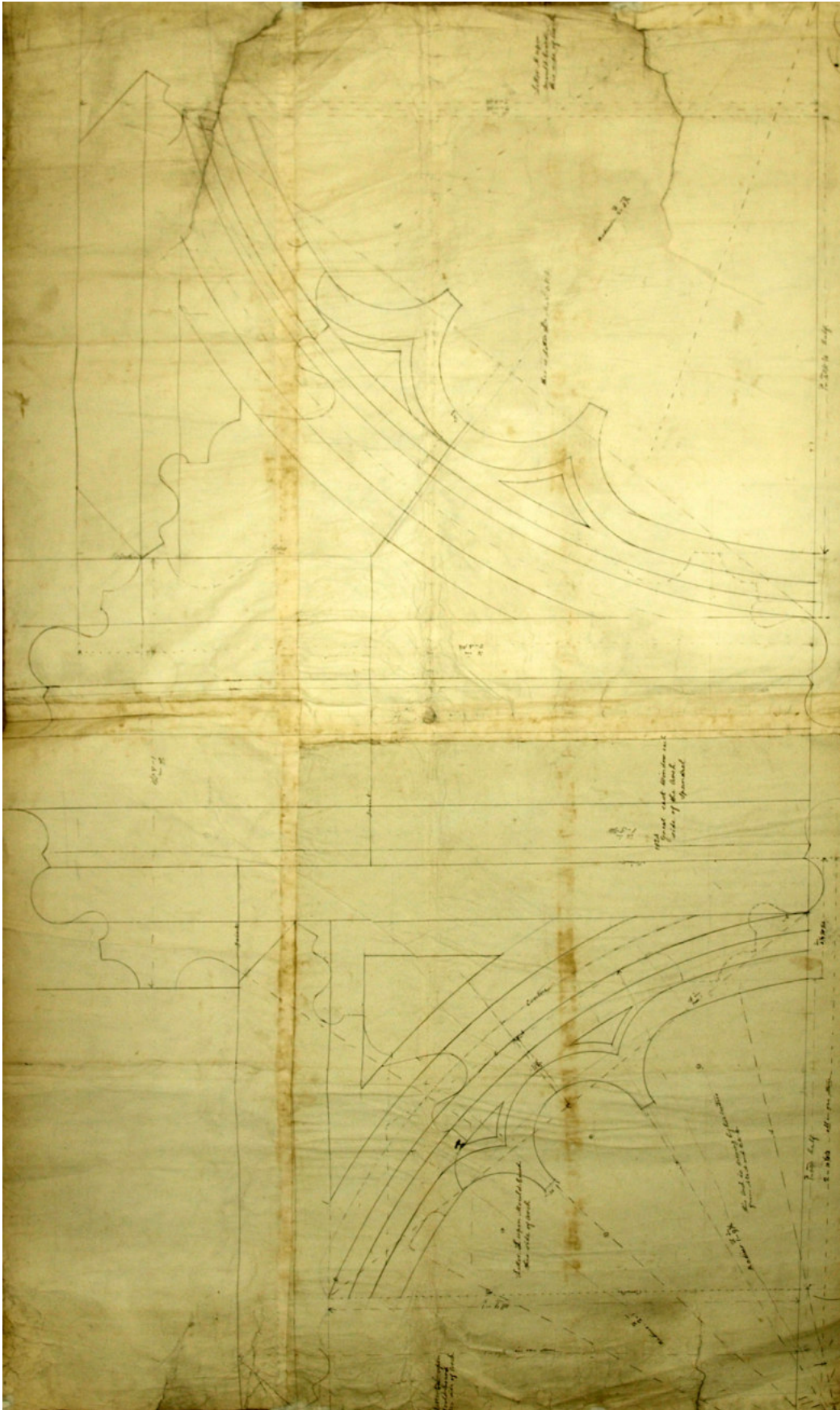


Figure 29: Setting-out drawing, details each side of the arch spandrel, William Shout 1825 (YML/31/281)

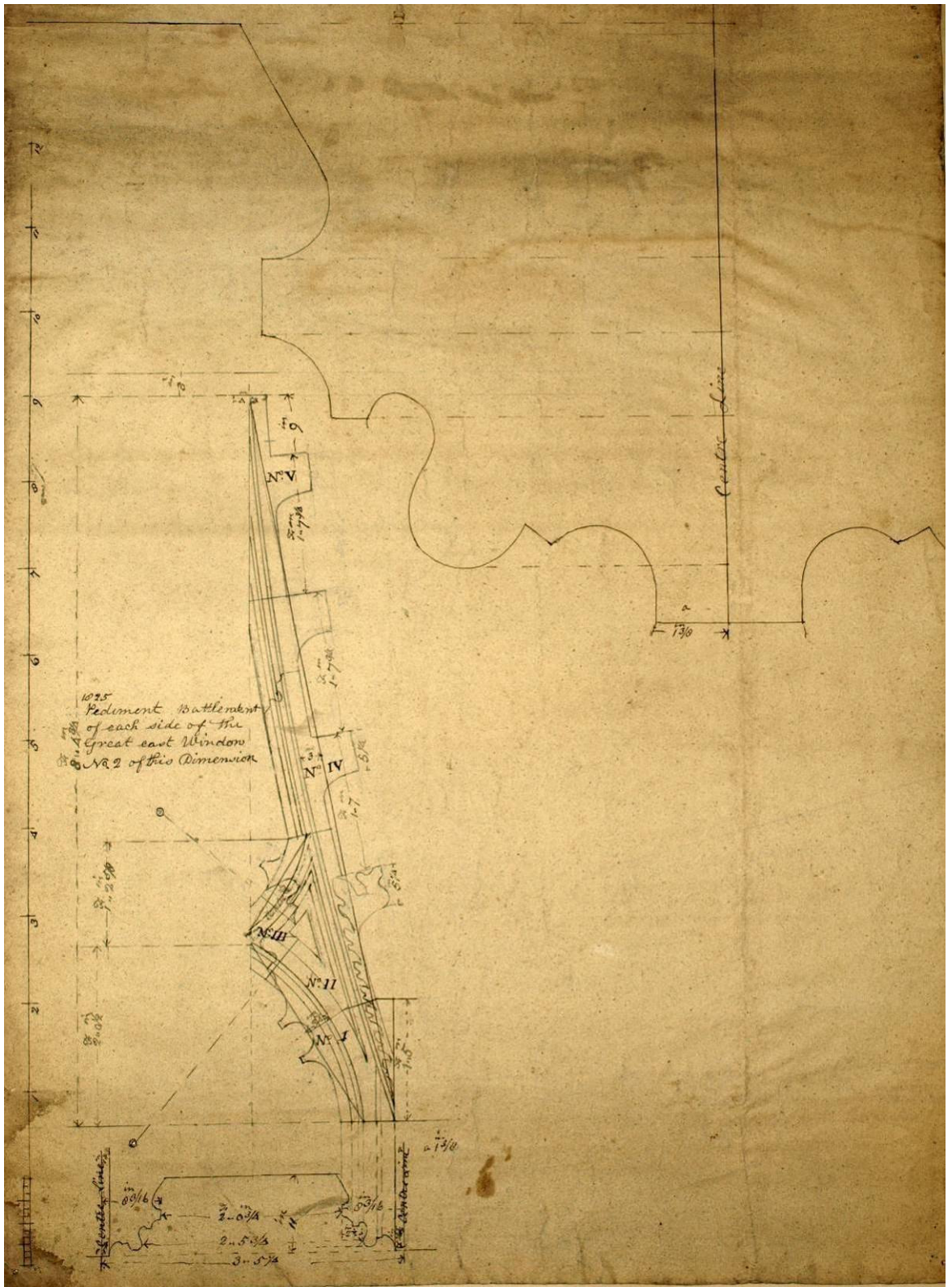


Figure 30: Setting-out elevation of parapet gablet, William Shout 1825 (YML/3/43)

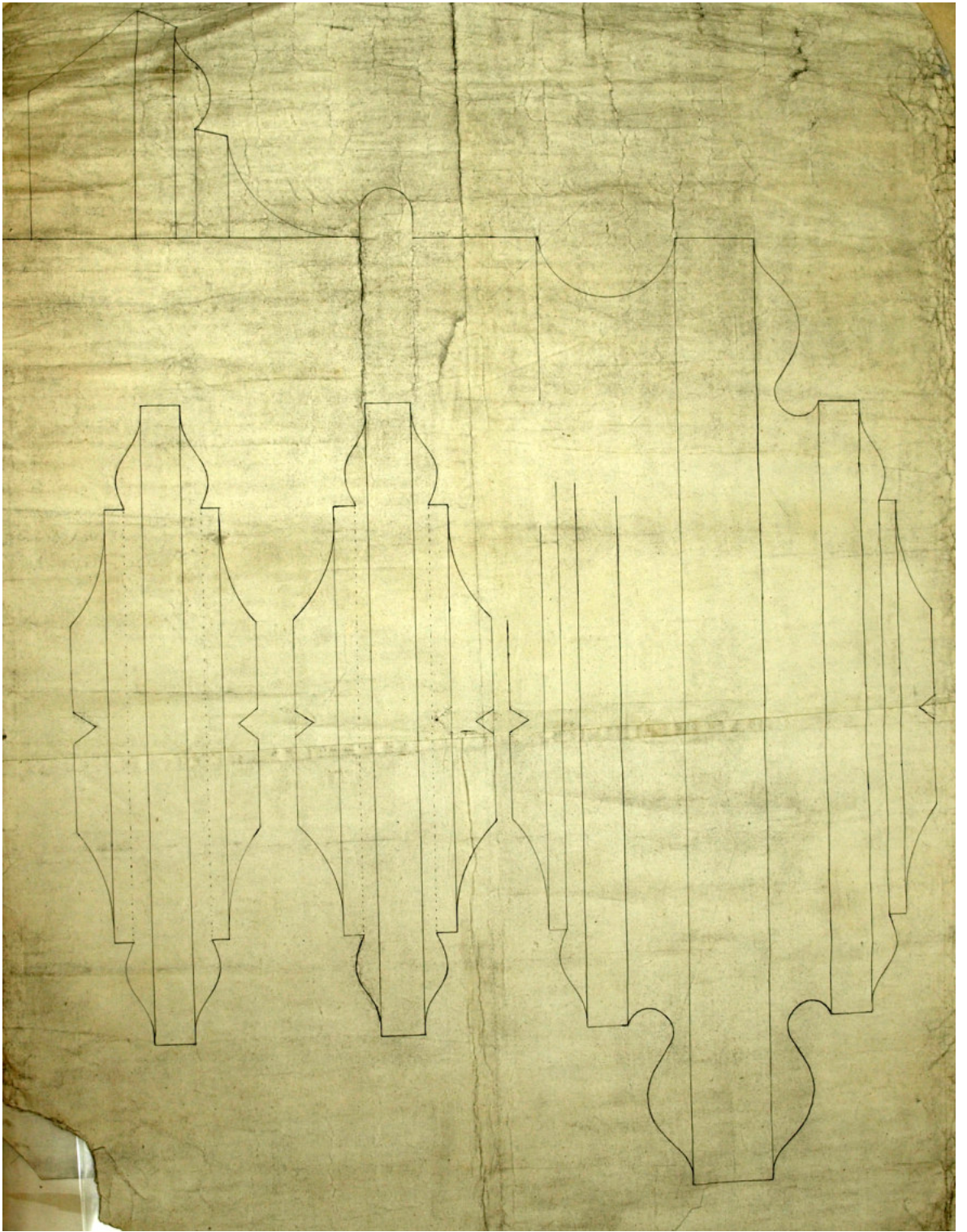


Figure 31: Great East Window moulding profiles, William Shout c.1824-1825 (YML/4/1/9)

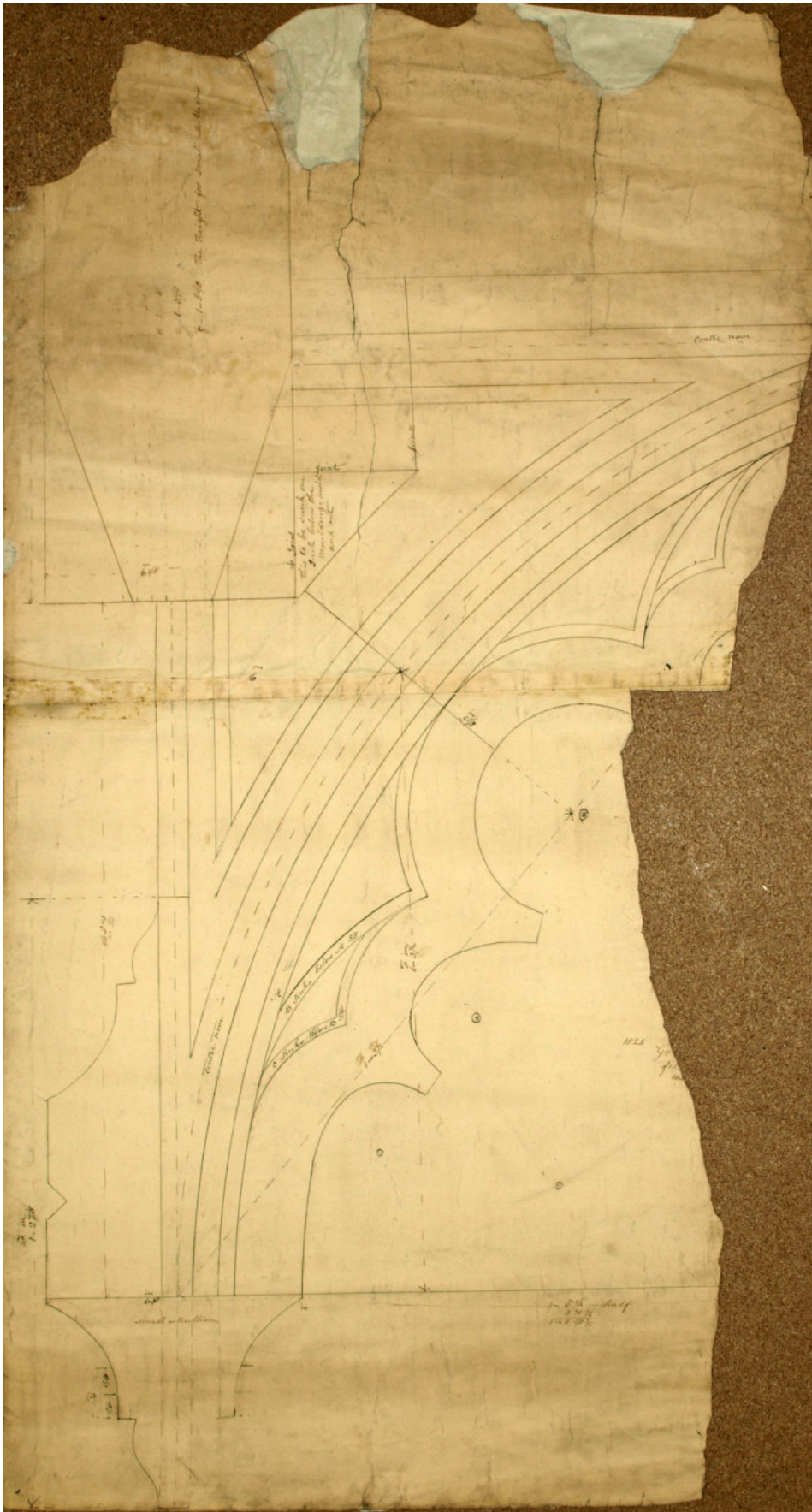


Figure 32: Setting-out details for lower transoms, Great East Window, William Shout 1824 (YML/31/277)

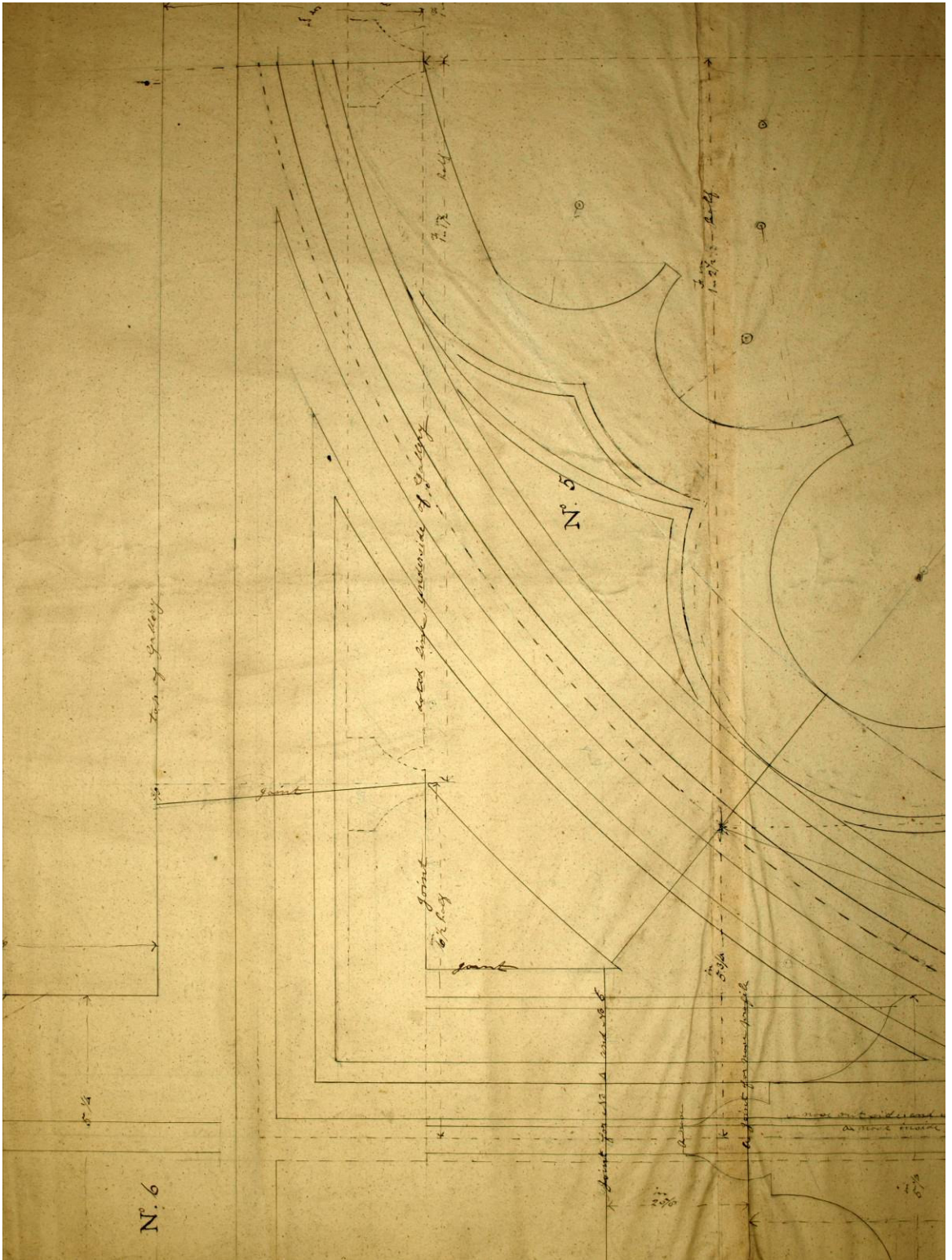


Figure 33: Setting-out drawing, arches below gallery-level, William Shout 1824 (YML/31/298)

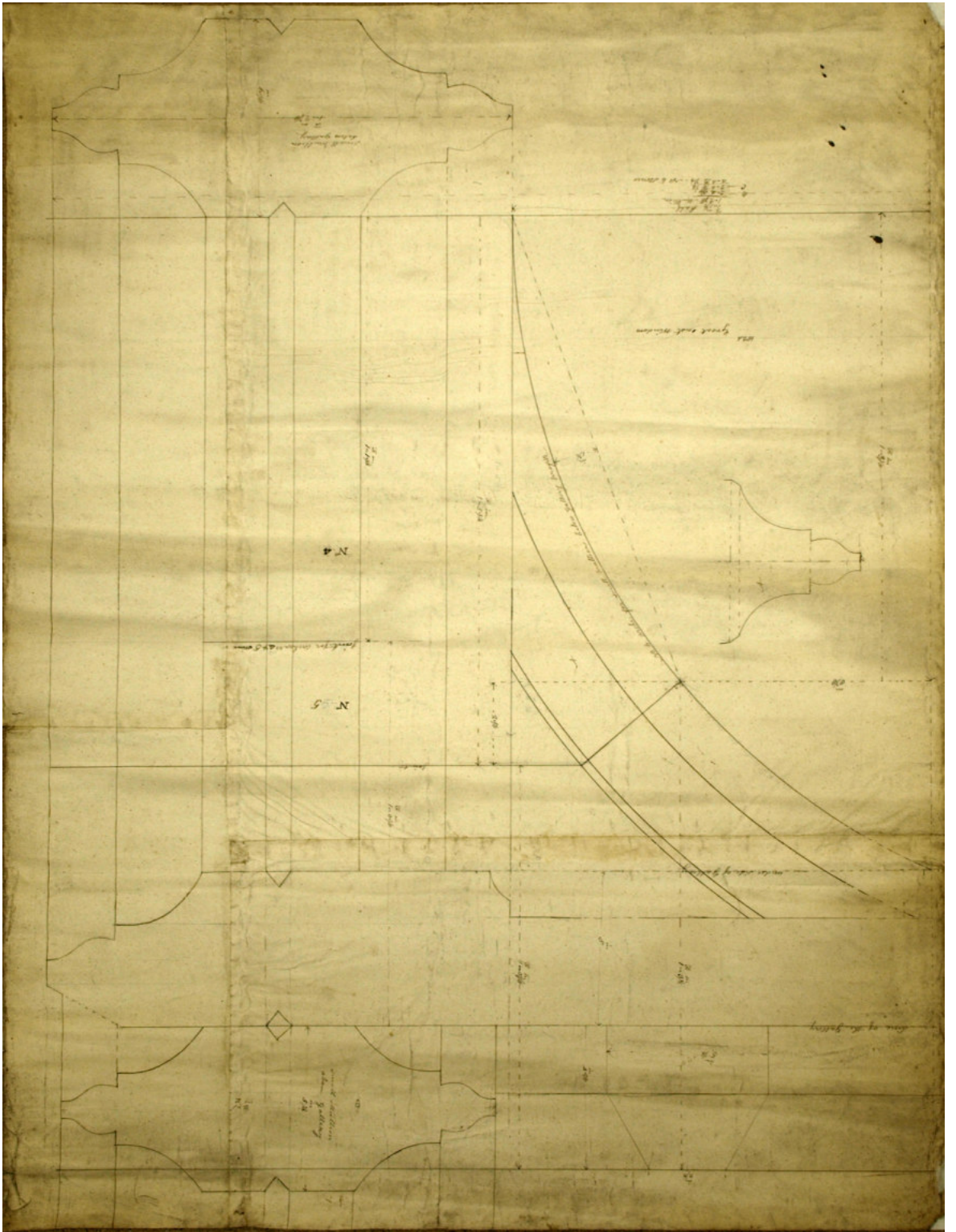


Figure 34: Setting-out drawing at gallery-level, William Shout 1824 (YML/31/299)

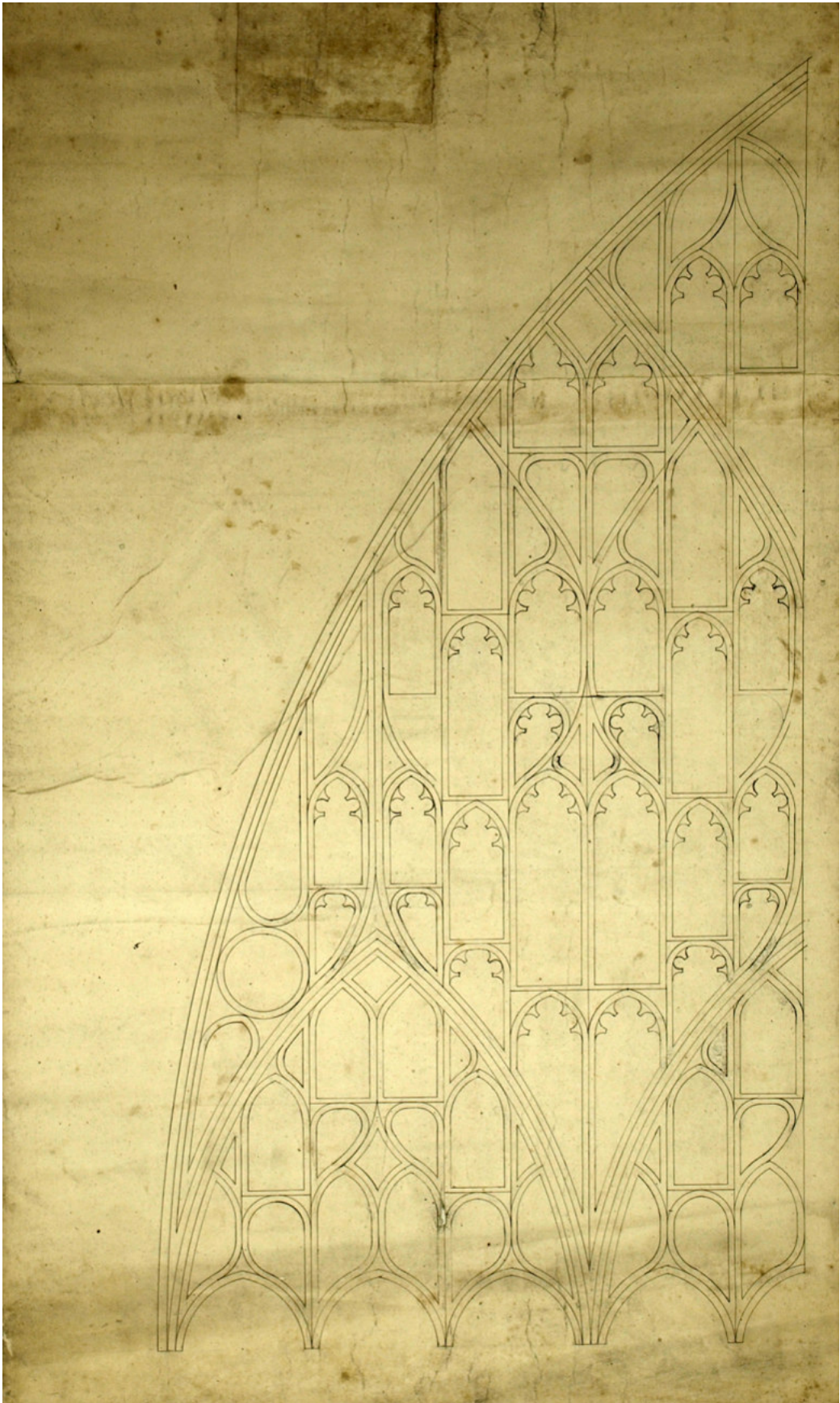


Figure 35: Part elevation of the tracery of the Great East Window, no date (YML/31/292)

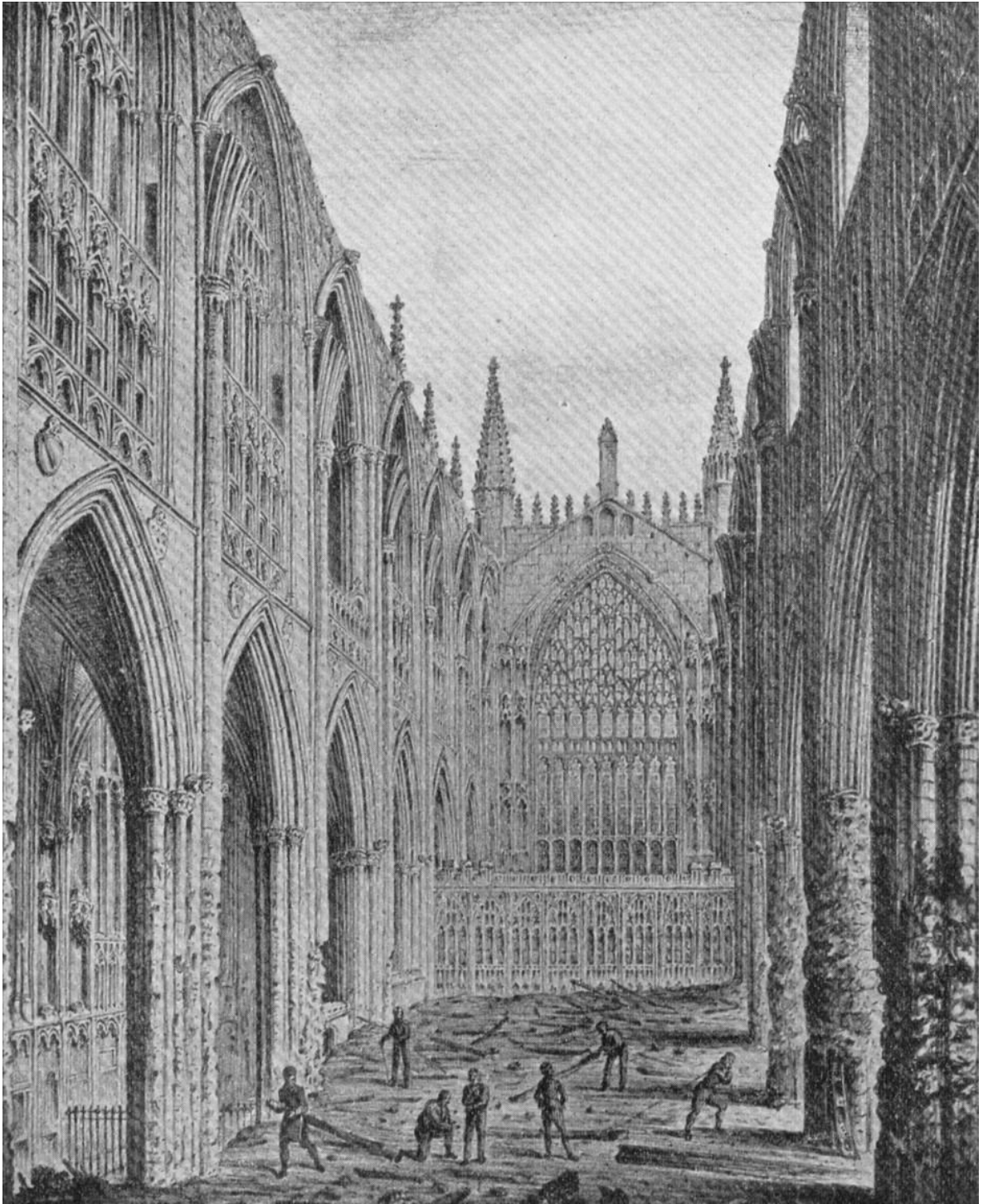


Figure 36: The aftermath of the 1829 fire in the choir, by John Browne (Purey-Cust 1899a, 3)

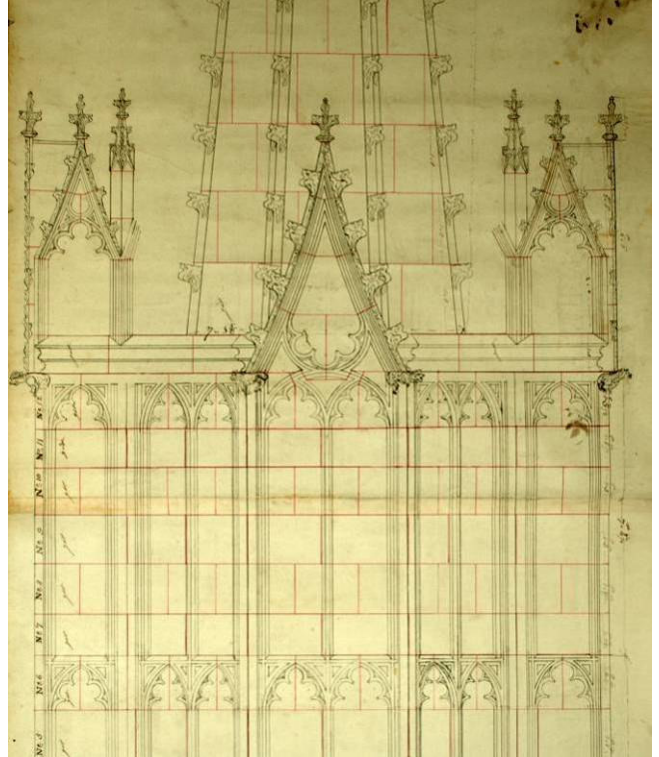
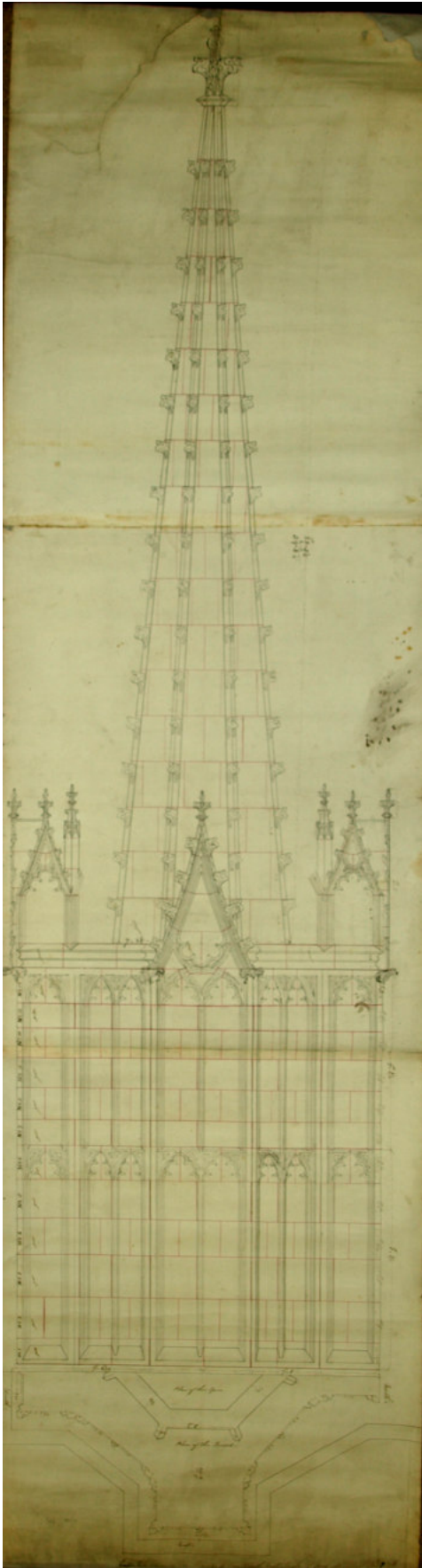


Figure 37: East Front, south-east turret elevation and section with detail, 1837-1838 (YML/3/10)

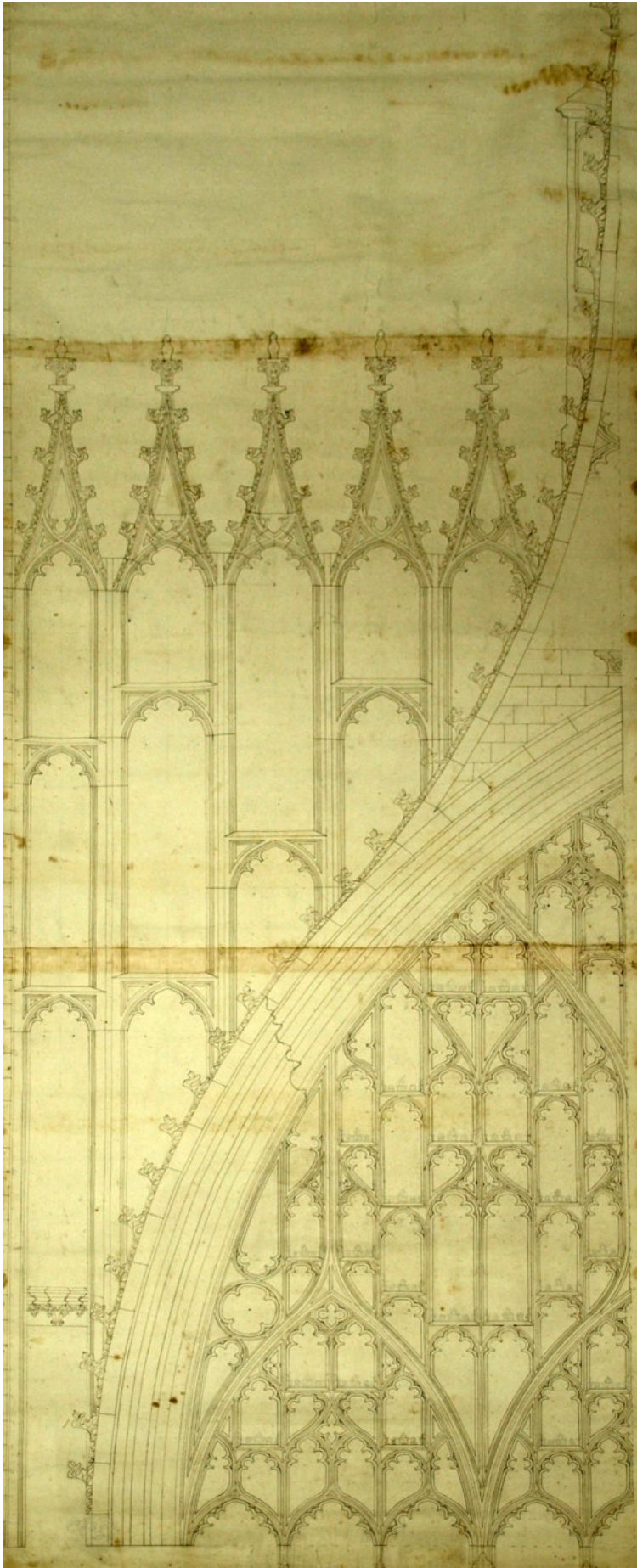


Figure 38: Part elevation of the Great East Window, 1830s-1840s (YML/3/17)

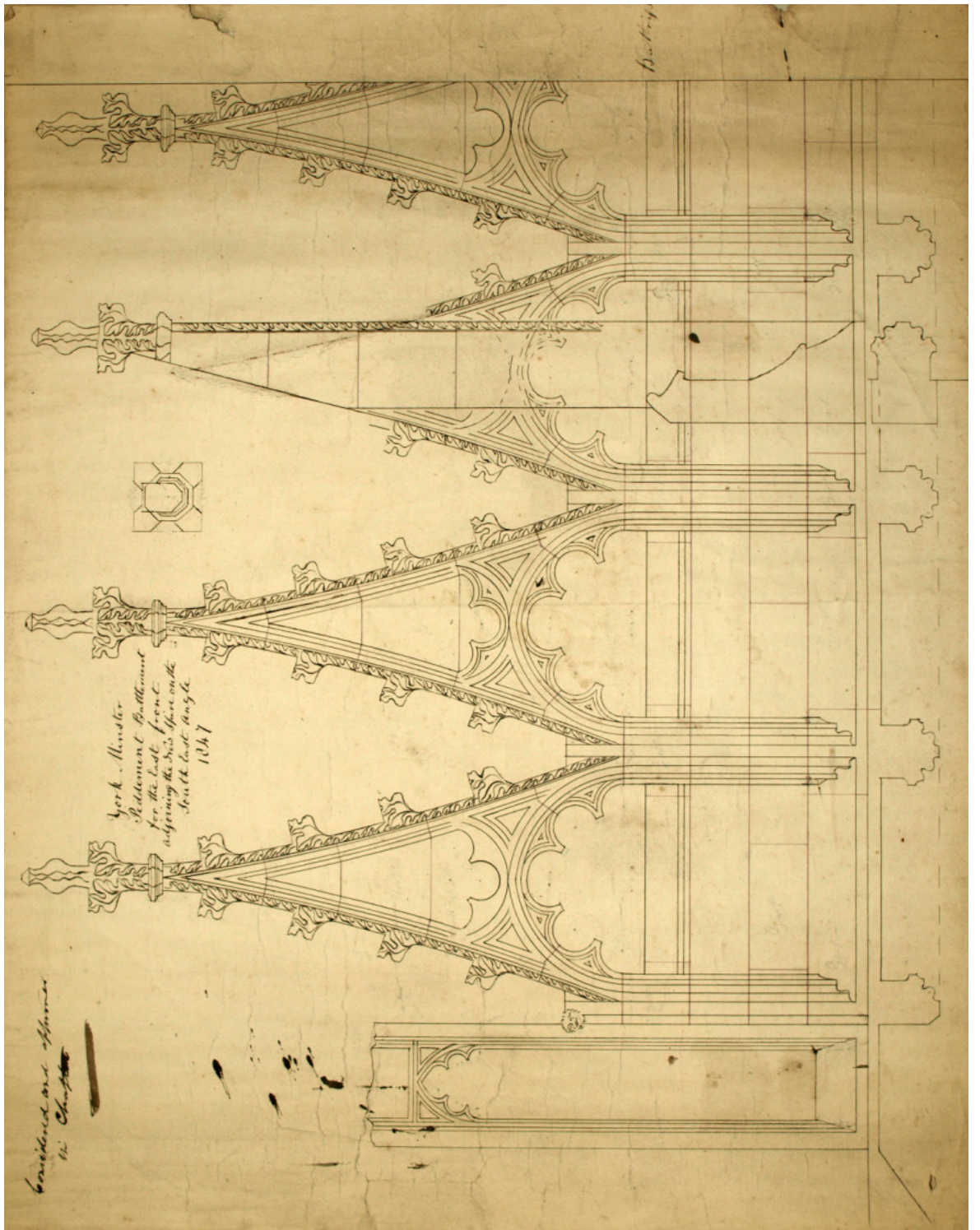


Figure 39: Elevation and section of south parapet gables, 1847 (YML/3/22)

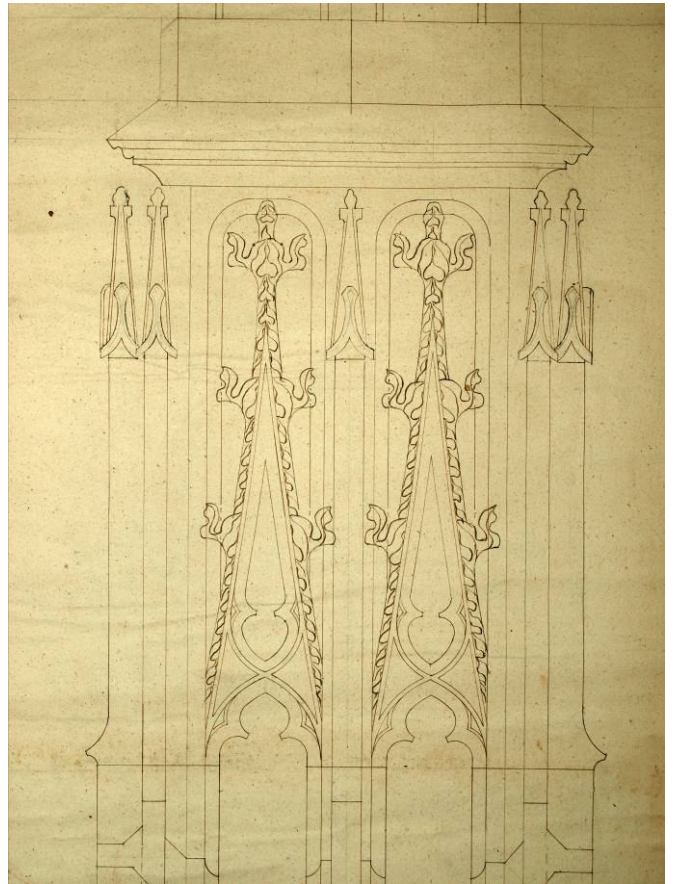
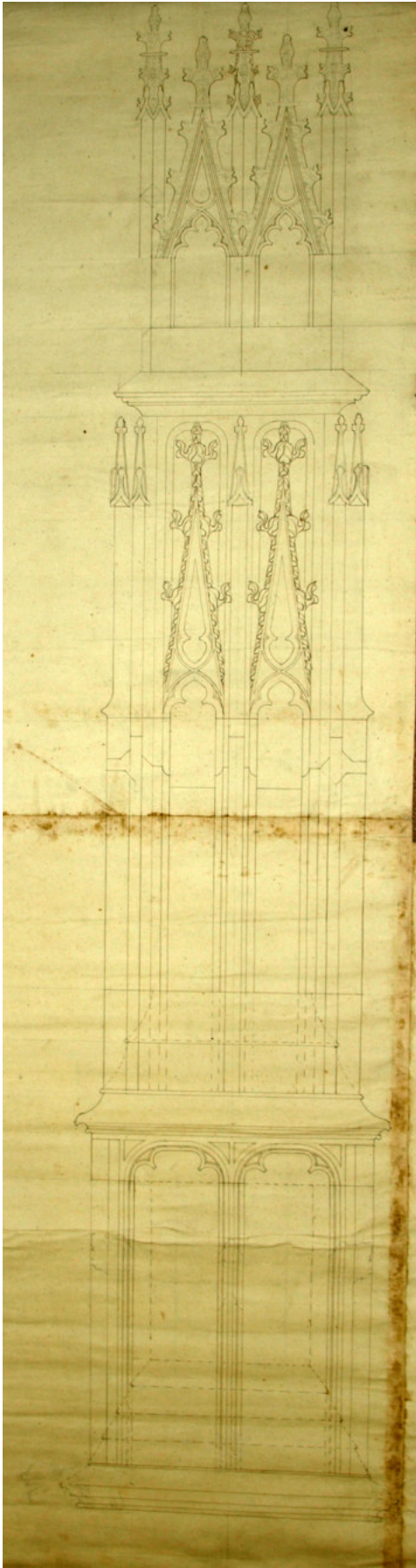


Figure 40: Elevation of the upper section of the north buttress with detail, 1840s (YML/3/11)

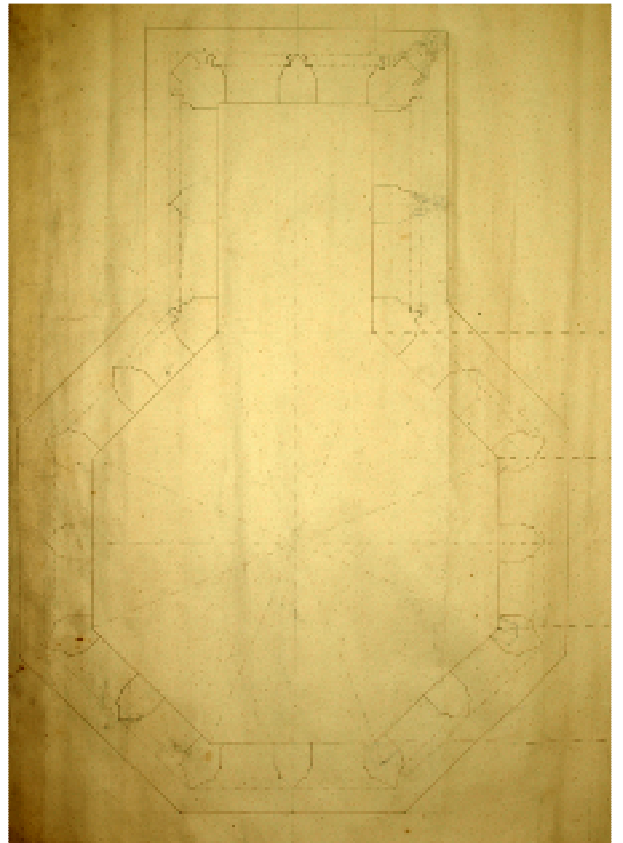
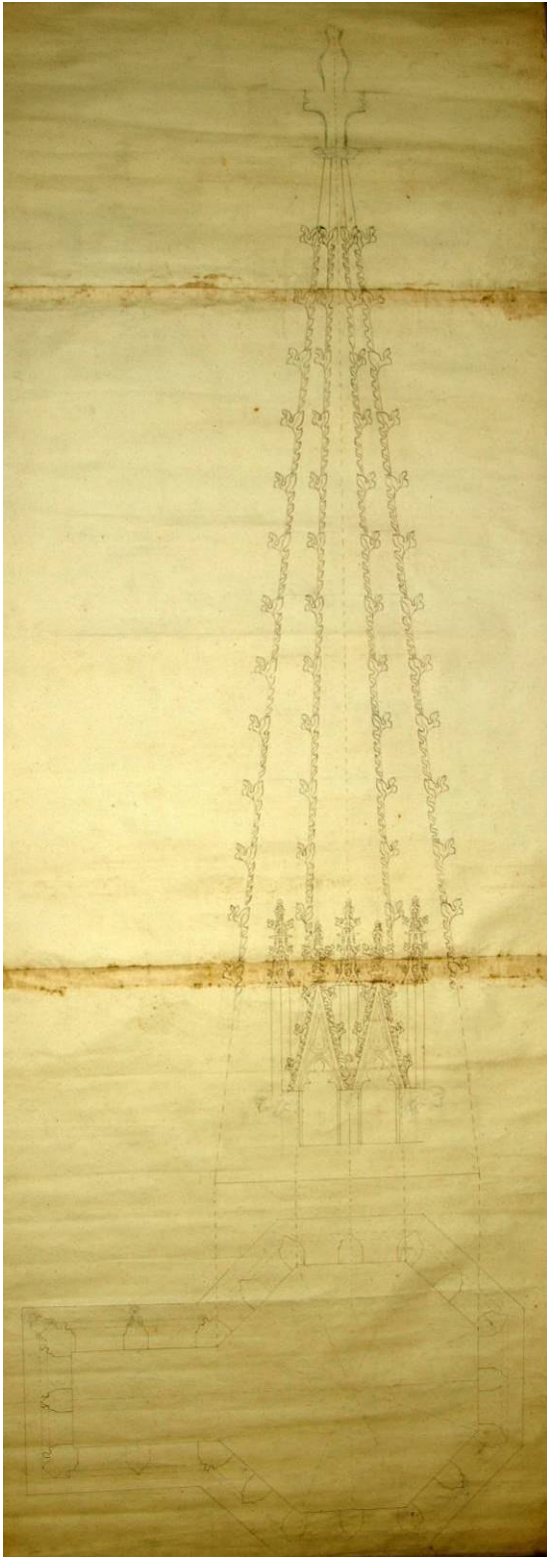


Figure 41: Elevation and section of north buttress and turret with detail, 1840s (YML/3/12)

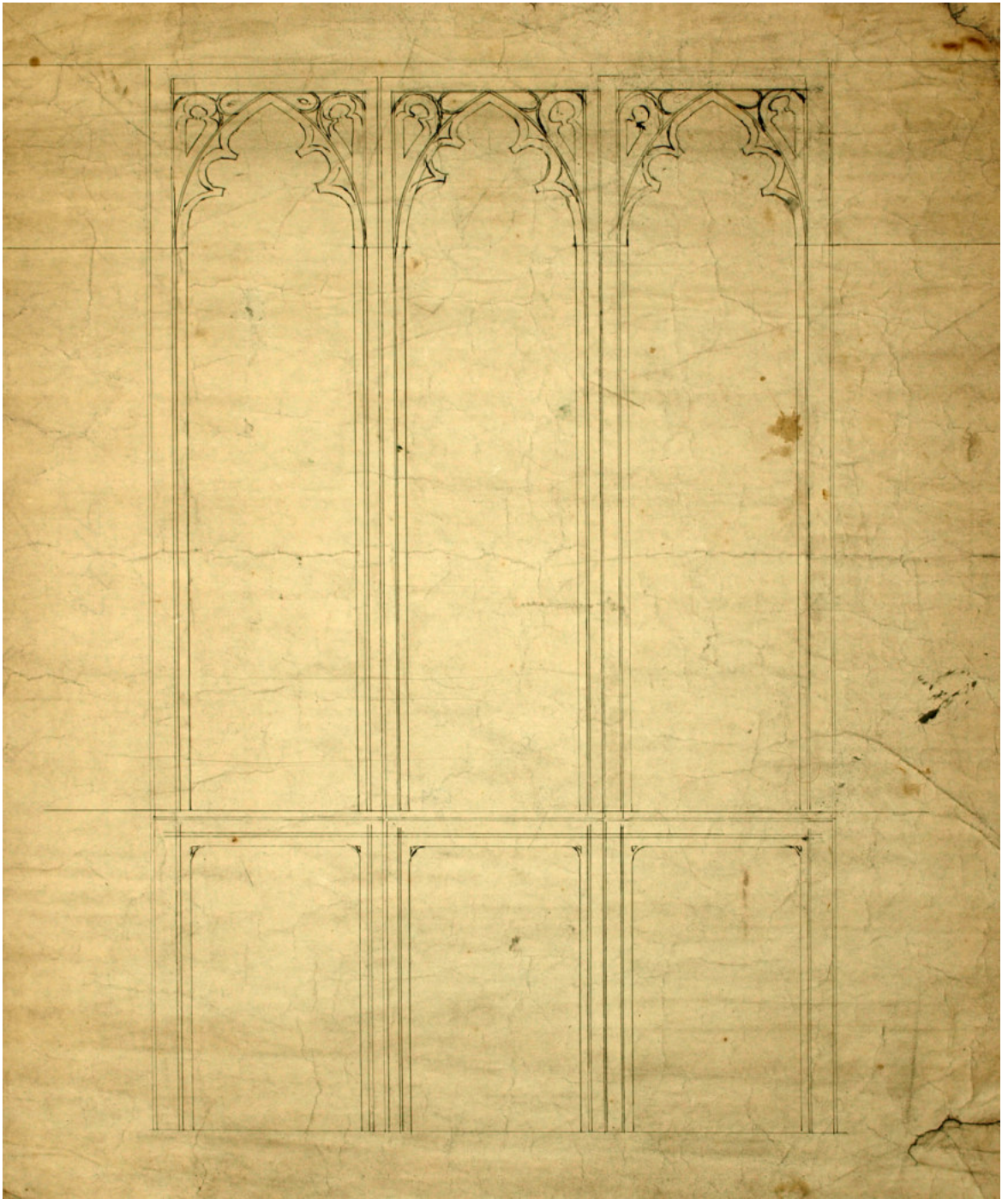


Figure 42: Elevation drawing of clerestory screenwork, 1840s (YML/31/49)

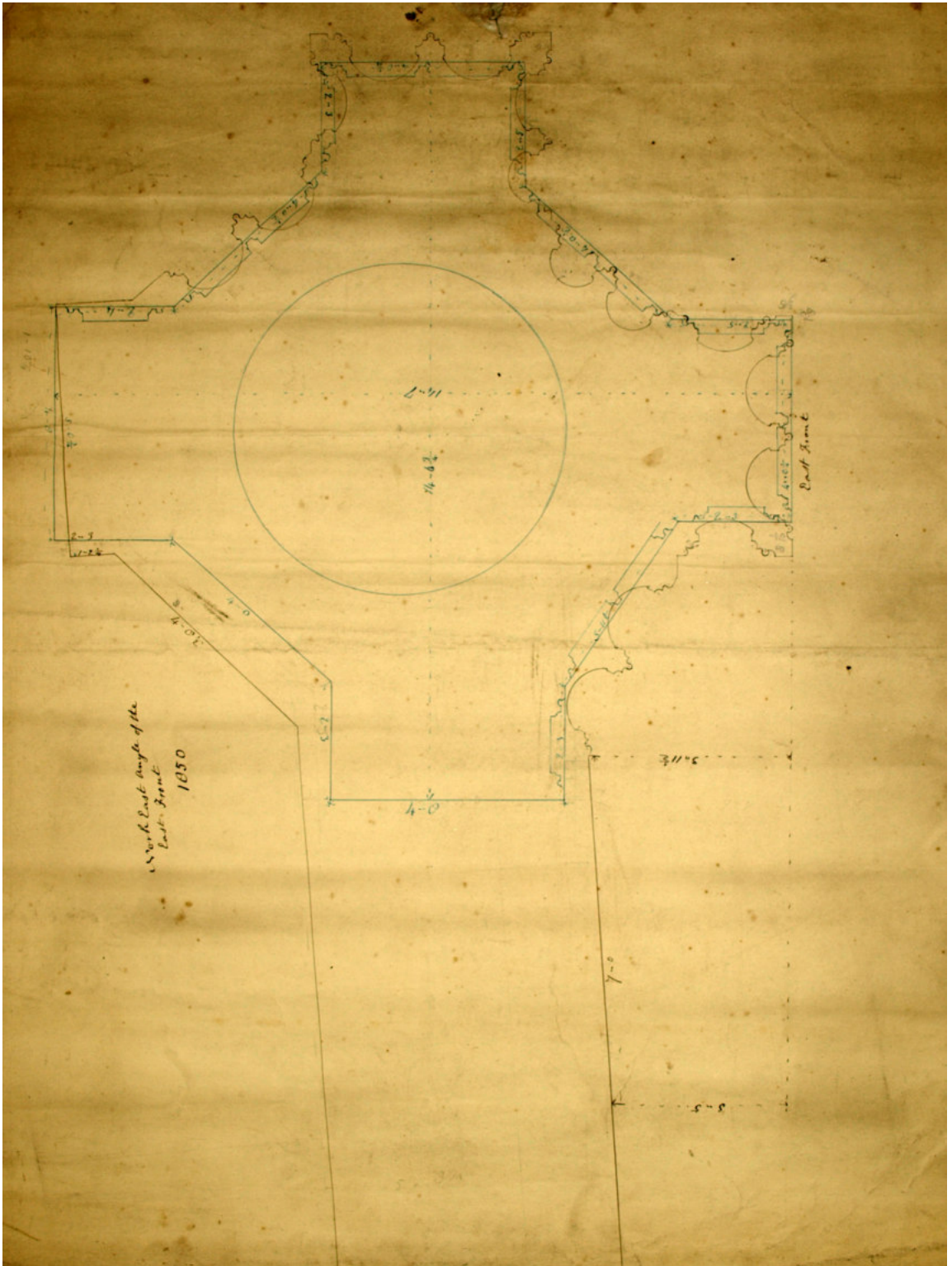


Figure 43: Section through north-east turret, 1850 (YML/3/7)

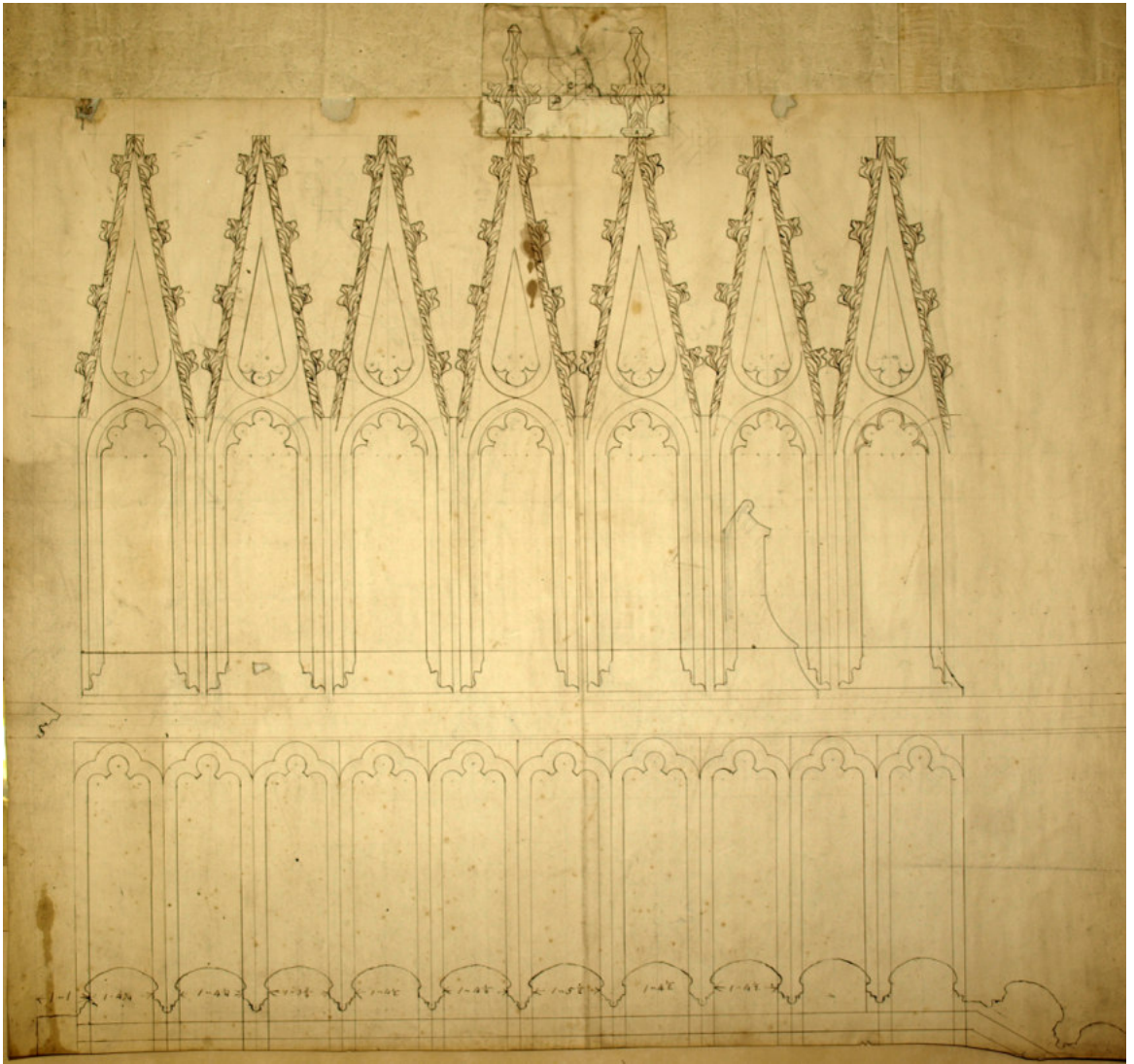


Figure 44: Elevation of north-aisle parapet gables and arcading, c.1850 (YML/3/14)

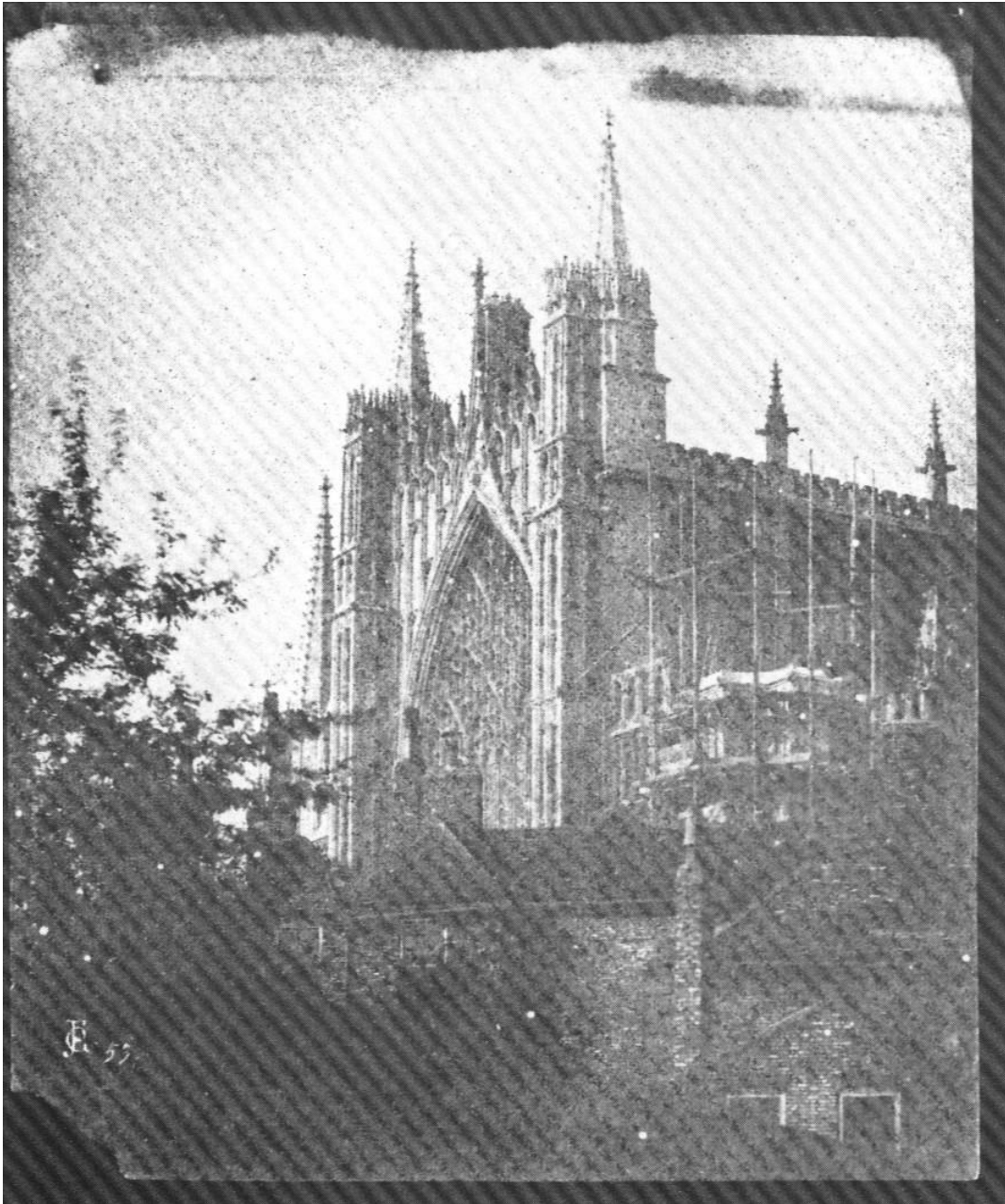


Figure 45: The East Front from the north-east by George Fowler-Jones, 1853 (Murray 1986, 72)

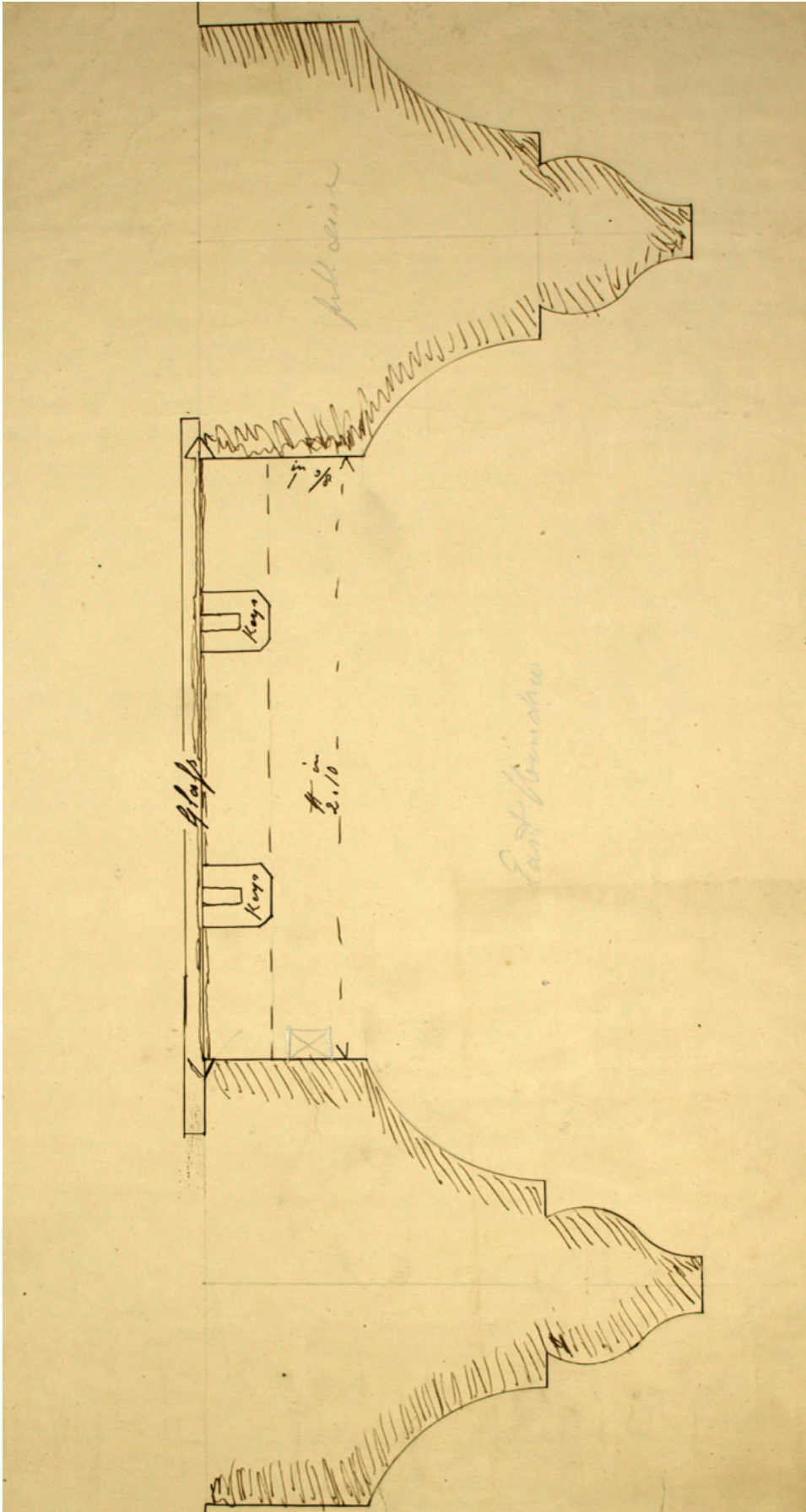


Figure 46: Design for protective glazing of the Great East Window, 1862 (YML/3/40)

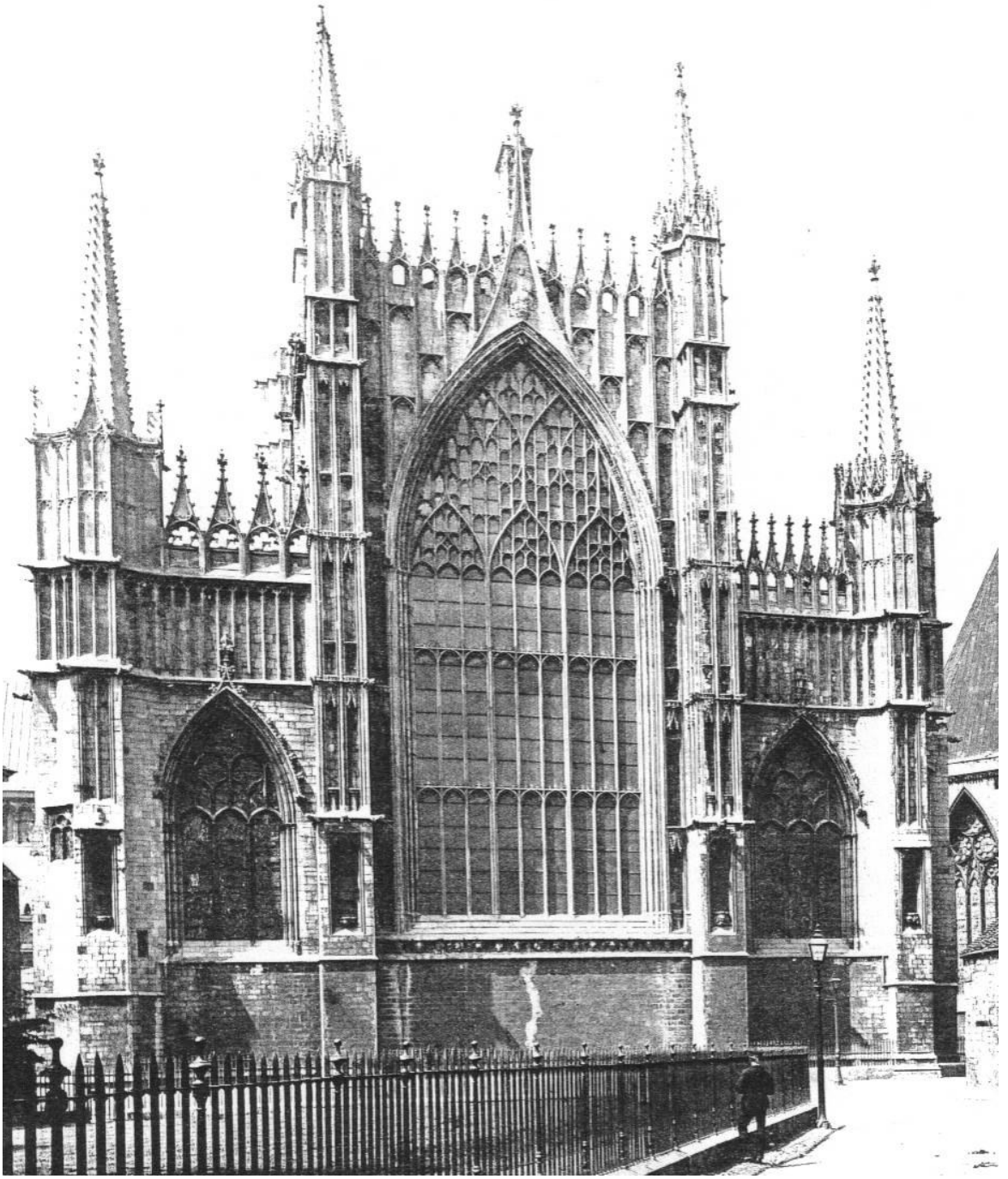


Figure 47: The East Front, Francis Frith 1871. Note recent re-pointing beneath the Great East Window (Murray 1986, 60)

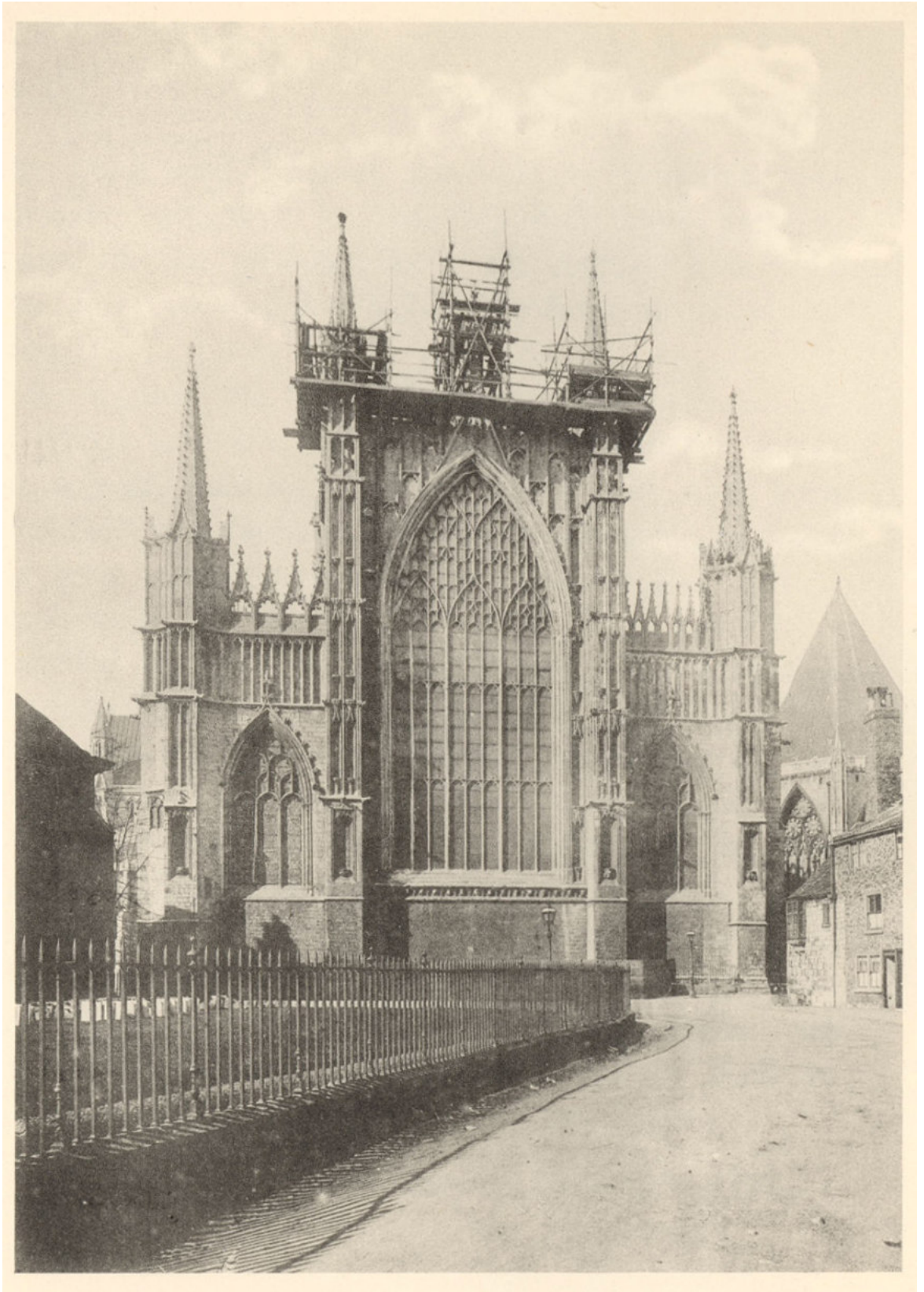


Figure 48: The East Front, 1899 (Purey-Cust 1899b, facing page 2)

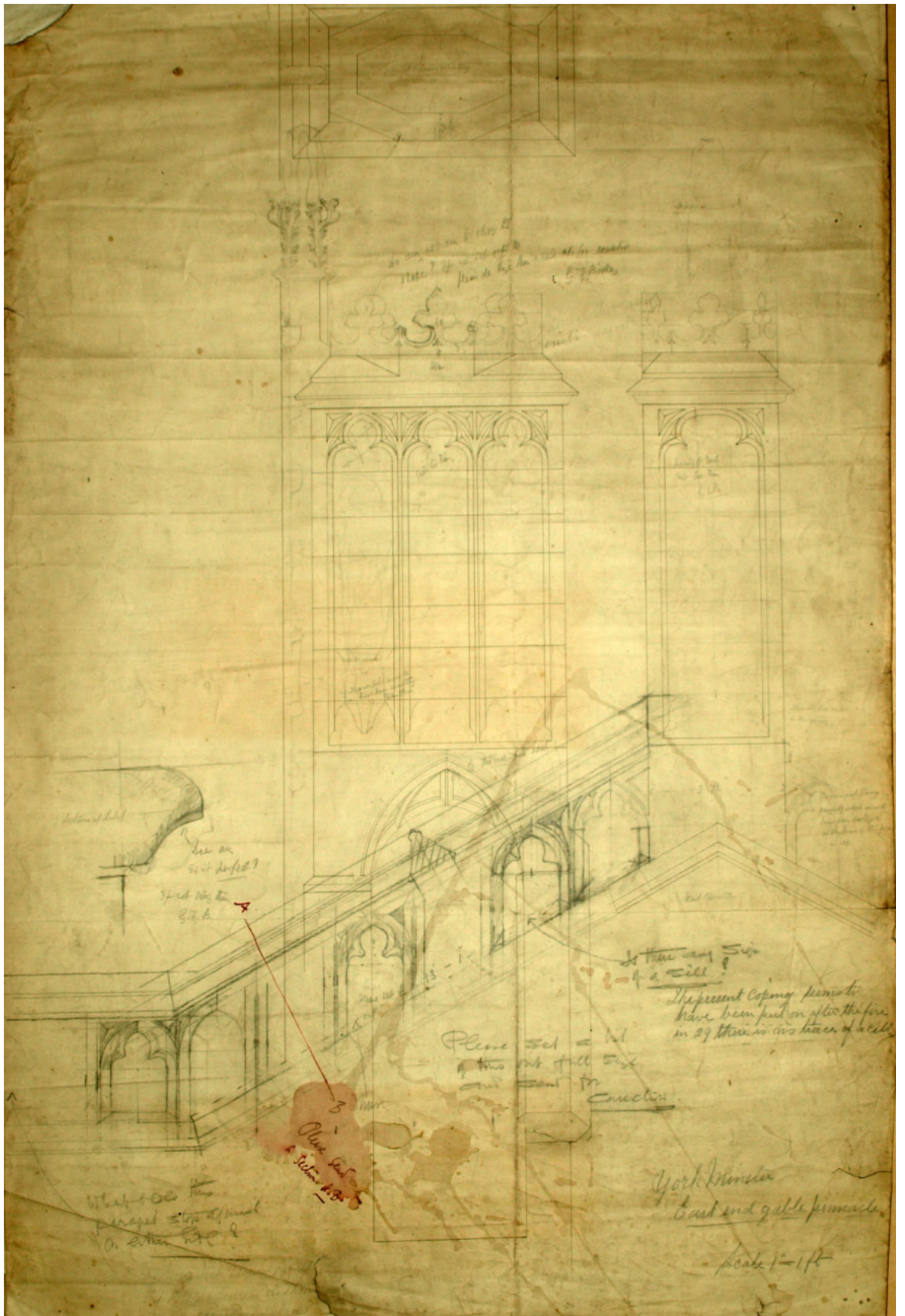


Figure 49: Drawing for East Front parapet renewal, GF Bodley c.1899 (YML/3/38)



Figure 50: East Front parapet looking south, c.1899 (YML/APYM/A58)

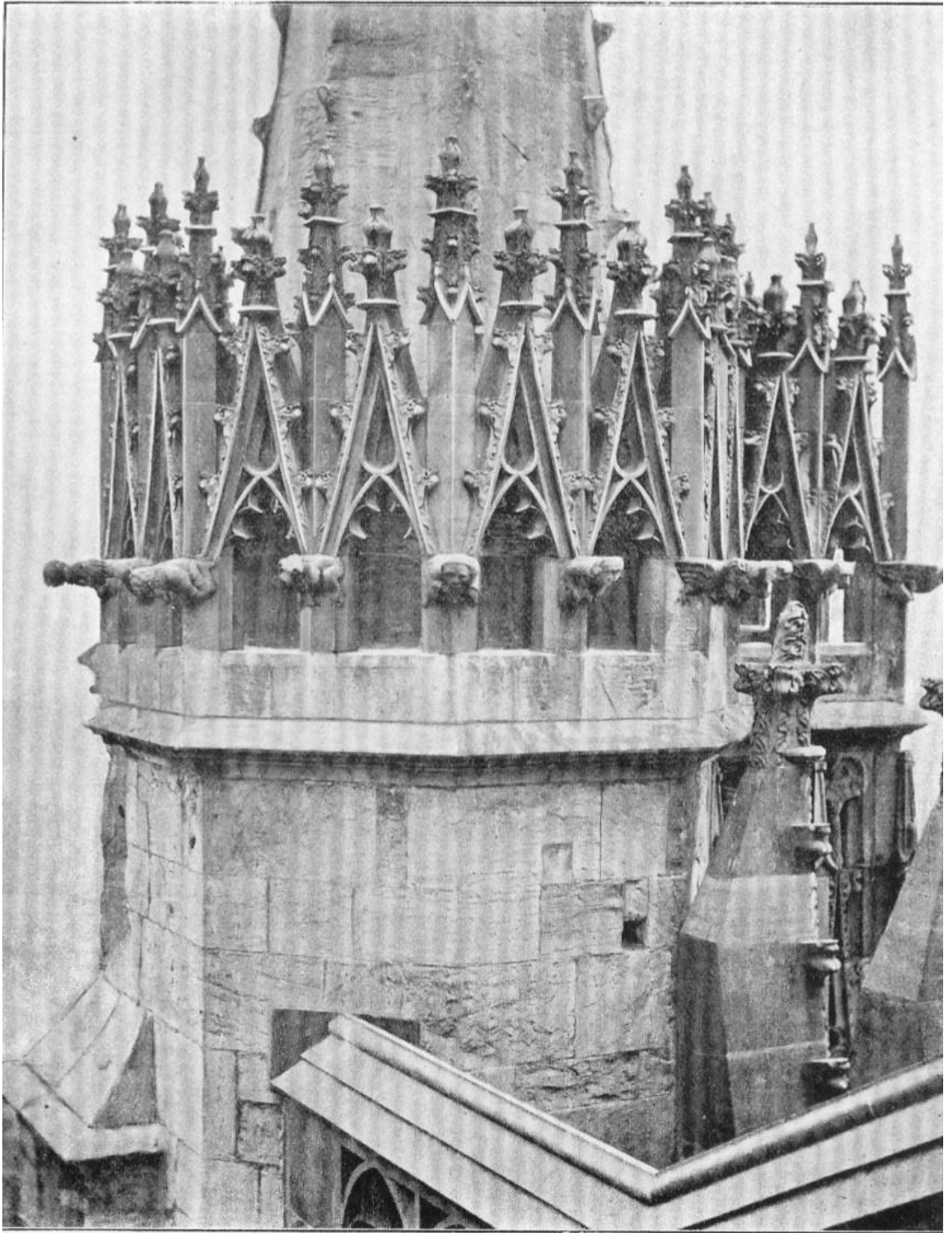


Figure 51: East Front, north-east parapet after renewal (Purey-Cust 1901, 9)

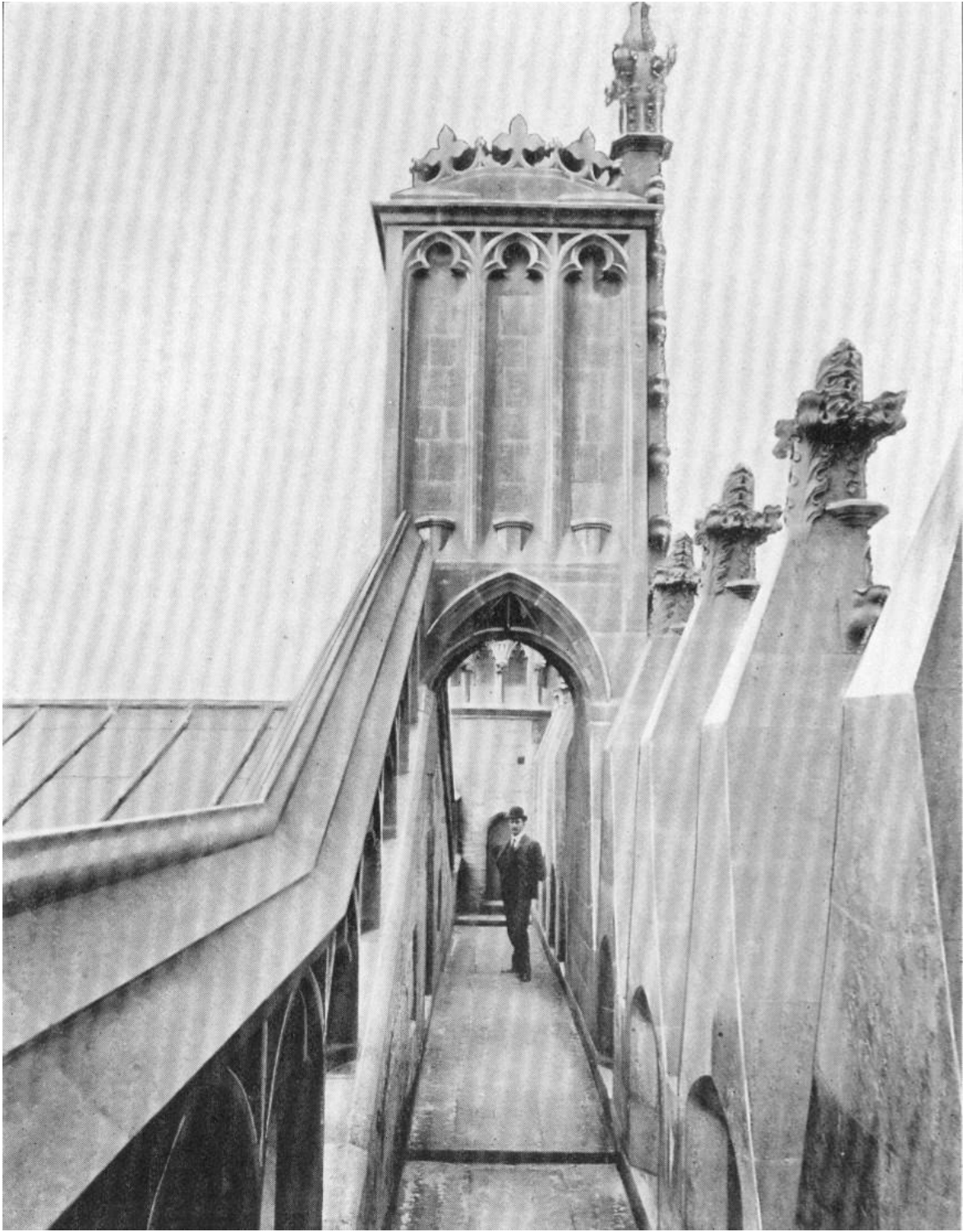


Figure 52: East Front parapet looking north after renewal (Purey-Cust 1901, 11)

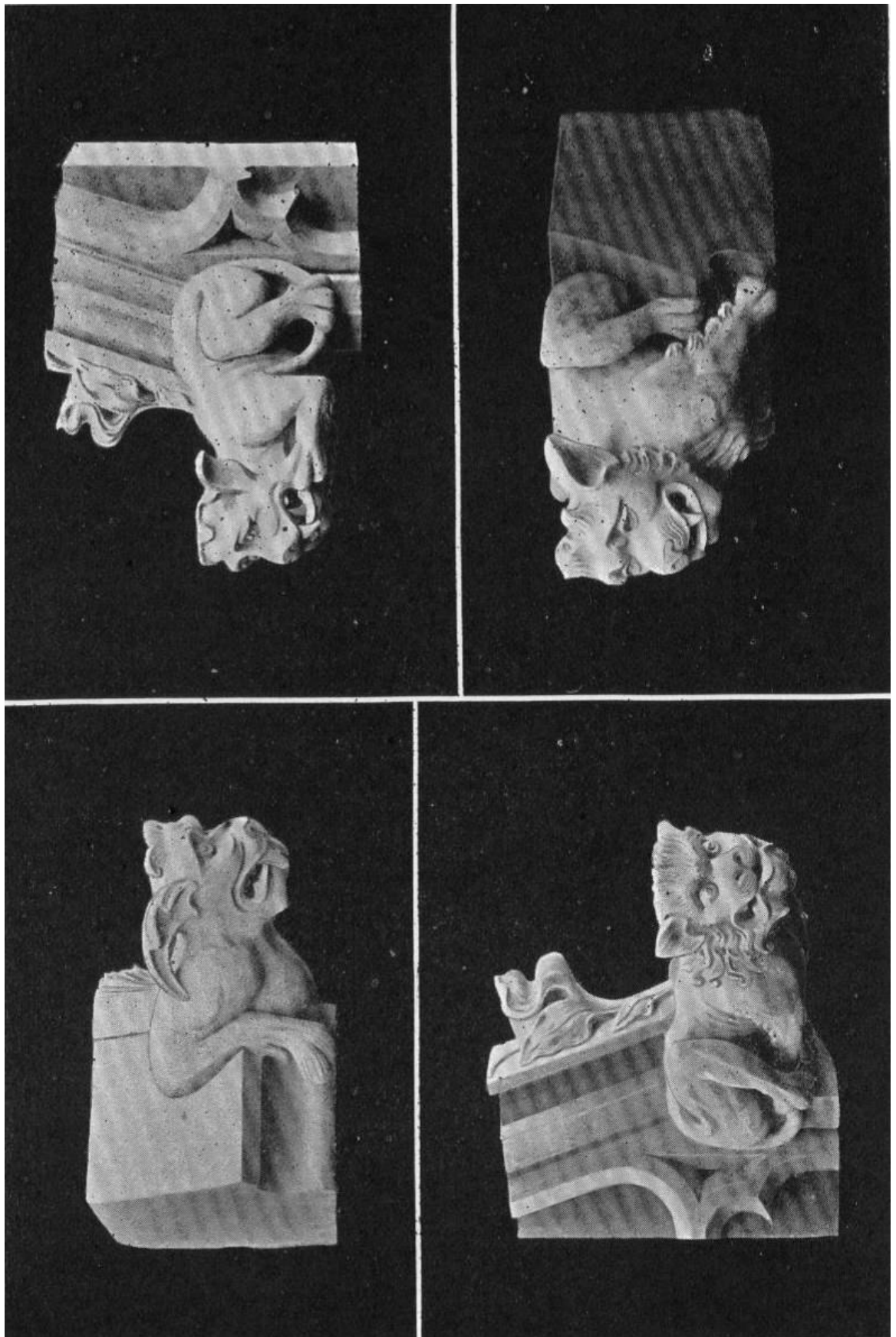


Figure 53: Examples of c.1900 carved work (Purey-Cust 1901, 21)



Figure 54: Sill carvings beneath Great East Window before renewals, Nos. 1-2 (YM Stoneyard)



Figure 55: Sill carvings beneath Great East Window before renewals, Nos. 3-4 (YM Stoneyard)



Figure 56: Sill carvings beneath Great East Window before renewals, Nos. 5-6 (YM Stoneyard)



Figure 57: Sill carvings beneath Great East Window before renewals, Nos. 7-8 (YM Stoneyard)

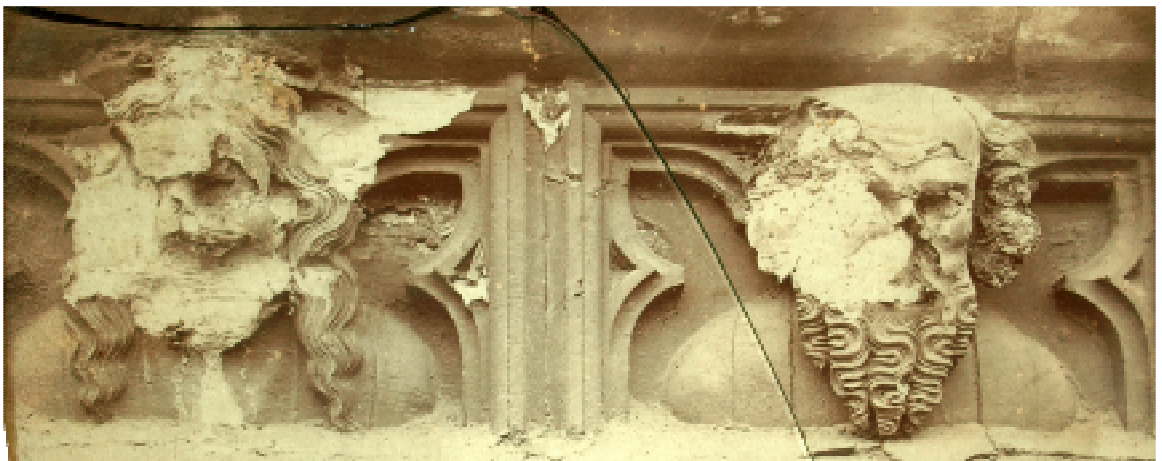


Figure 58: Sill carvings beneath Great East Window before renewals, Nos. 9-10 (YM Stoneyard)



Figure 59: Sill carvings beneath Great East Window before renewals, Nos. 11-12 (YM Stoneyard)



Figure 60: Sill carvings beneath Great East Window before renewals, Nos. 13-14 (YM Stoneyard)



Figure 61: Sill carvings beneath Great East Window before renewals, Nos. 15-16 (YM Stoneyard)



Figure 62: Sill carving beneath Great East Window before renewals, No. 17 (YM Stoneyard)



Figure 63: The East Front, 1940s (NMR B47/7920)



Figure 64: The East Front during the 1950s repairs (YML/APYM/A55)



Figure 65: Great East Window exterior voussoirs, north side 1955 (YML/APYM/A57ii/14)



Figure 66: Great East Window exterior voussoirs, north side 1955 (YML/APYM/A57ii/14)



Figure 67: Great East Window exterior voussoirs, south side 1955 (YML/APYM/A57ii)



Figure 68: Great East Window exterior voussoirs, north side 1955 (YML/APYM/A57ii/14)



Figure 69: Great East Window exterior voussoirs, south side 1955 (YML/APYM/A57ii/14)



Figure 70: Great East Window exterior voussoirs, apex 1955 (YML/APYM/A57ii/14)

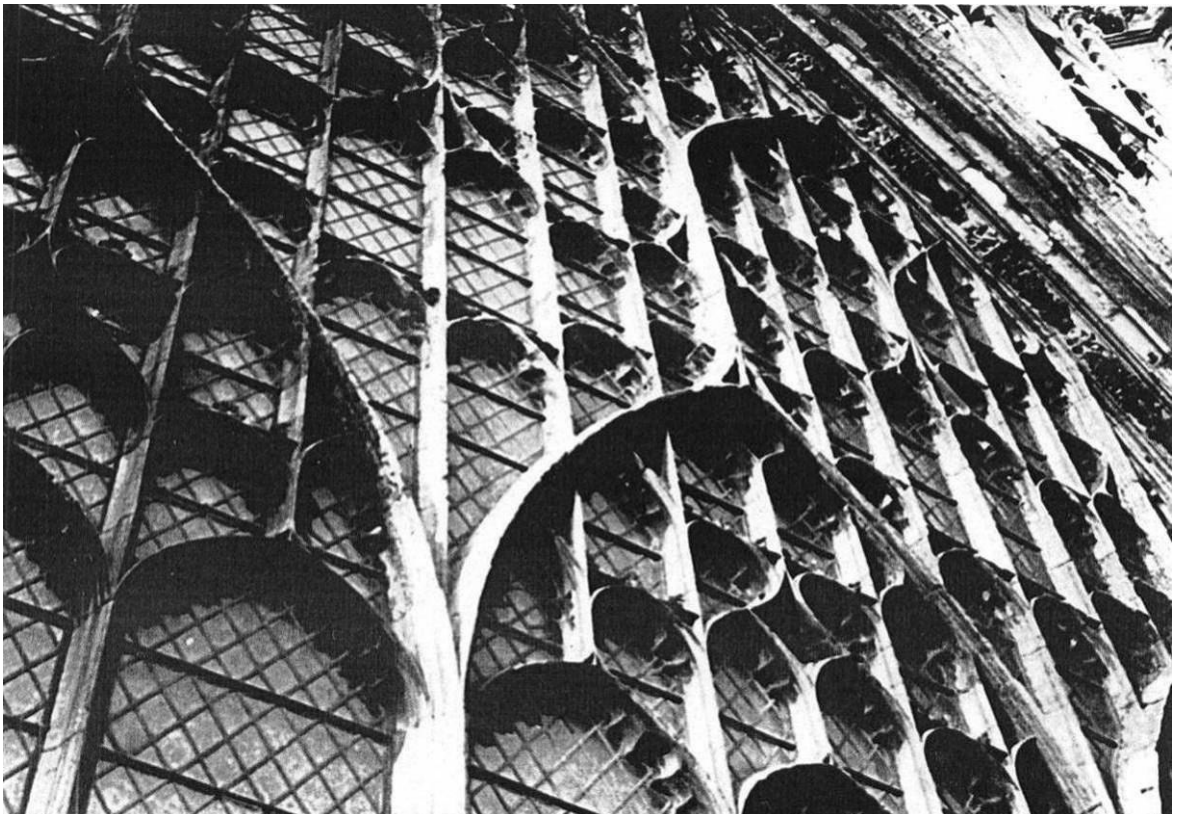


Figure 71: Great East Window tracery and voussoirs, 1955 (YML/APYM/A40)



Figure 72: Seated figure in Great East Window apex-niche, 1955 (YML/APYM/A57iii/14)



Figure 73: Seated figure in Great East Window apex-niche, 1955 (YML/APYM/A57iii)



Figure 74: East Front, grotesque detail, 1954 (YML/APYM/A57iv/S3)



Figure 75: East Front, south parapet detail, 1954 (YML/APYM/A57iv/S15)



Figure 76: East Front, buttress-console detail, 1955 (YML/APYM/A57iv/C1+)



Figure 77: East end grotesque, 1950s (YML/APYM/A57iv/S4-28)



Figure 78: East Front, south-east turret window, 1955 (YML/APYM/A57v)



Figure 79: East end, bay 1 of the north clerestory, 1954 (YML/APYM/A71)



**Figure 80: East Front, south buttress, turret and pinnacle from the south, 1950s
(YML/APYM/A57iv)**

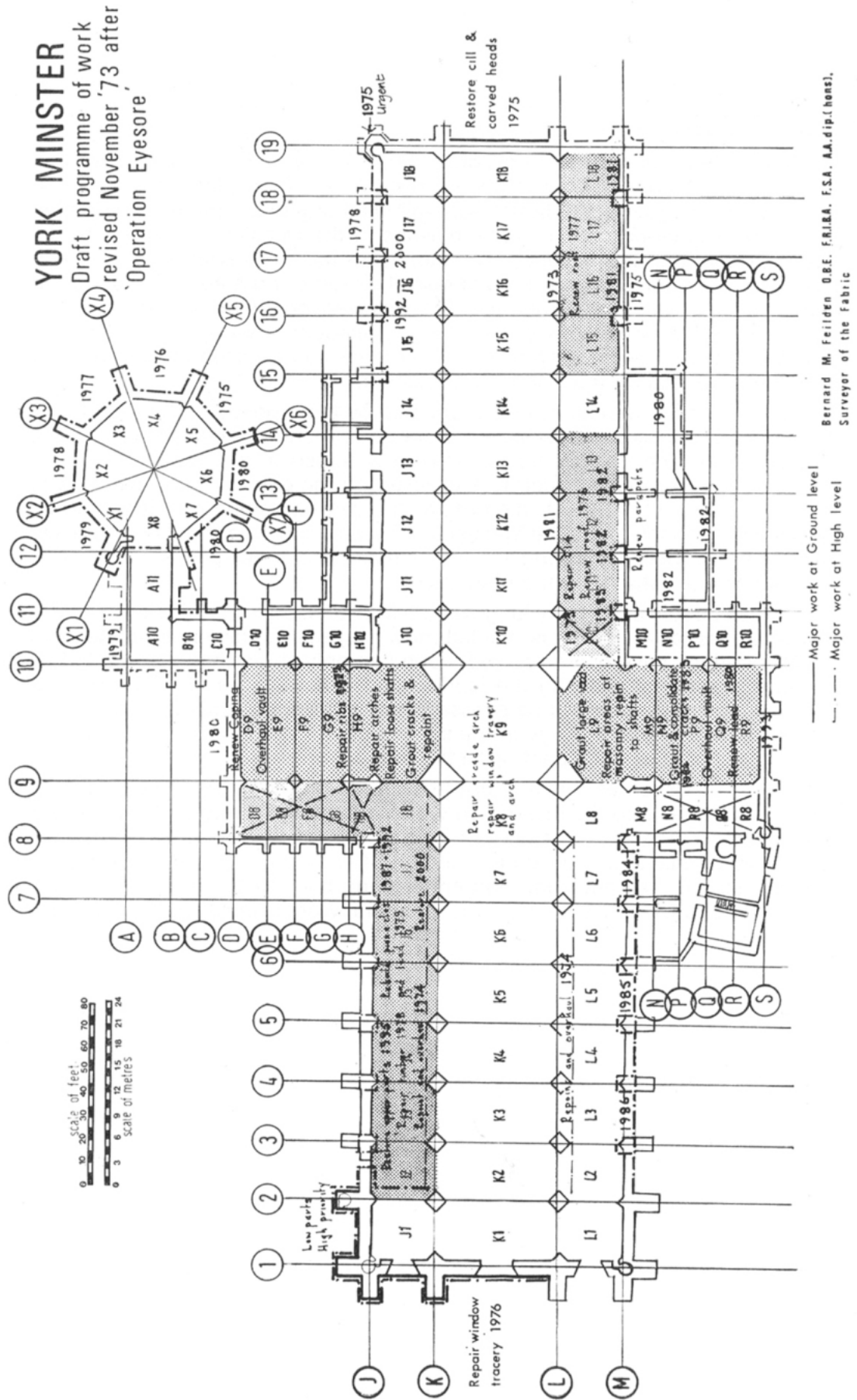


Figure 81: Draft programme of works to York Minster, November 1973 (revised) (Feilden 1976, 62)

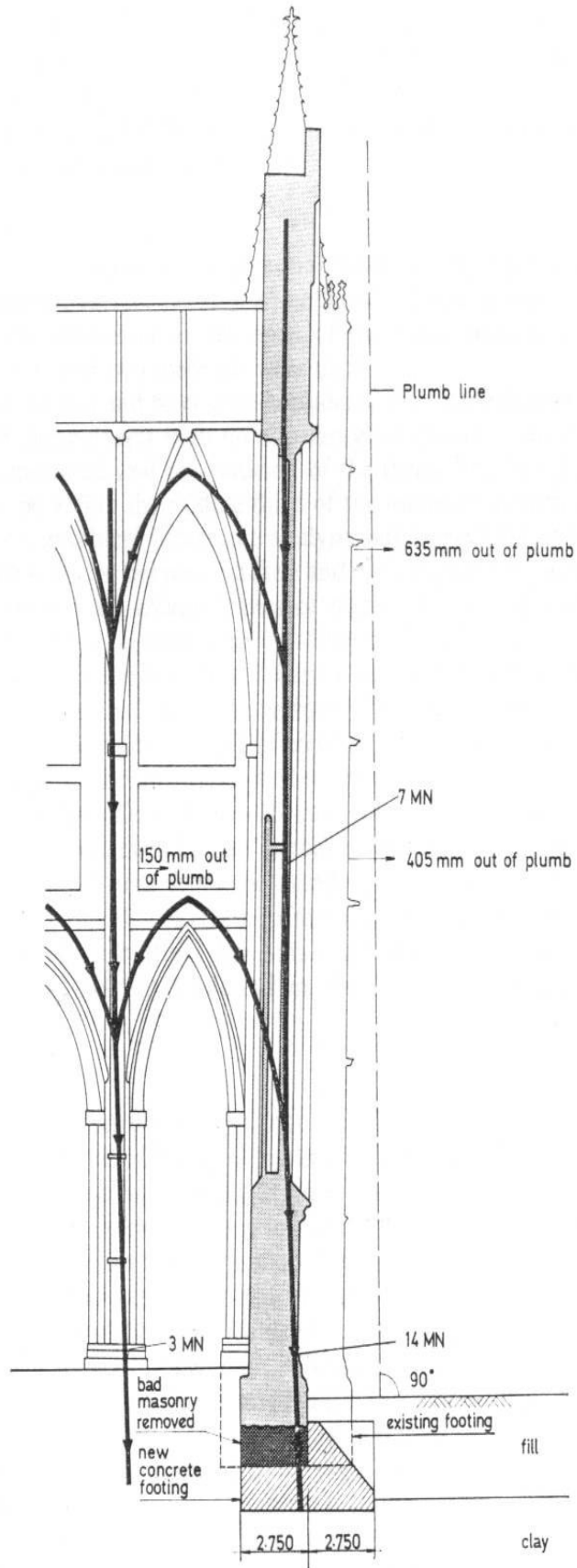


Figure 82: East Front section and plan showing thrusts, movements and new footings (Dowrick and Beckmann 1971, 138, Figure 31)

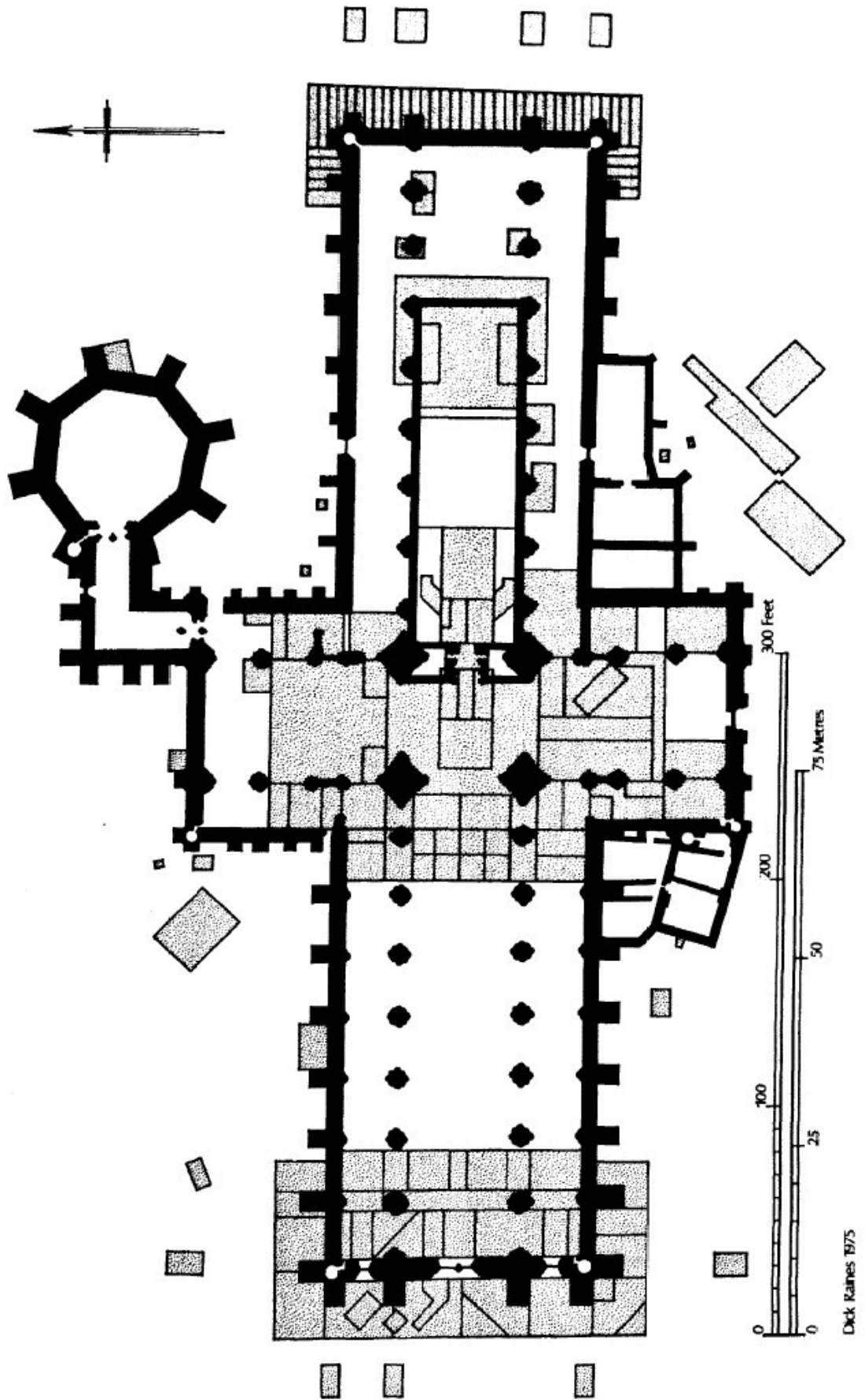


Figure 83: Extent of excavations in York Minster 1967-1973 (Phillips 1976, 56, Figure 19)

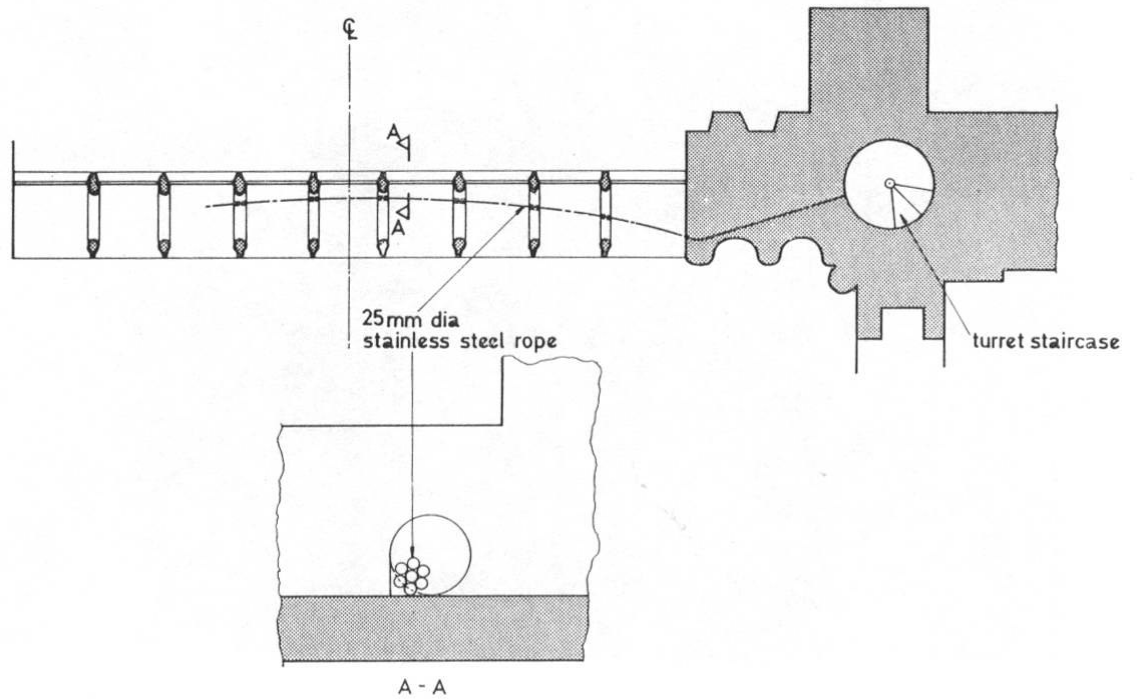


Figure 84: Plan showing strengthening system applied to Great East Window (Dowrick and Beckmann 1971, 141, Figure 33)



Figure 85: Sill carvings beneath Great East Window showing dark sulphation and structural cracking (Feilden 1976, 89)

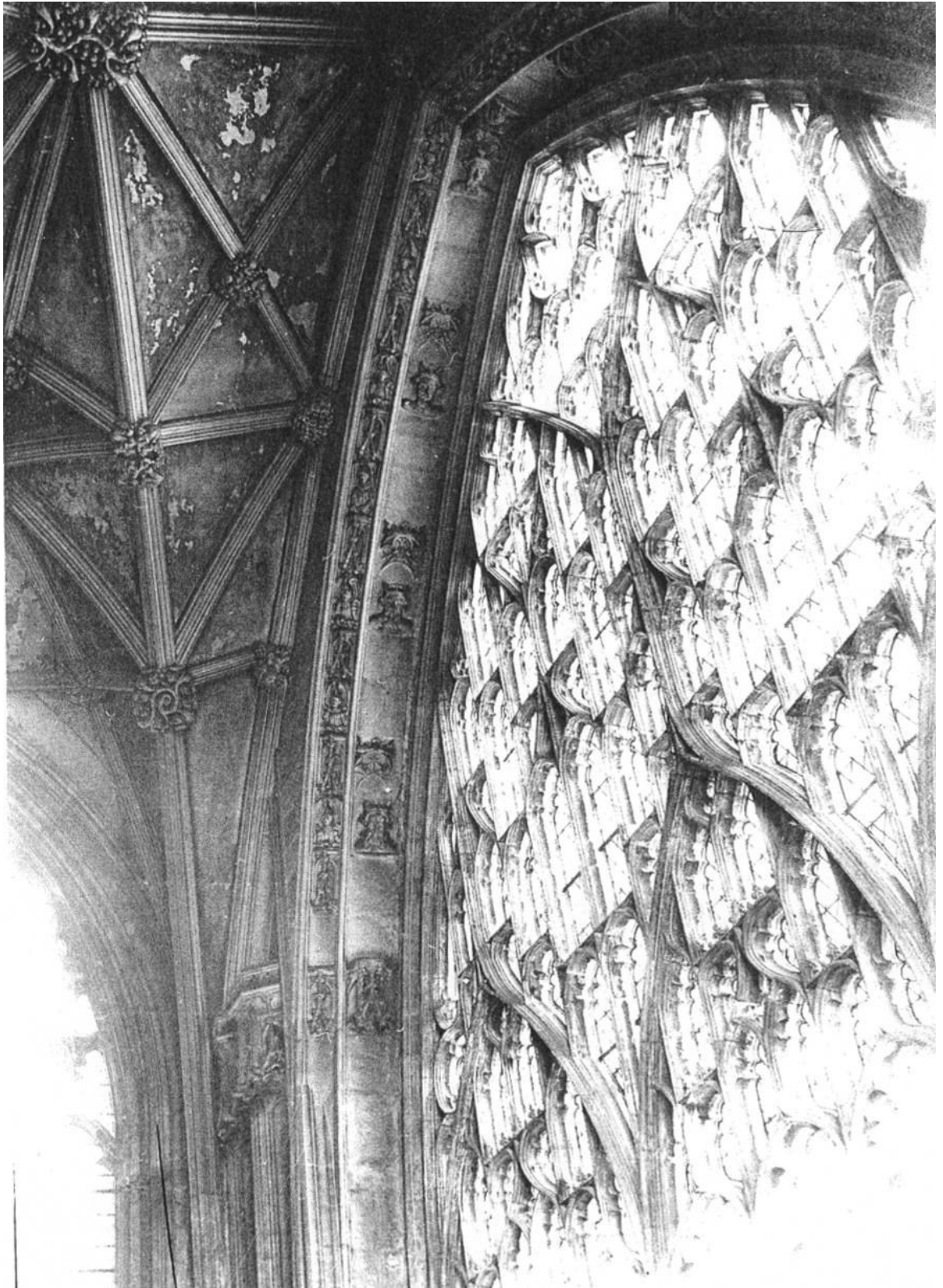


Figure 86: Great East Window arch, interior, 1942 (NMR A42/4742)

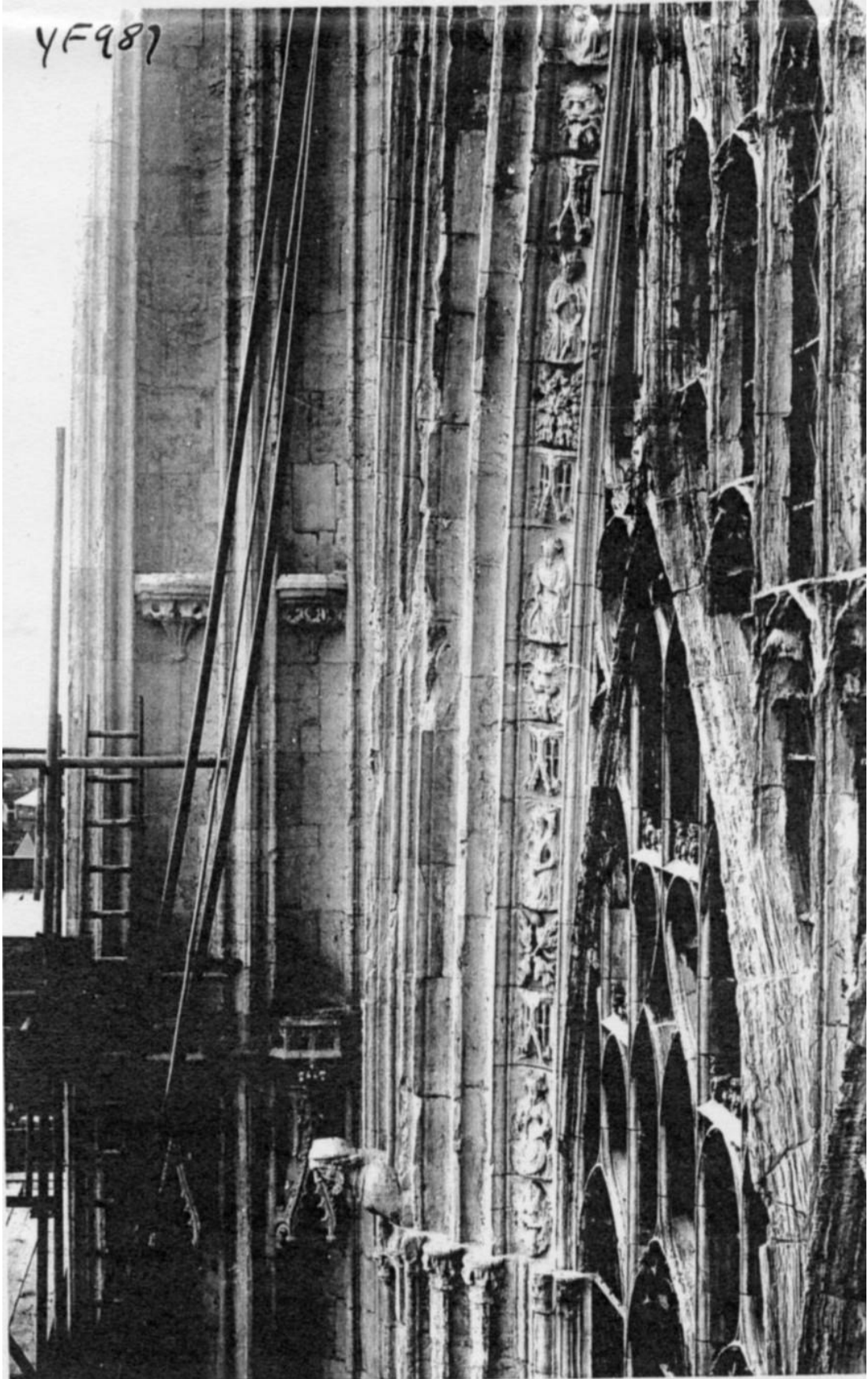


Figure 87: Great East Window, south side after cleaning, 20 September 1971 (NMR AA71/4217)

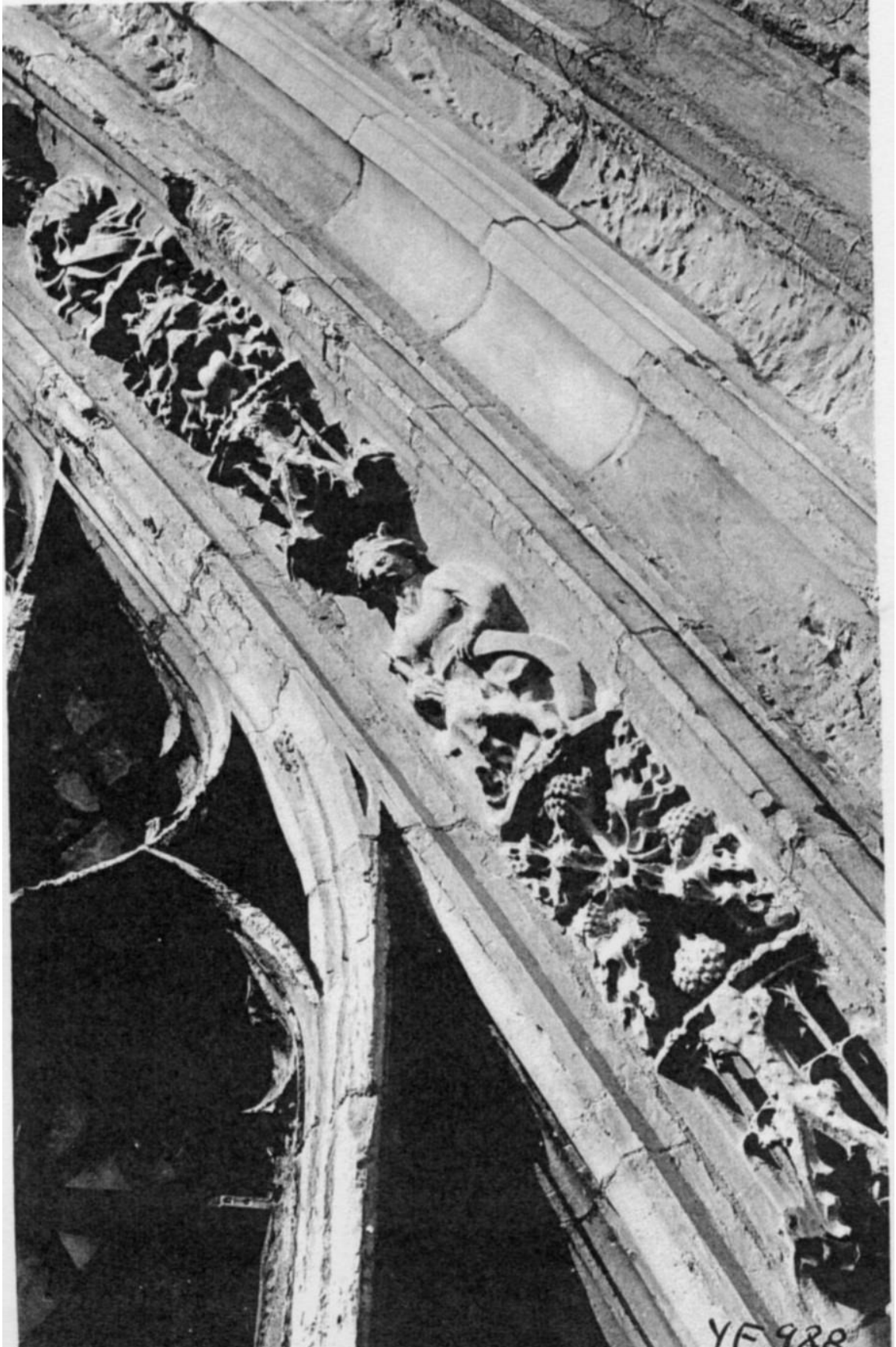


Figure 88: Great East Window exterior voussoirs after cleaning, 20 September 1971 (NMR AA71/4216)



Figure 89: Great East Window, exterior voussoir after cleaning, north side at springing point of arch, September 1971 (NMR YM/5200)



**Figure 90: Great East Window interior, voussoirs and busts on south side, 1970
(YML/YMSP/777)**



Figure 91: Crowned bust on south side, Great East Window interior, 1970 (YML/YMSP/778)



**Figure 92: Great East Window interior, voussiors and busts on south side, 1970
(YML/YMSP/780)**



Figure 93: Great East Window exterior, south side of arch at springing level showing moulding change



Figure 94: Great East Window exterior, north side of arch at springing level showing moulding change

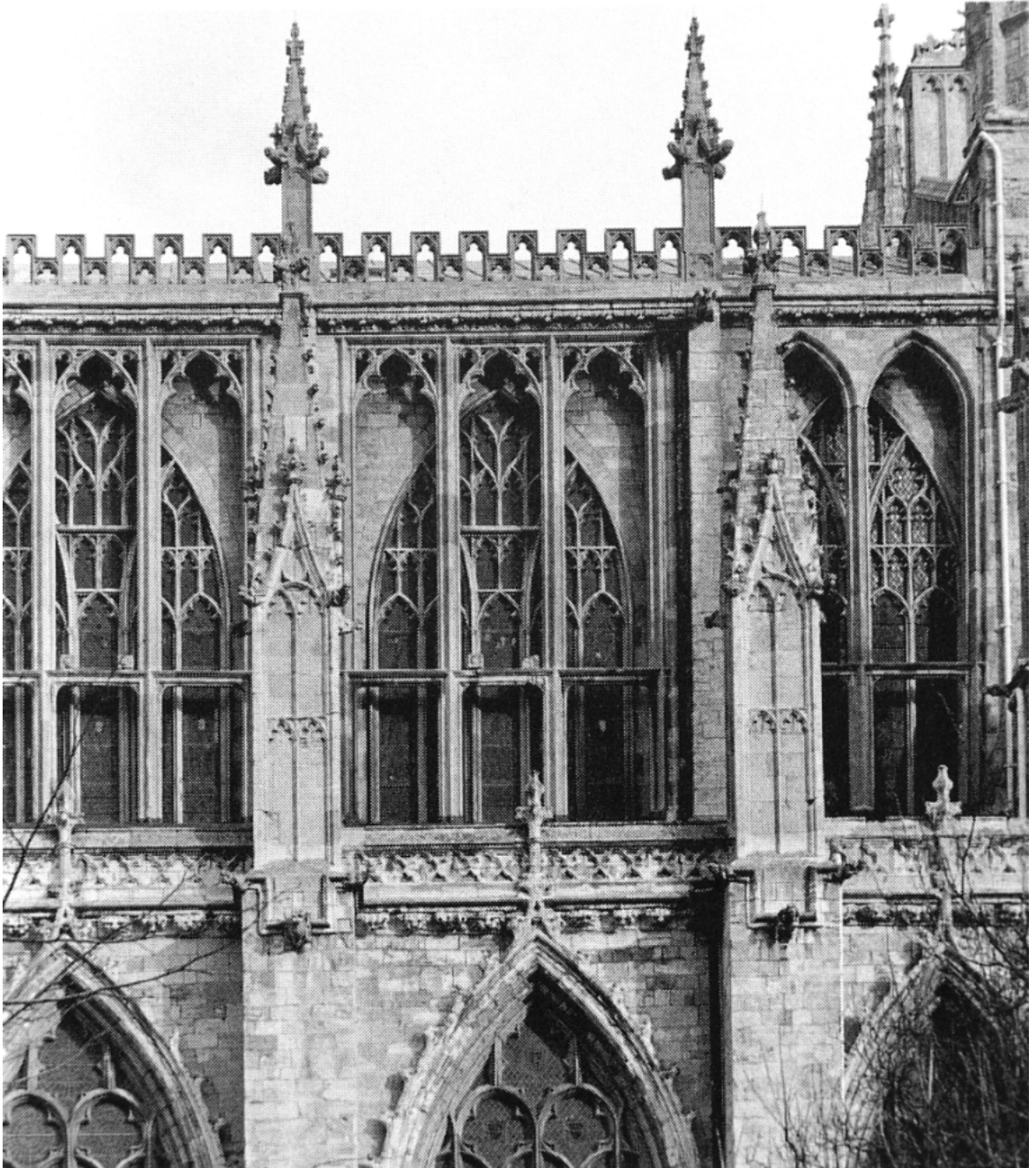


Figure 95: East end clerestory, south side showing transition in bay design (Brown 2003, 145, Figure 4.6)

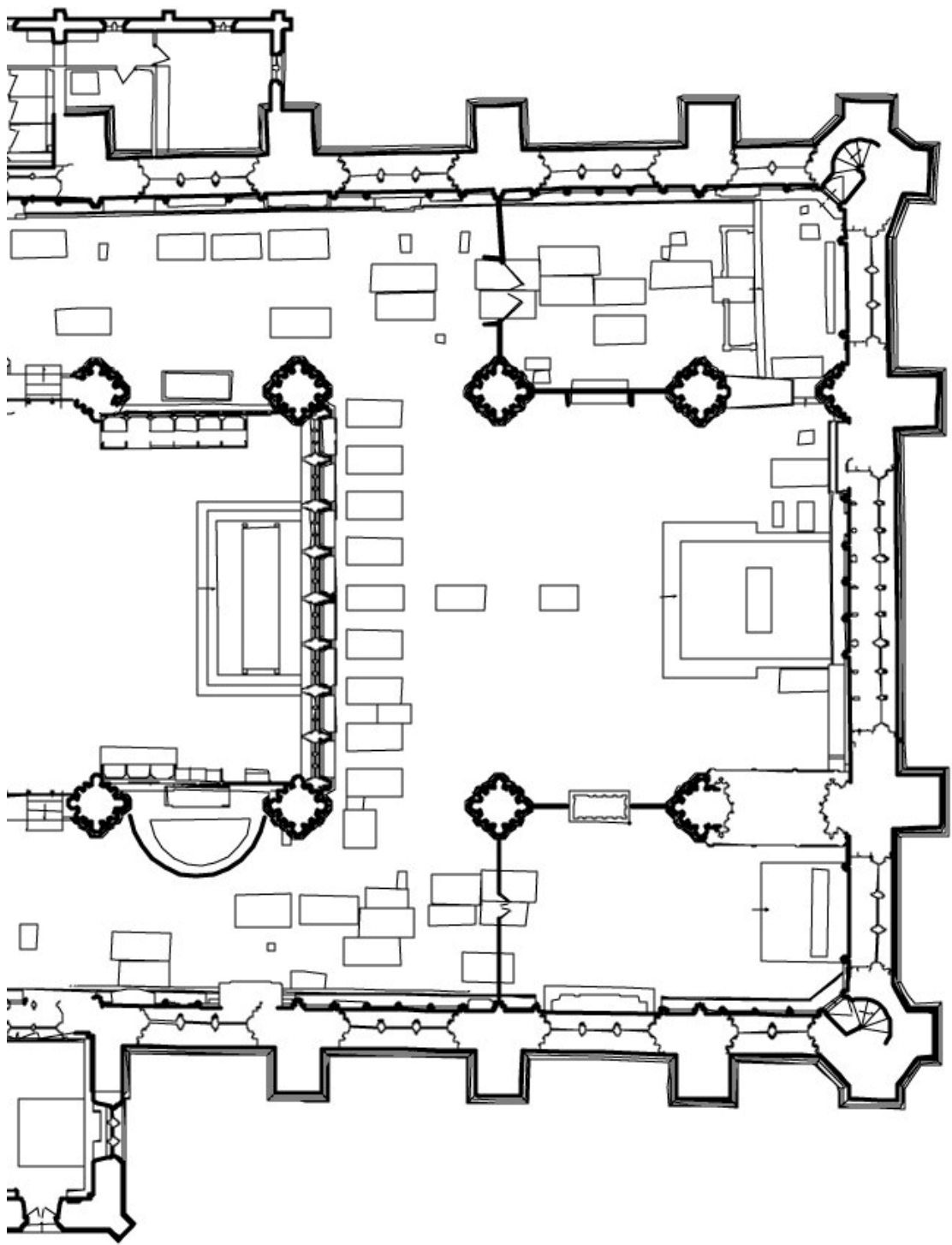


Figure 96: Plan of Thoresby's east end (Field Archaeology Specialists/Dean and Chapter of York Minster)

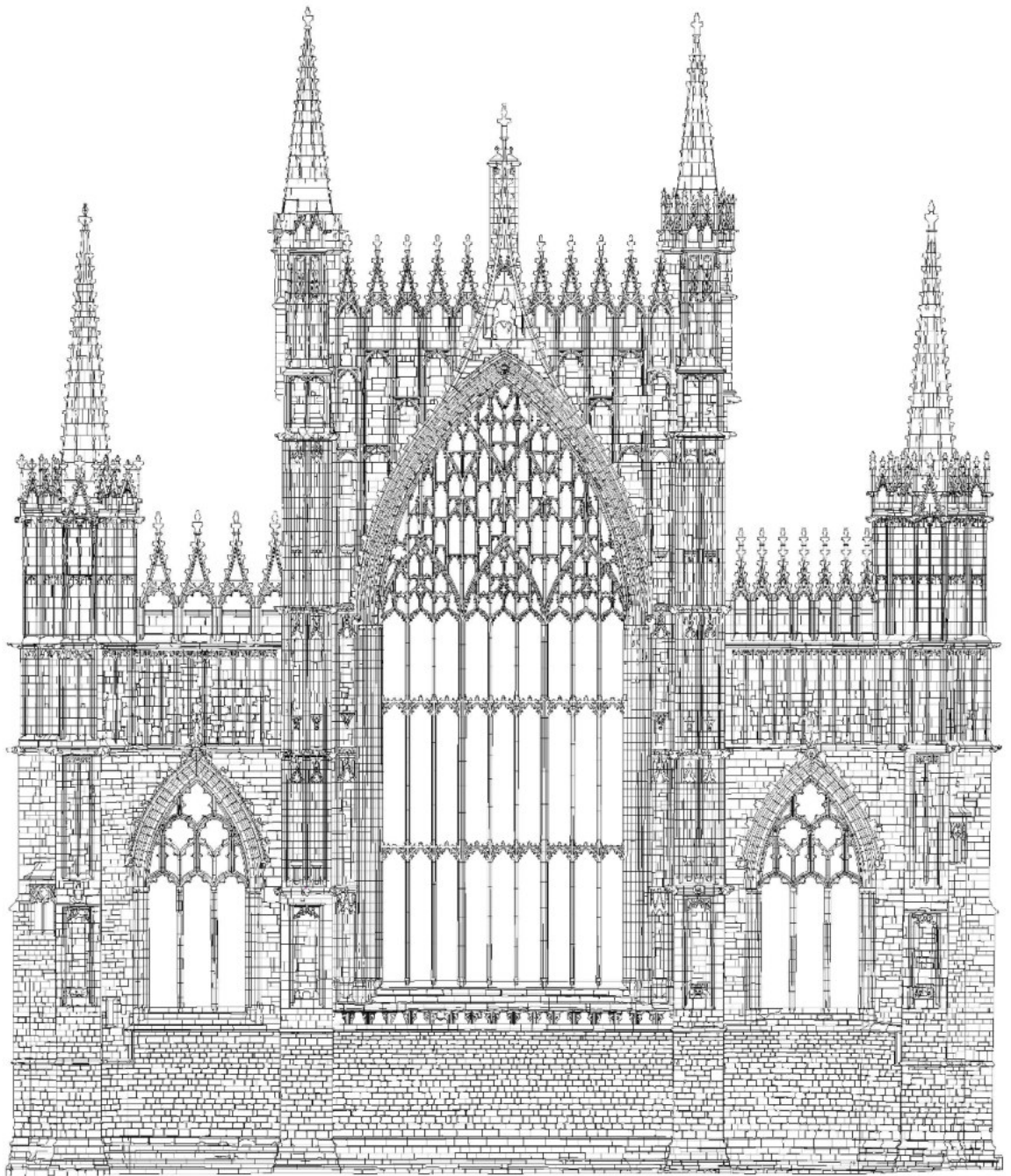


Figure 97: The East Front, 1997 photogrammetric survey (Downland Partnership/Dean and Chapter of York Minster)



Figure 98: Ely Cathedral, east end 1239



Figure 99: Lincoln Cathedral, east end 1256



Figure 100: Ripon Cathedral, east end 1288

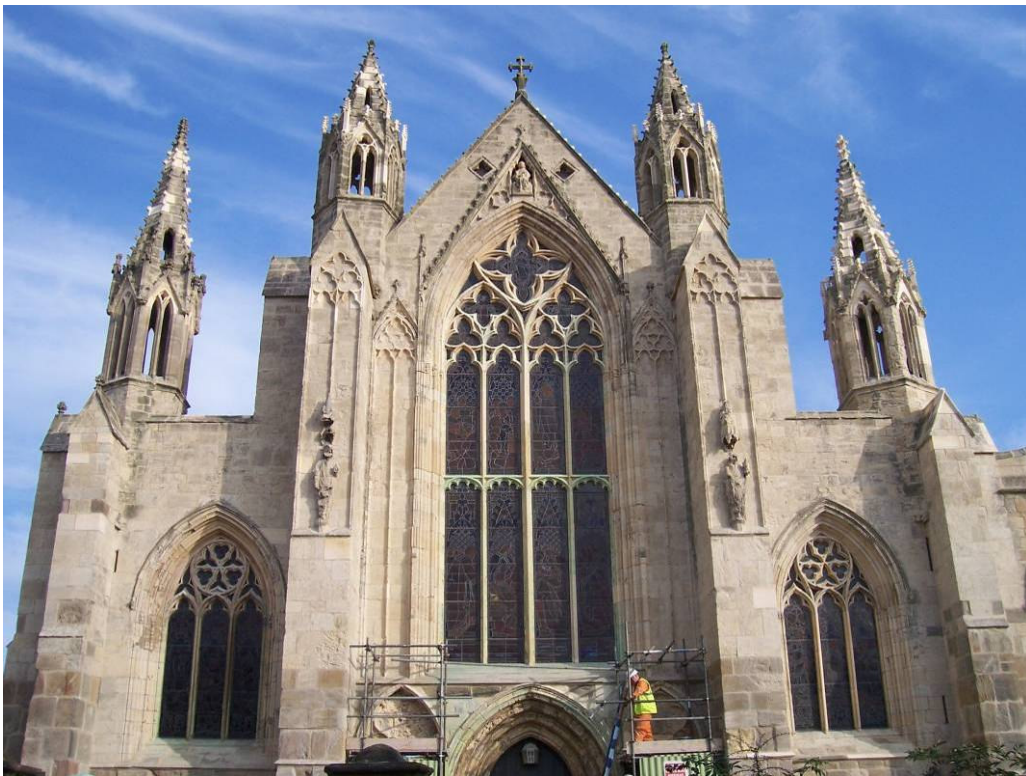


Figure 101: Howden Minster, West Front c.1300



Figure 102: Howden Minster, east end c.1320



Figure 103: Selby Abbey, east end completed by c.1350

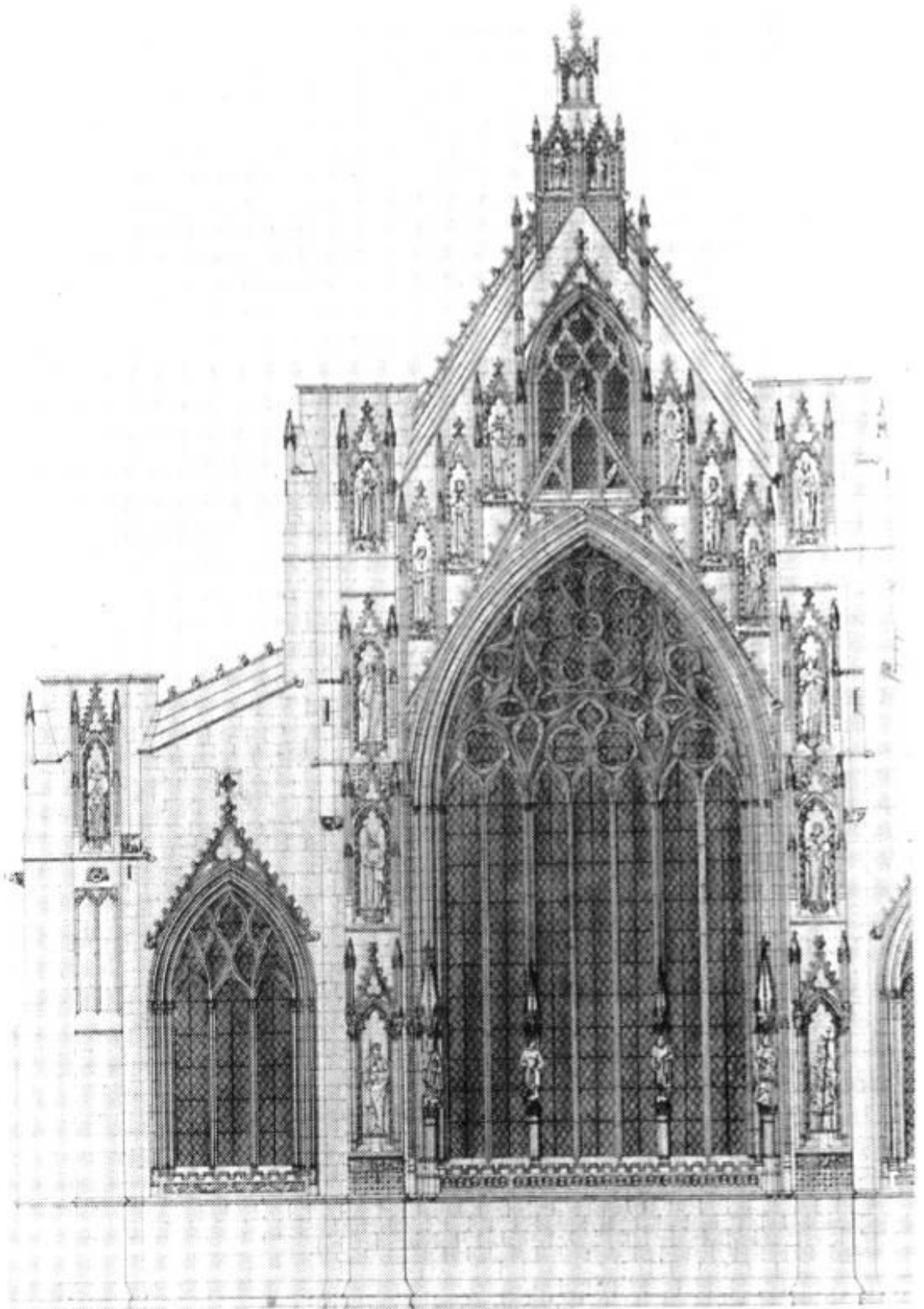


Figure 104: Howden Minster, east end as reconstructed by Edmund Sharpe (from Coldstream 1989, Figure XXA)



Figure 105: Beverley Minster, east end remodelled c.1416



Figure 106: Melrose Abbey, Scotland, east end after 1385 (Fawcett and Oram 2004, 101, Figure 26)

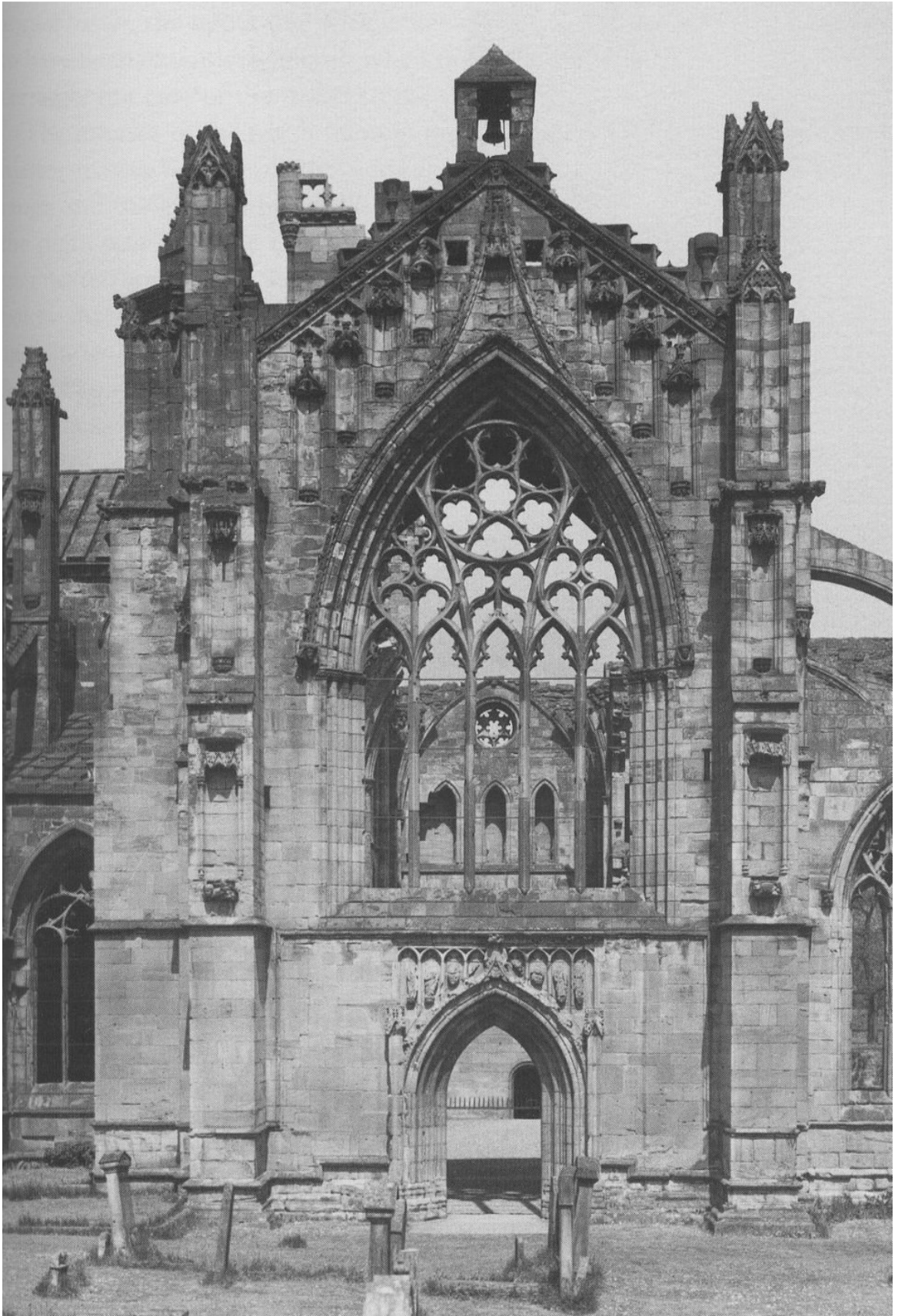


Figure 107: Melrose Abbey, south transept termination after 1385 (Fawcett and Oram 2004, 129, Figure 45)



Figure 108: Tadcaster magnesian limestone, late fourteenth century (x50 approx.)

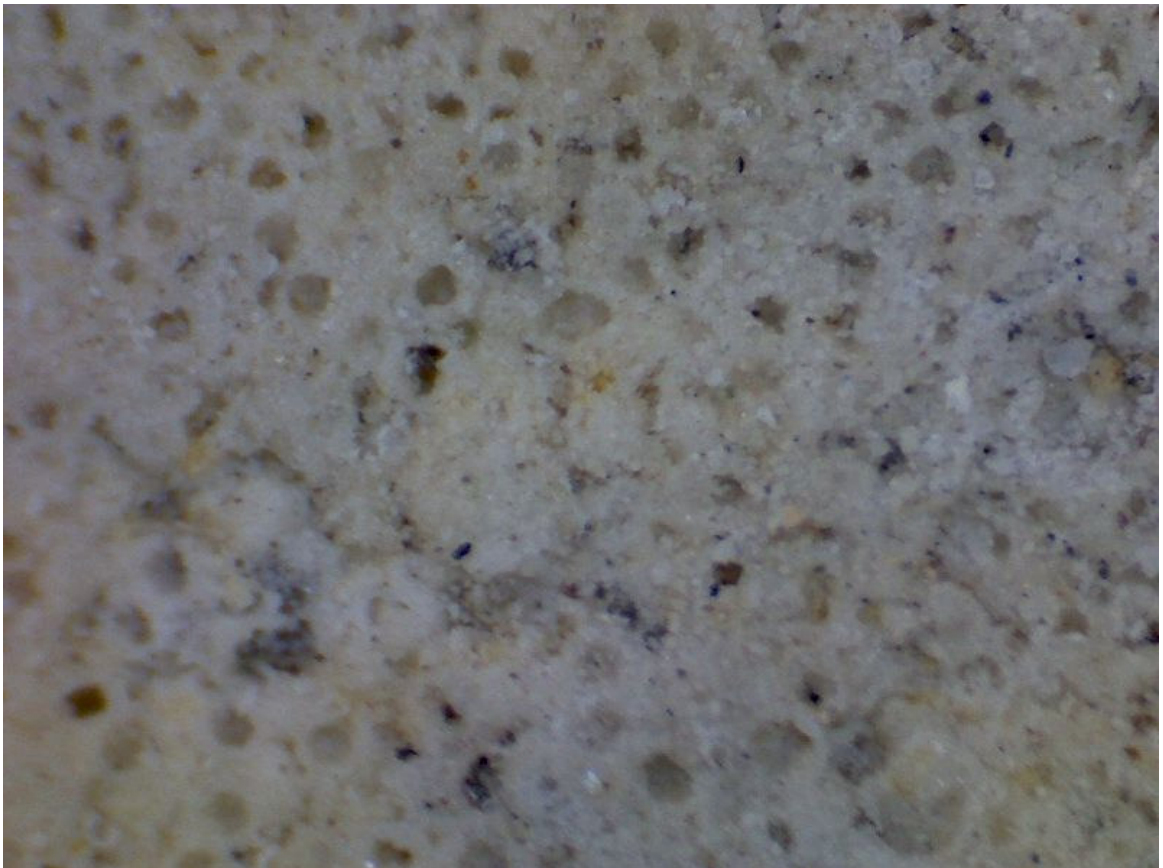


Figure 109: Tadcaster magnesian limestone, late fourteenth century (x200 approx.)



Figure 110: Tadcaster magnesian limestone, 1820s (x50 approx.)

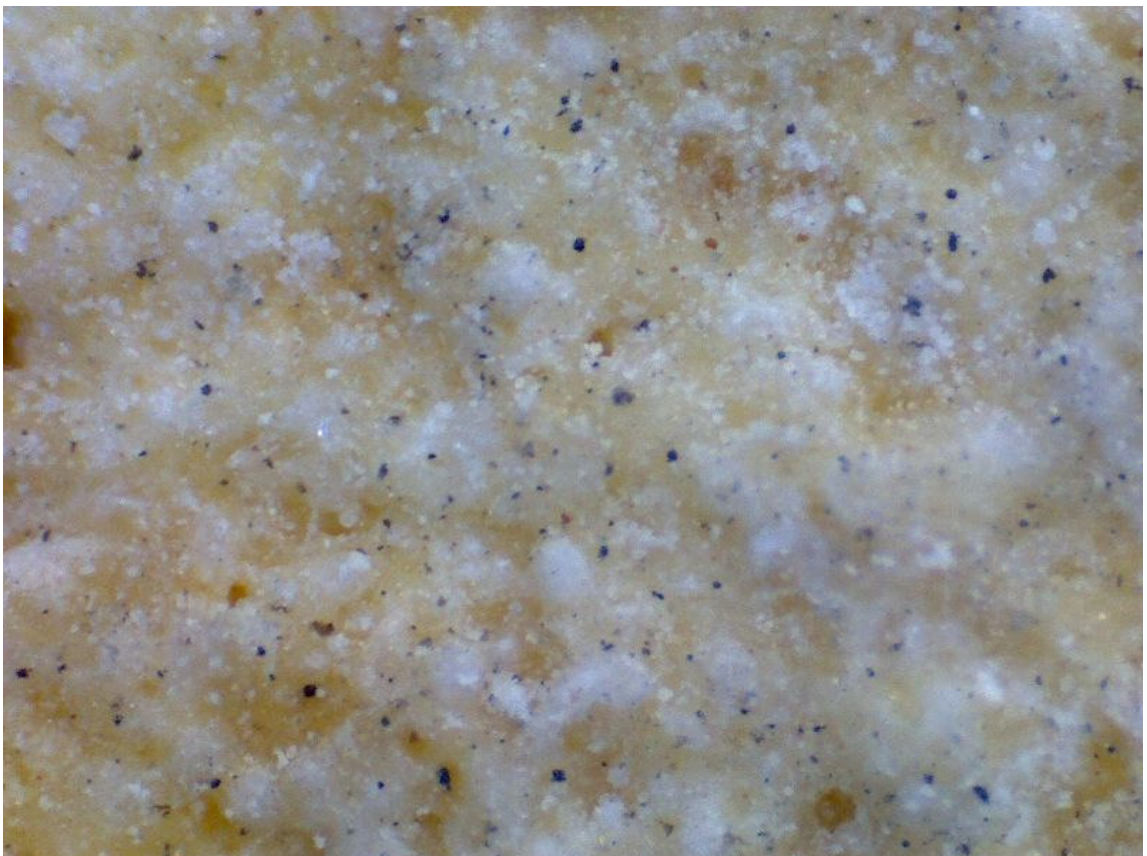


Figure 111: Tadcaster magnesian limestone, 1820s (x200 approx.)



Figure 112: Huddleston magnesian limestone, late fourteenth century after 1385 (x50 approx.)

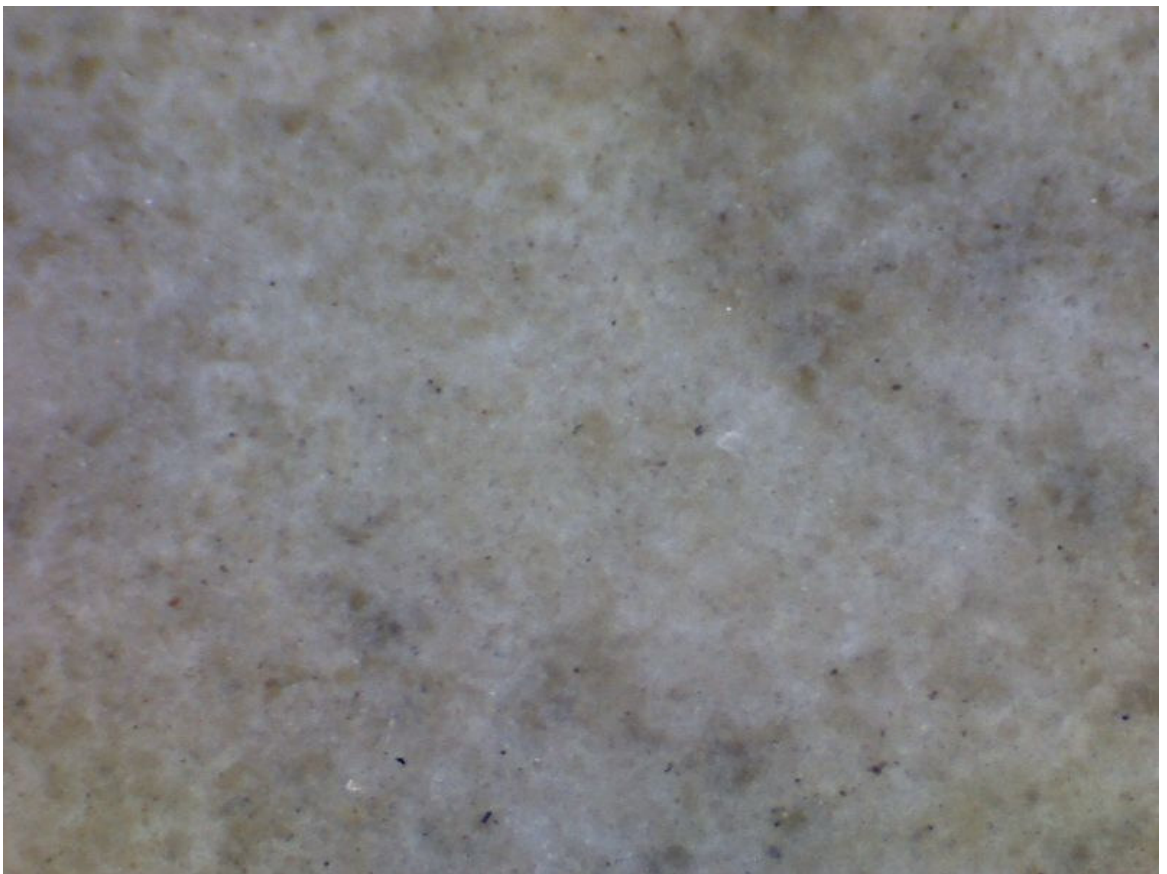


Figure 113: Huddleston magnesian limestone, late fourteenth century after 1385 (x200 approx.)

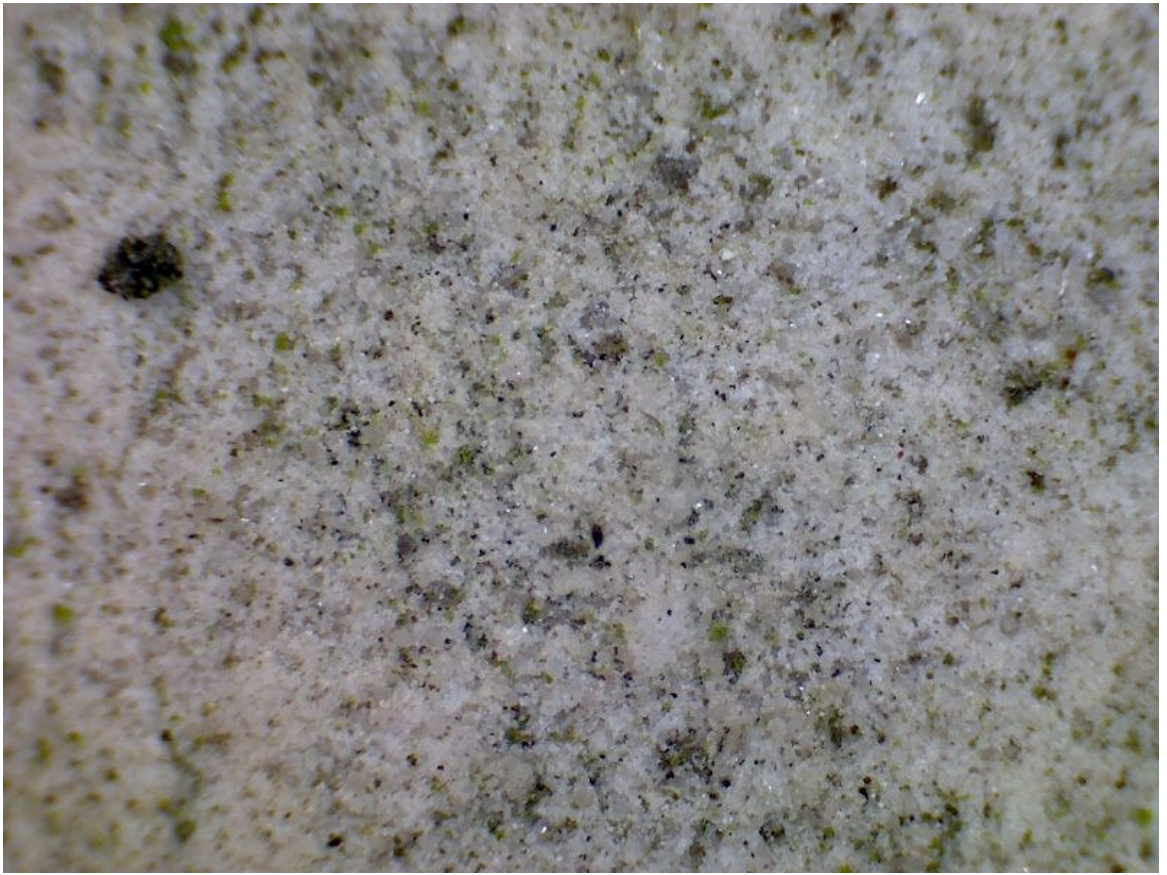


Figure 114: Huddleston magnesian limestone, 1840s and 1850s (x50 approx.)

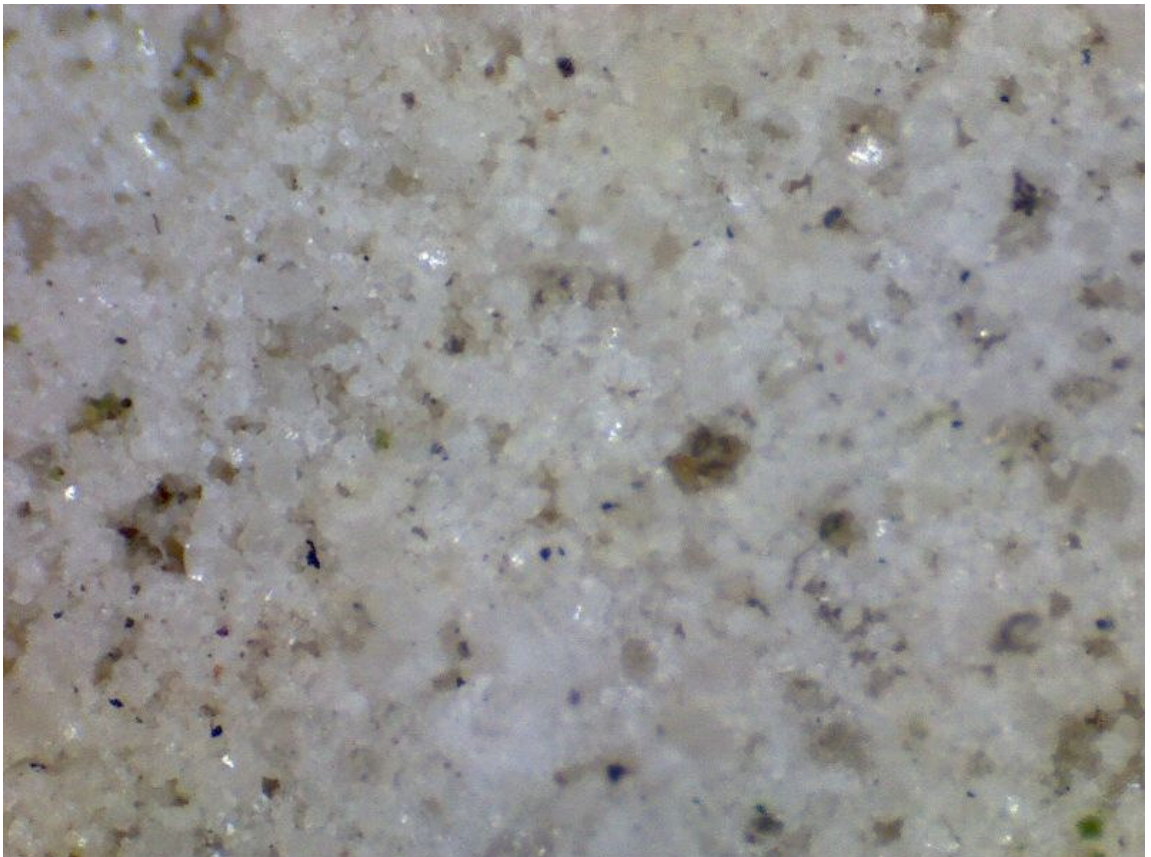


Figure 115: Huddleston magnesian limestone, 1840s and 1850s (x200 approx.)

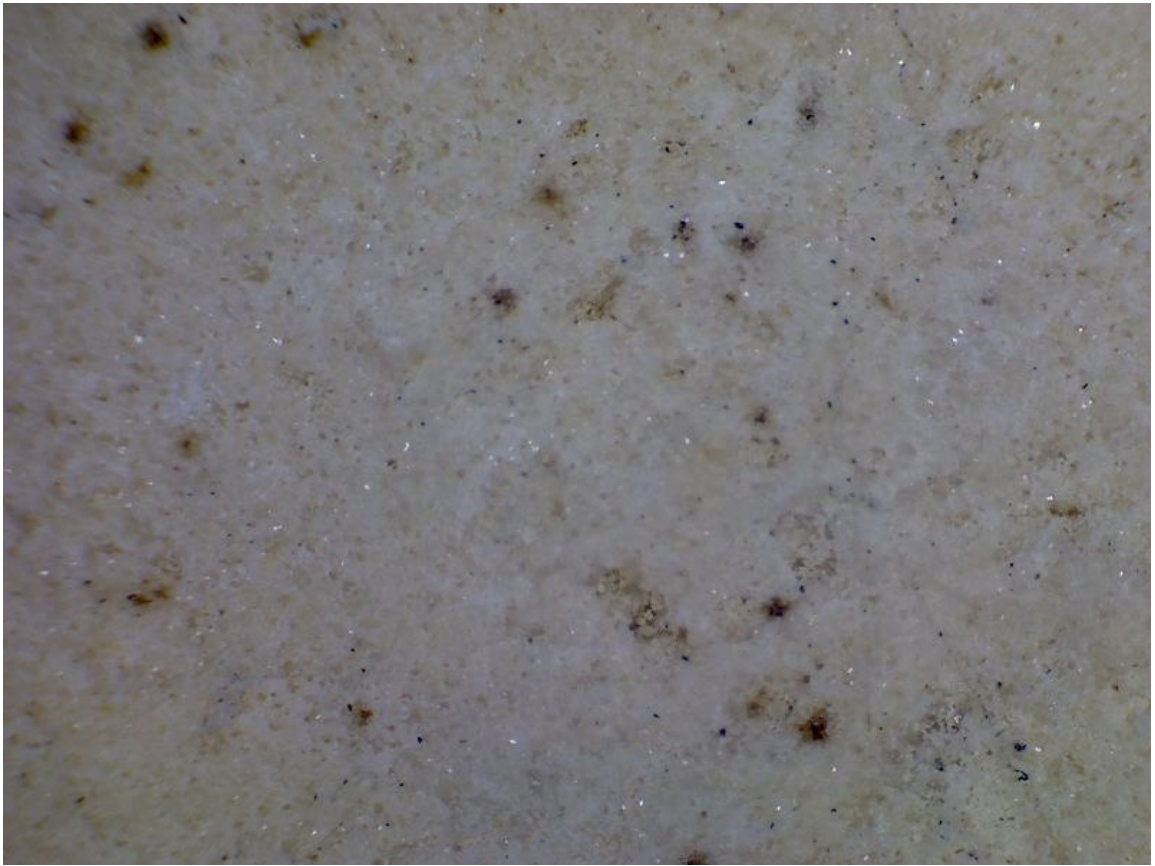


Figure 116: Huddleston magnesian limestone, 1970s (x50 approx.)

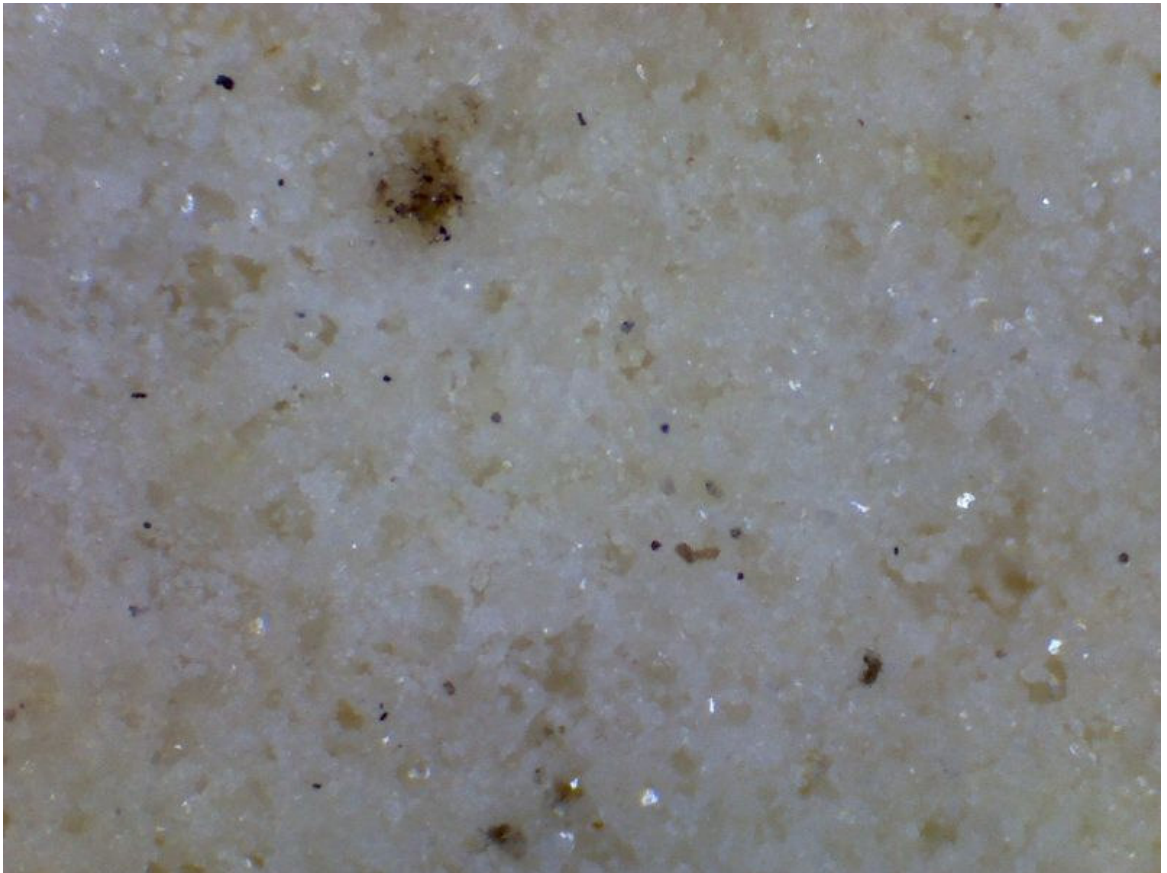


Figure 117: Huddleston magnesian limestone, 1970s (x200 approx.)



Figure 118: Cadeby magnesian limestone, 1970s-1980s (x50 approx.)

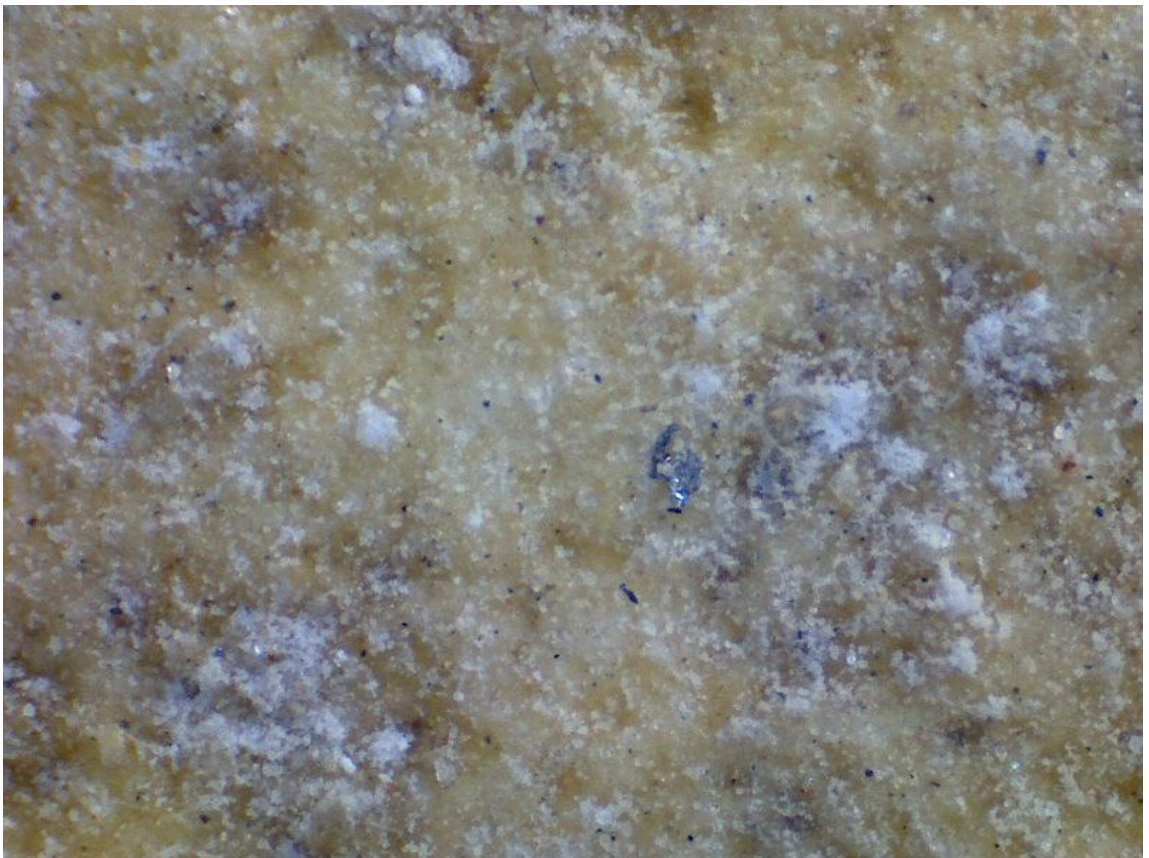


Figure 119: Cadeby magnesian limestone, 1970s-1980s (x200 approx.)

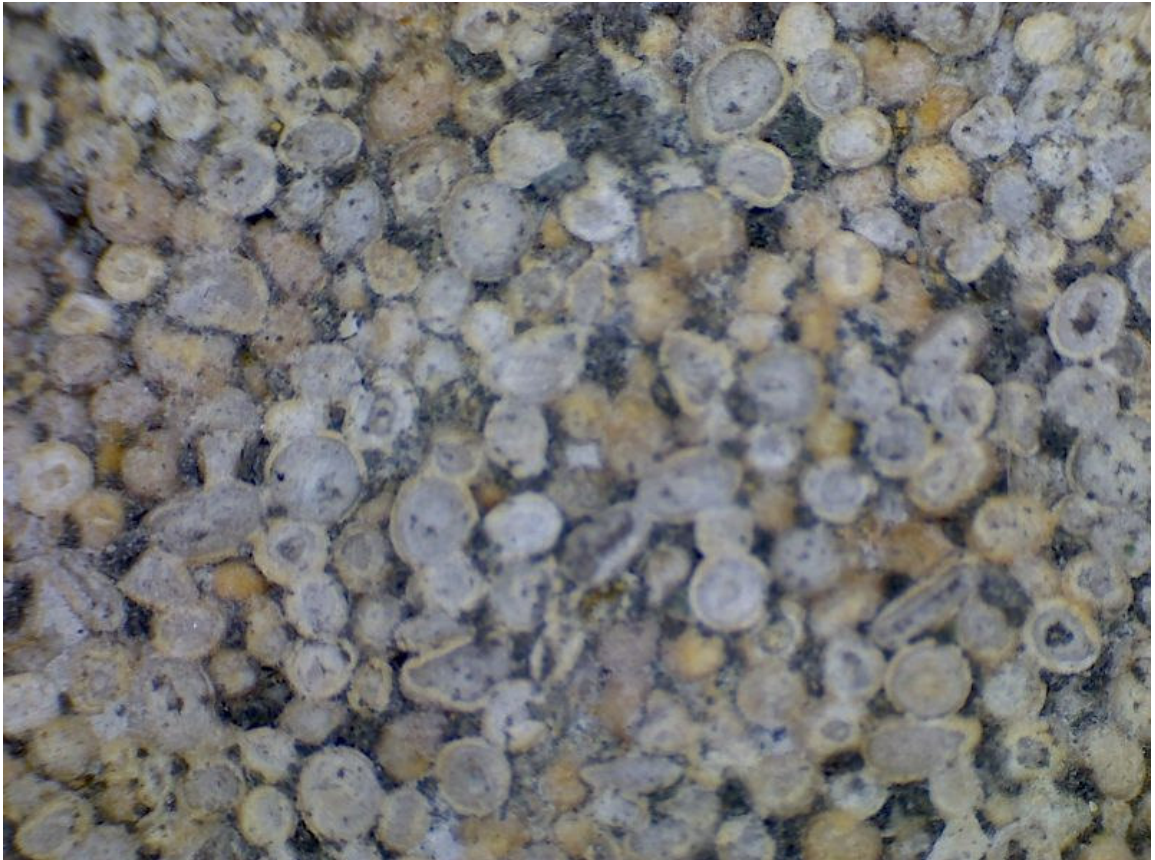


Figure 120: New Ketton oolitic limestone, 1895-1920s (x50 approx.)

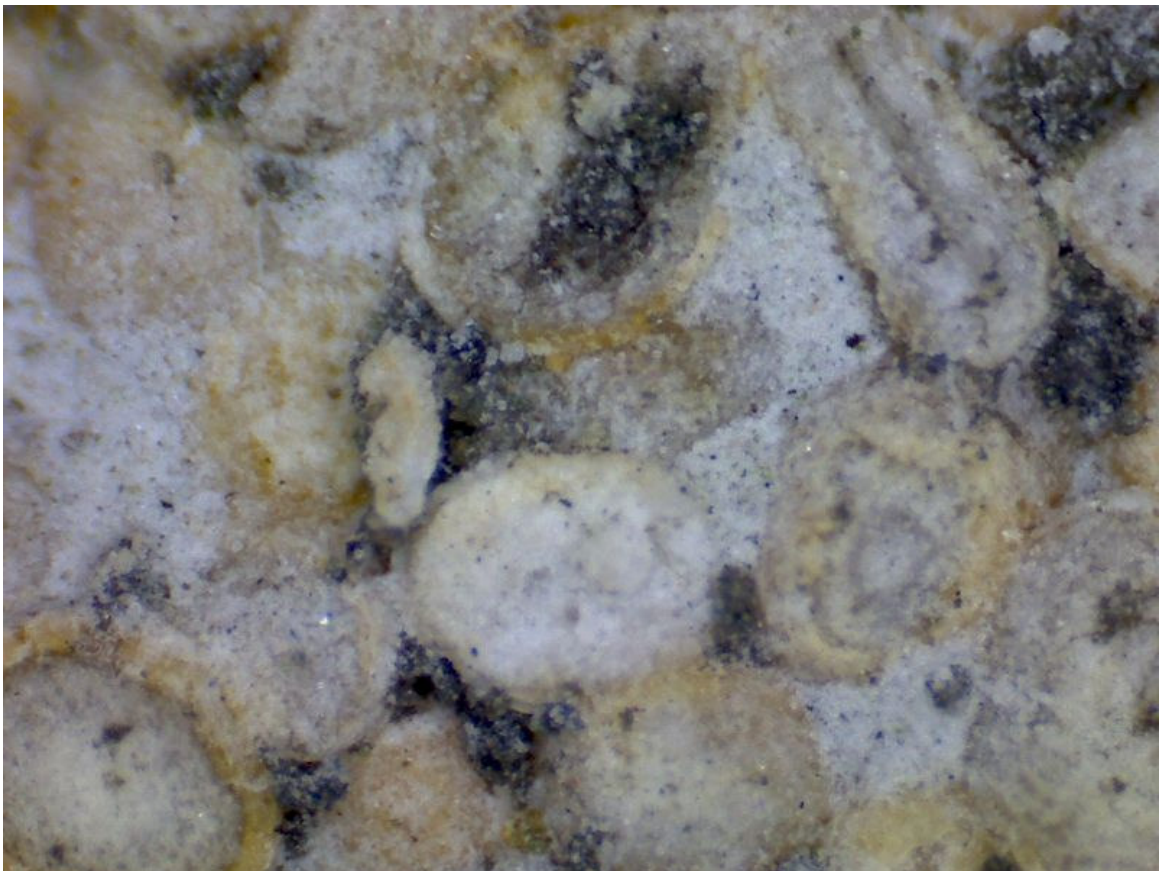


Figure 121: New Ketton oolitic limestone, 1895-1920s (x200 approx.)



Figure 122: Clipsham oolitic limestone, 1920s-1960s (x50 approx.)

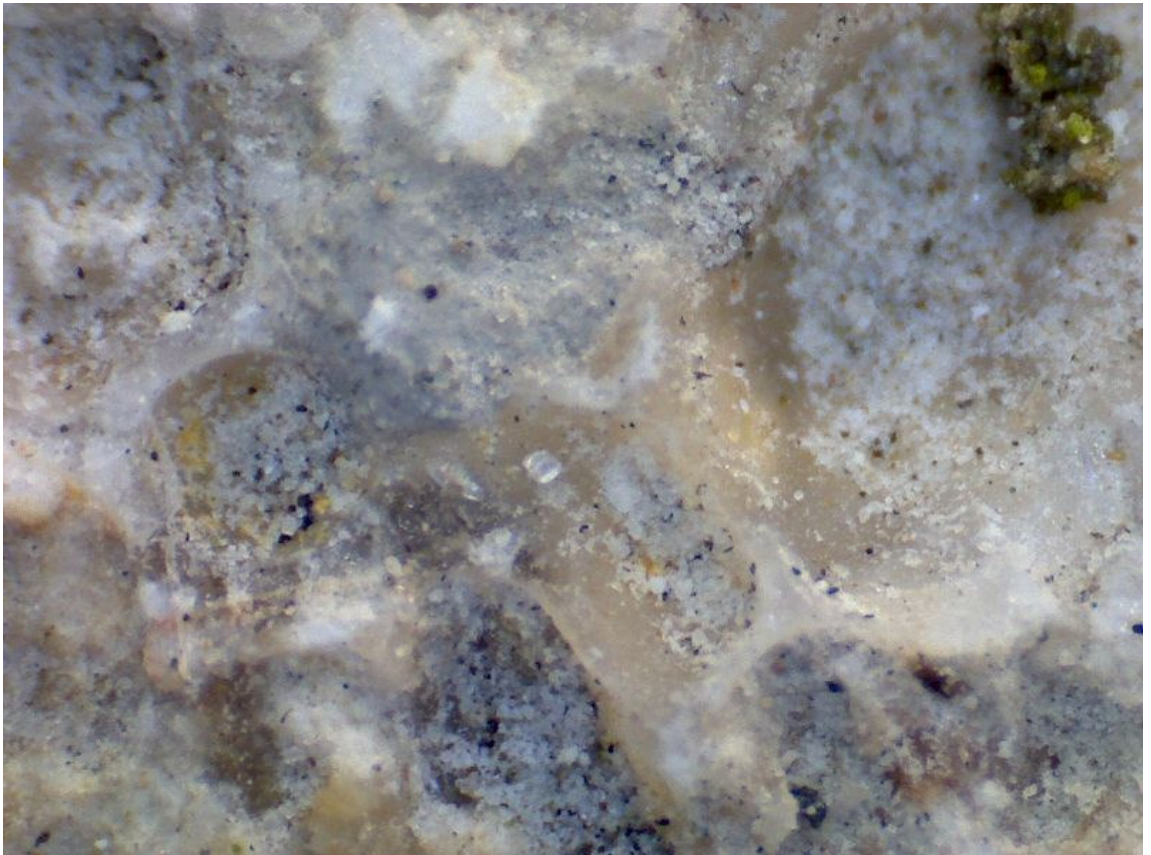


Figure 123: Clipsham oolitic limestone, 1920s-1960s (x200 approx.)

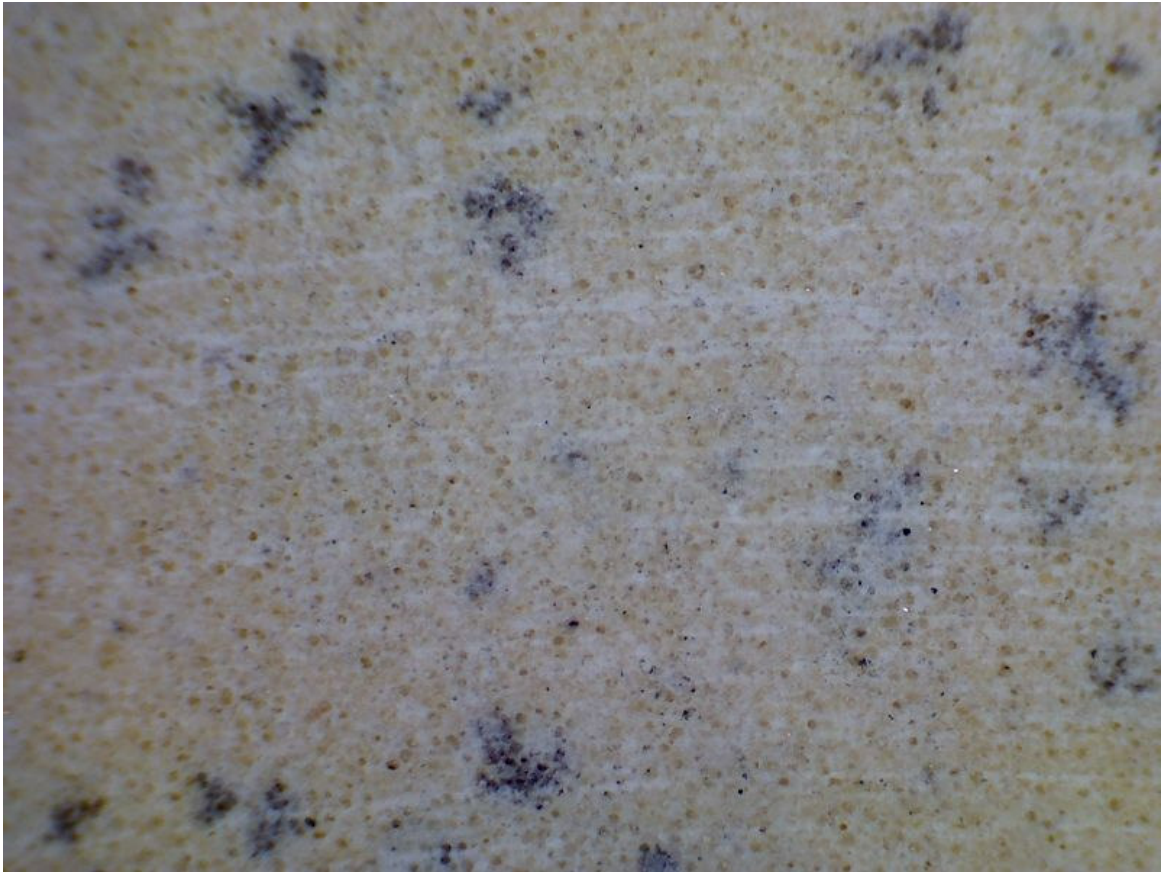


Figure 124: Highmoor magnesian limestone, c.2006 (x50 approx.)

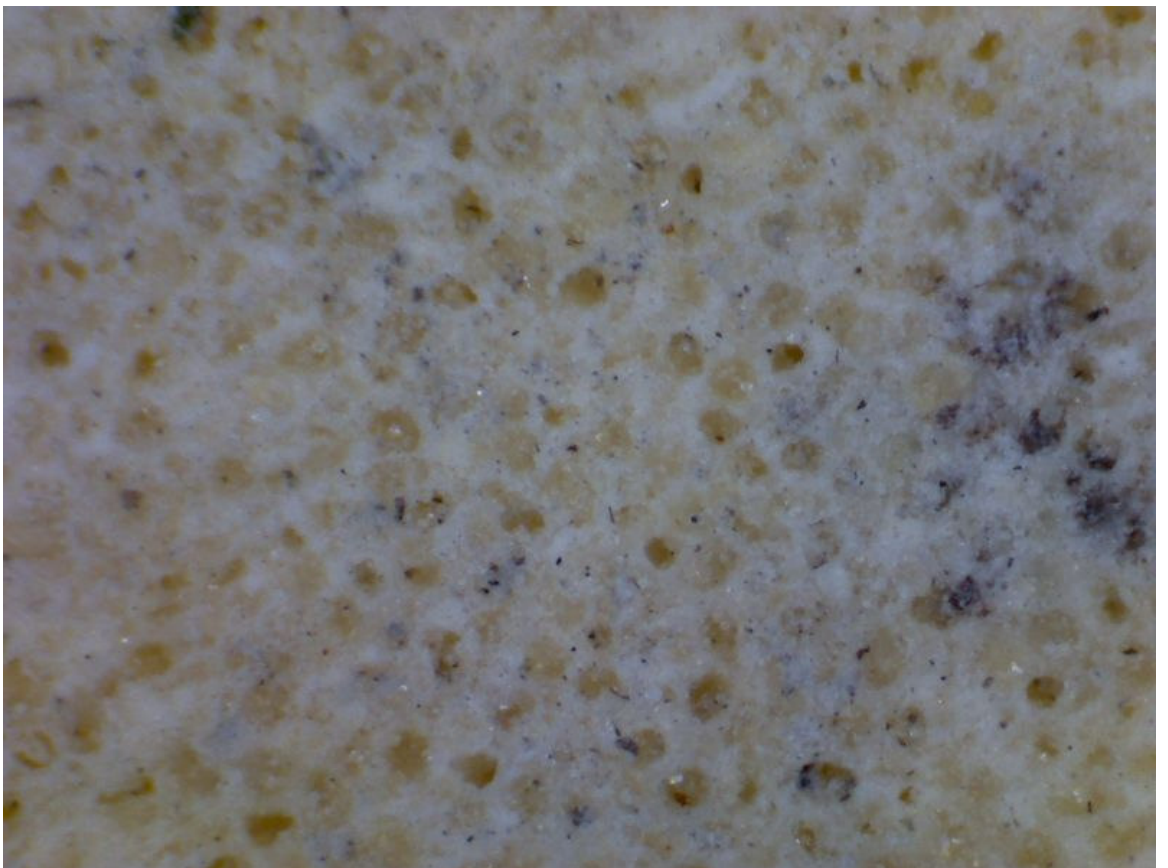


Figure 125: Highmoor magnesian limestone, c.2006 (x200 approx.)



Figure 126: Warmsworth magnesian limestone, c.2006 (x50 approx.)

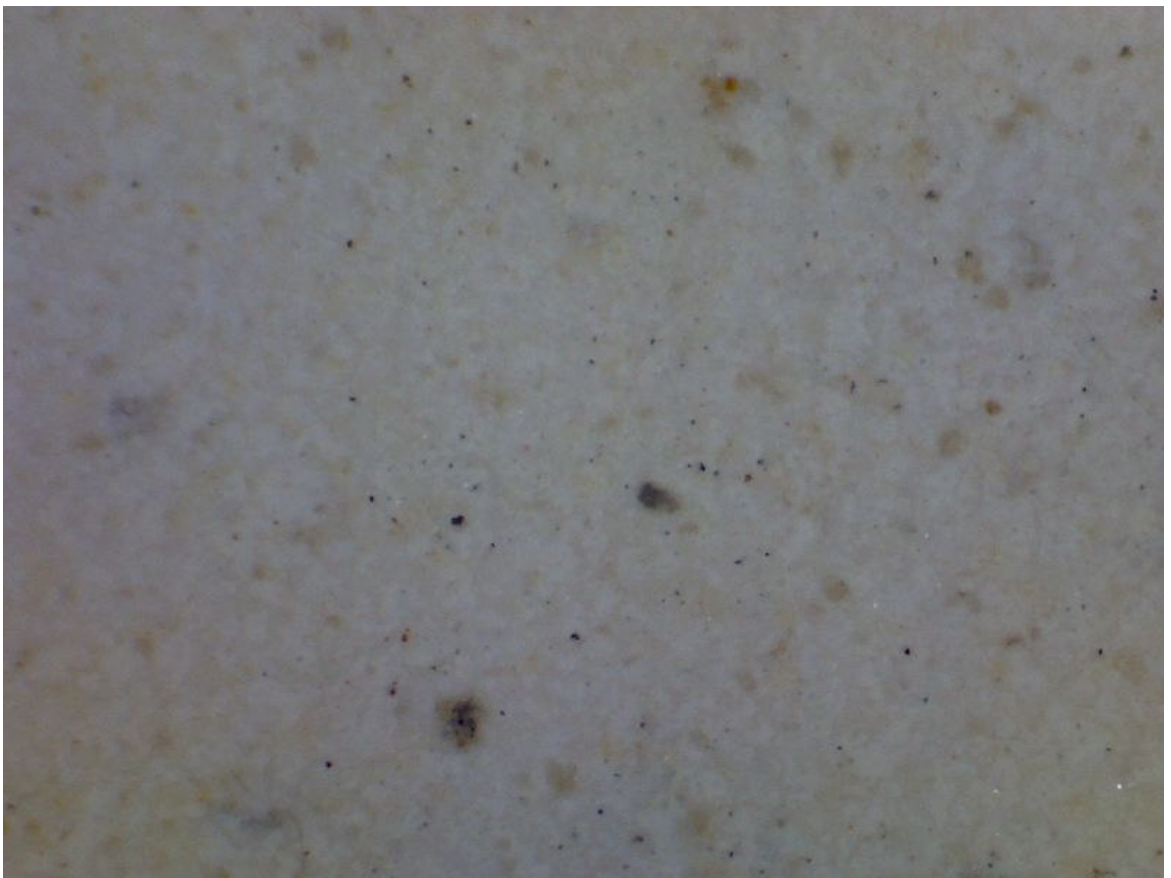


Figure 127: Warmsworth magnesian limestone, c.2006 (x200 approx.)



Figure 128: Diagonal plain axe on re-used twelfth-century ashlar in east end



Figure 129: Claw tooling, medieval



Figure 130: Punched tooling, late medieval on re-used twelfth-century ashlar



Figure 131: Abrasive tooling, medieval



Figure 132: Plain bolster or boaster tooling, eighteenth century



Figure 133: Plain bolster or boaster tooling, nineteenth century



Figure 134: Twentieth-century claw tooling, 1970s



Figure 135: Fourteenth-century lime mortar (x50 approx.)

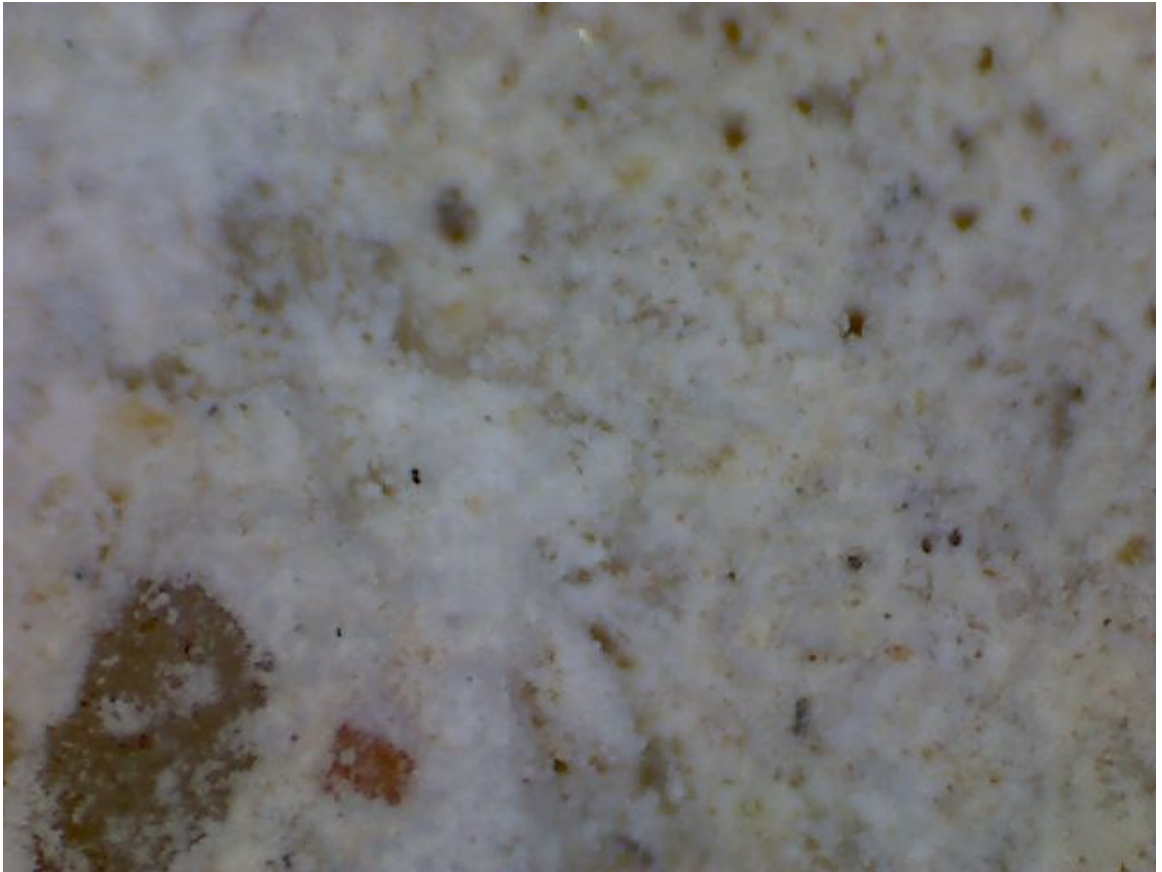


Figure 136: Fourteenth-century lime mortar (x200 approx.)

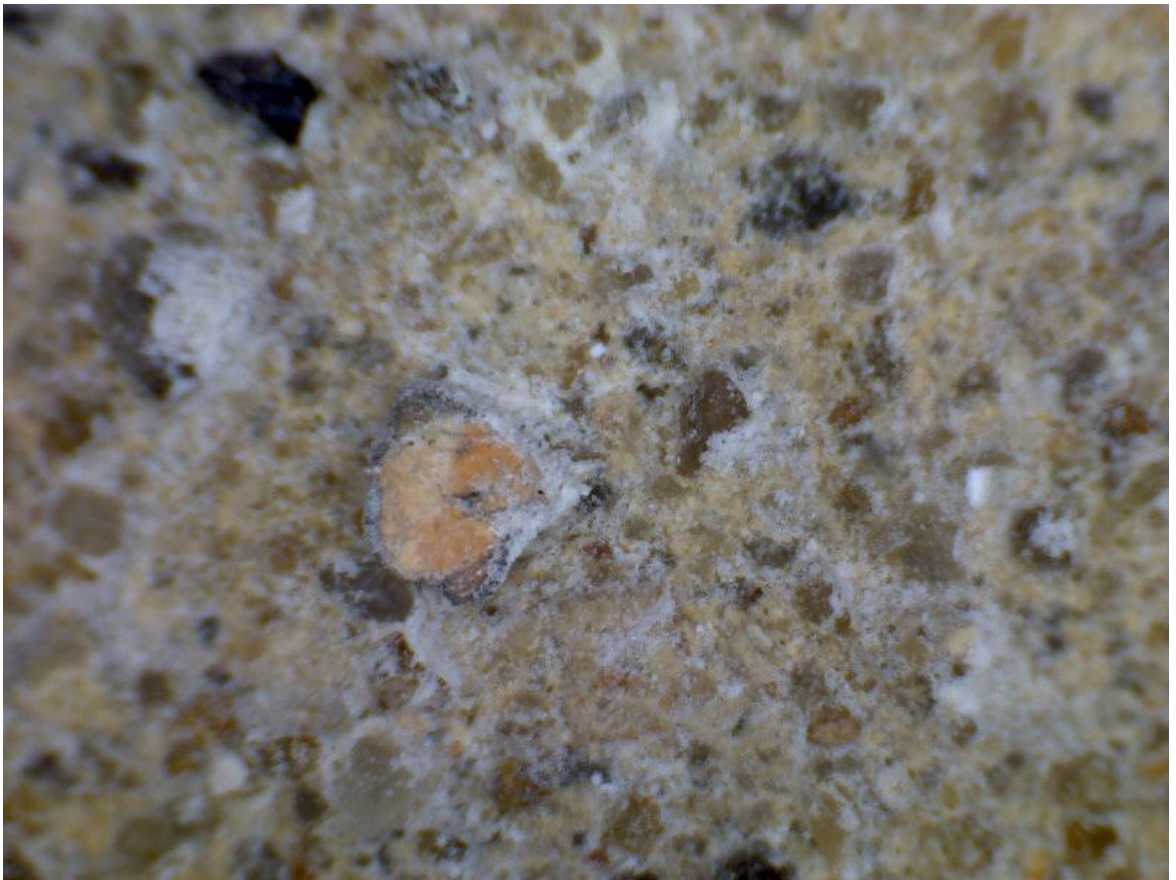


Figure 137: Post-medieval lime mortar (x50 approx.)

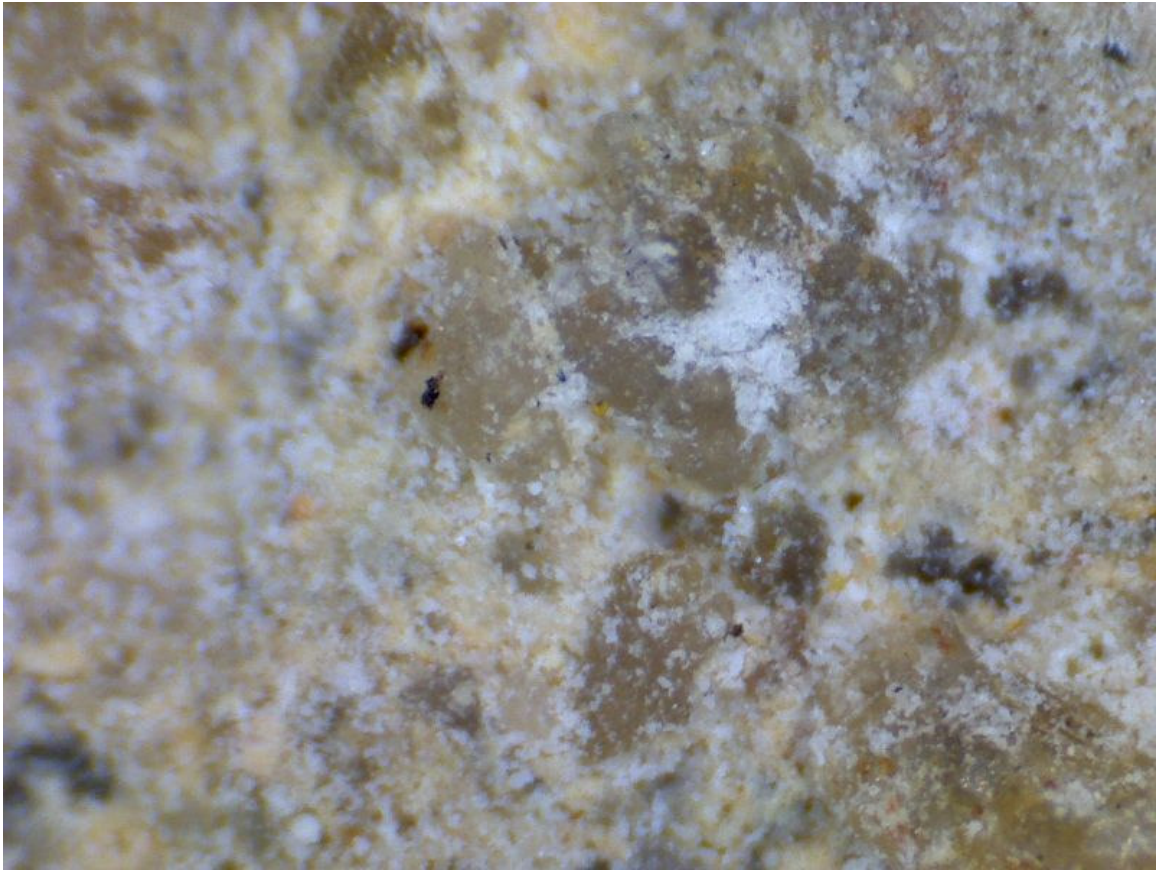


Figure 138: Post-medieval lime mortar (x200 approx.)

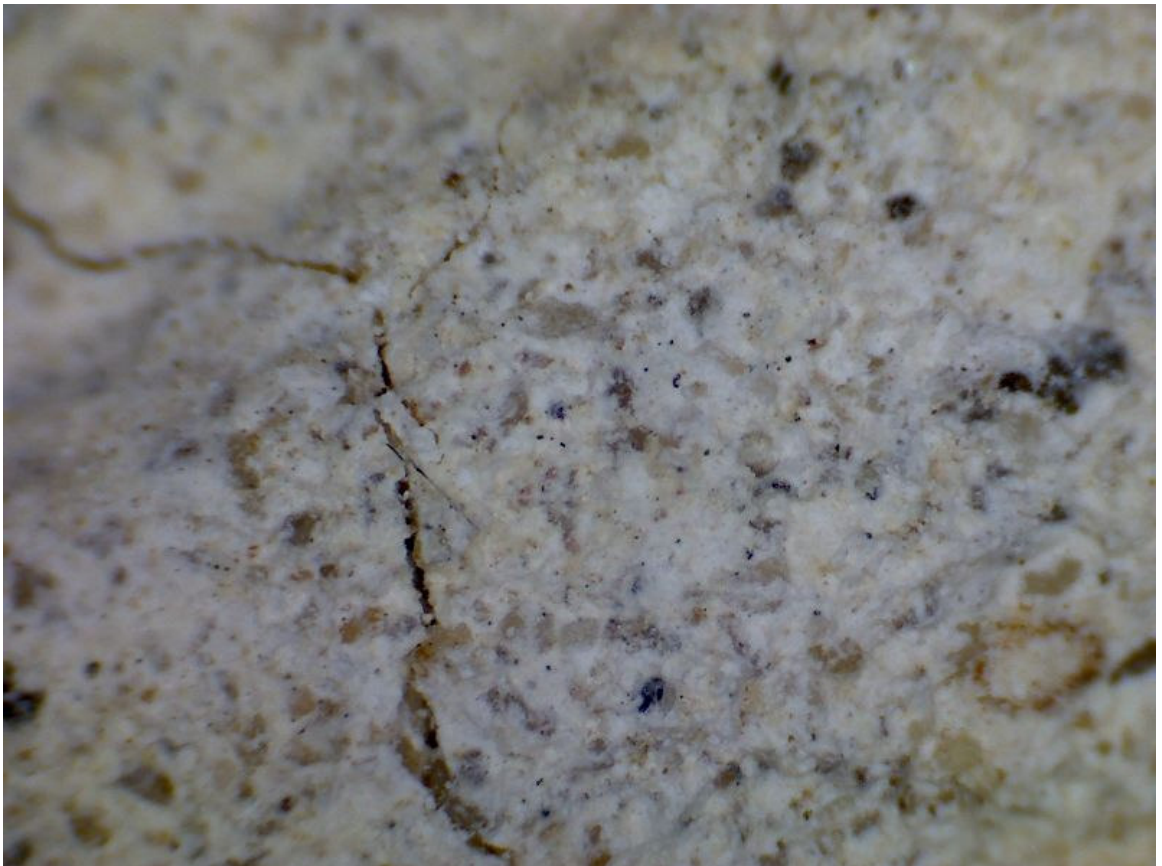


Figure 139: Early nineteenth-century lime mortar, 1820s (x50 approx.)



Figure 140: Early nineteenth-century lime mortar, 1820s (x200 approx.)

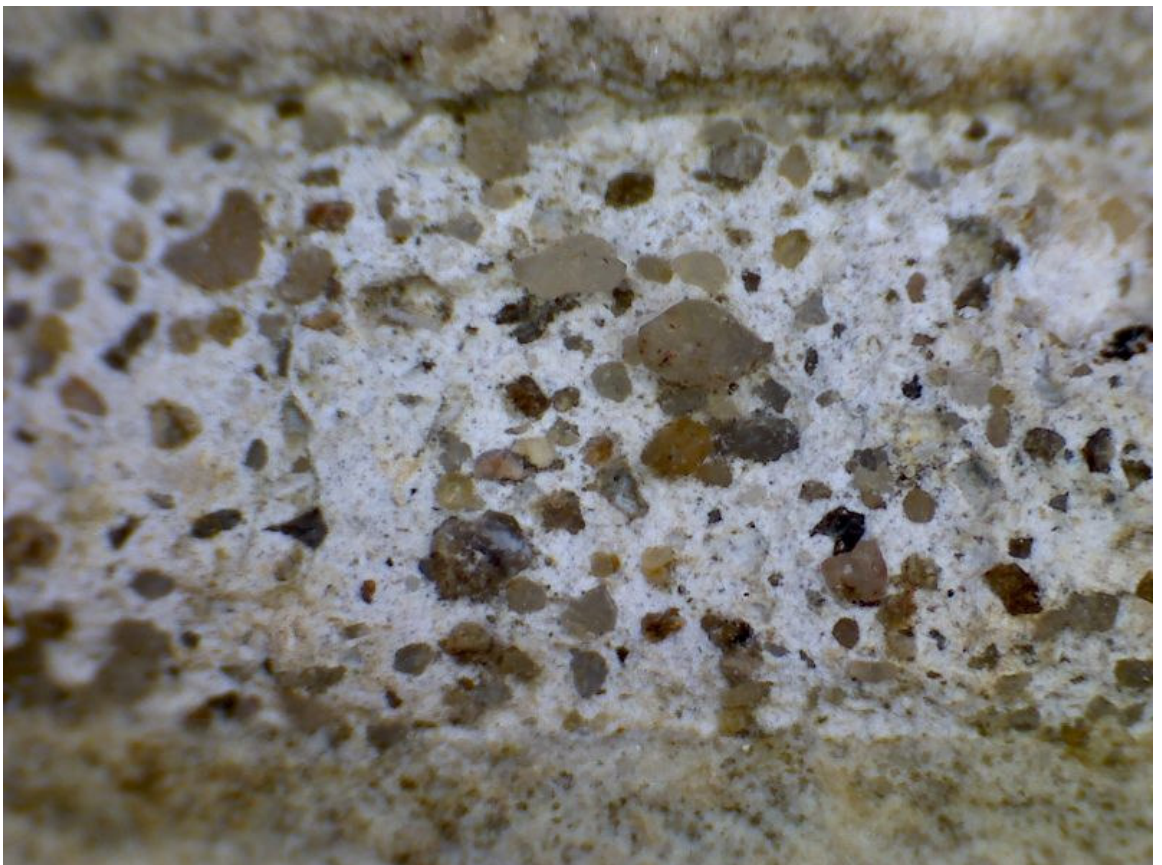


Figure 141: Mid nineteenth-century lime mortar, 1840s (x50 approx.)

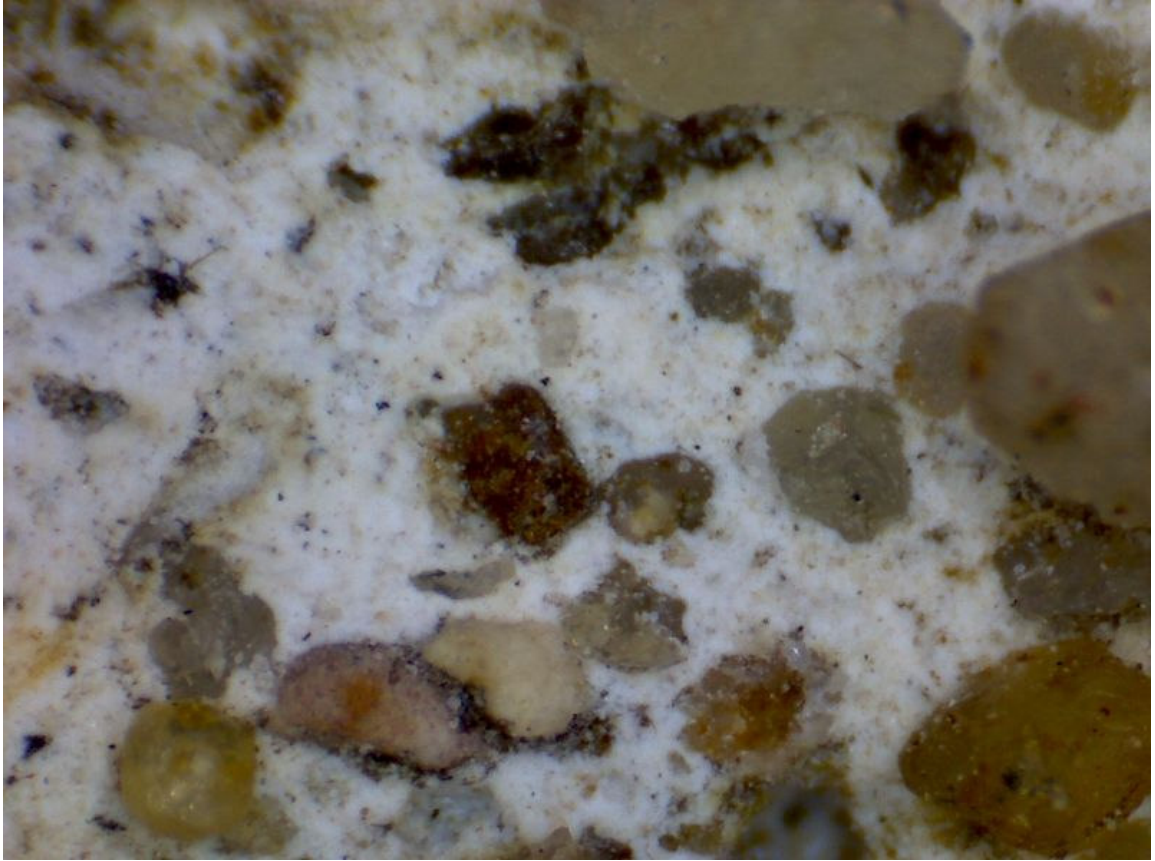


Figure 142: Mid nineteenth-century lime mortar, 1840s (x200 approx.)

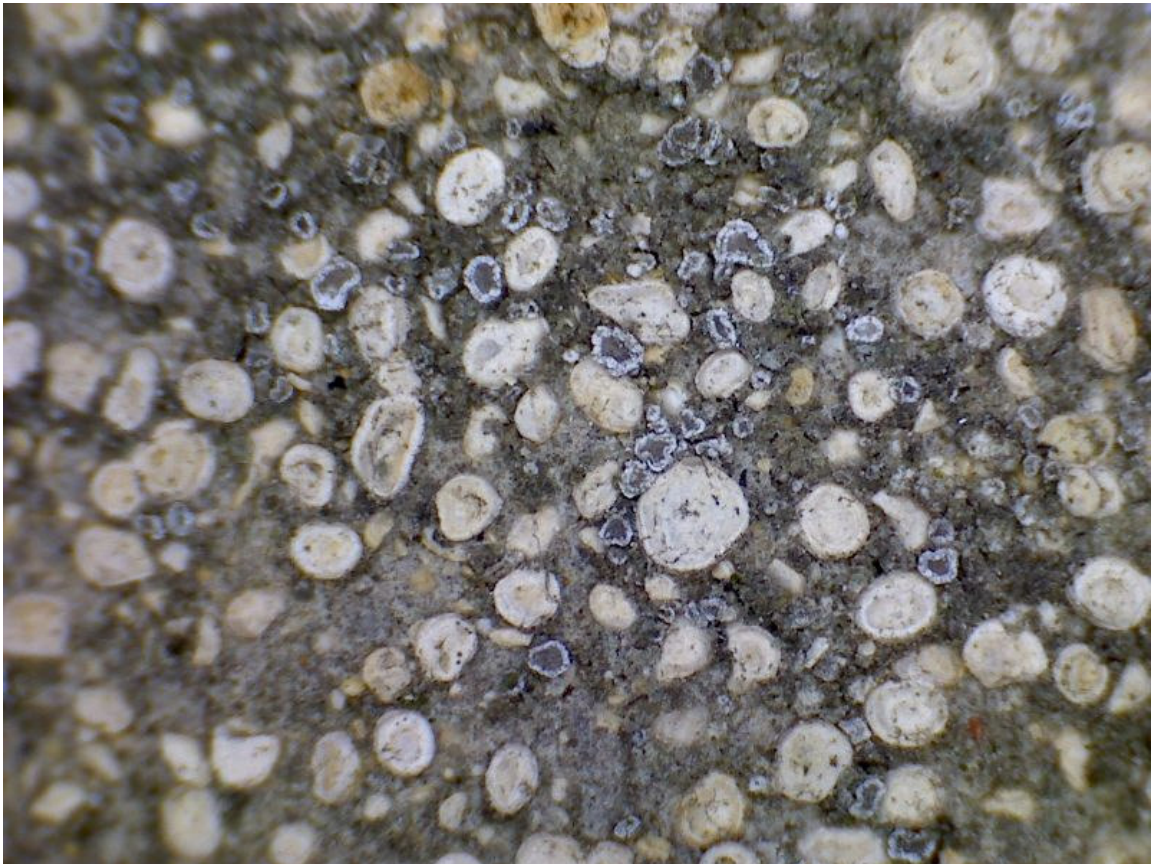


Figure 143: Late nineteenth/early twentieth-century mortar (x50 approx.)

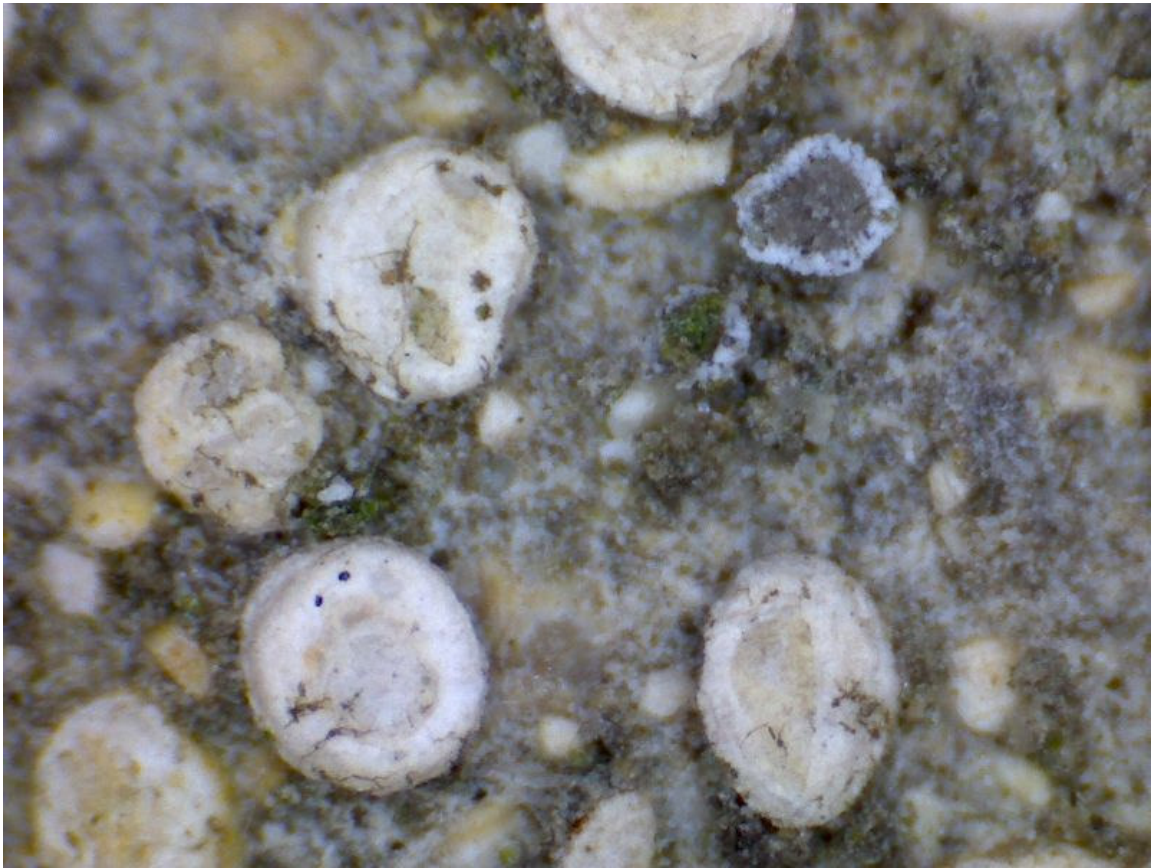


Figure 144: Late nineteenth/early twentieth-century mortar (x200 approx.)

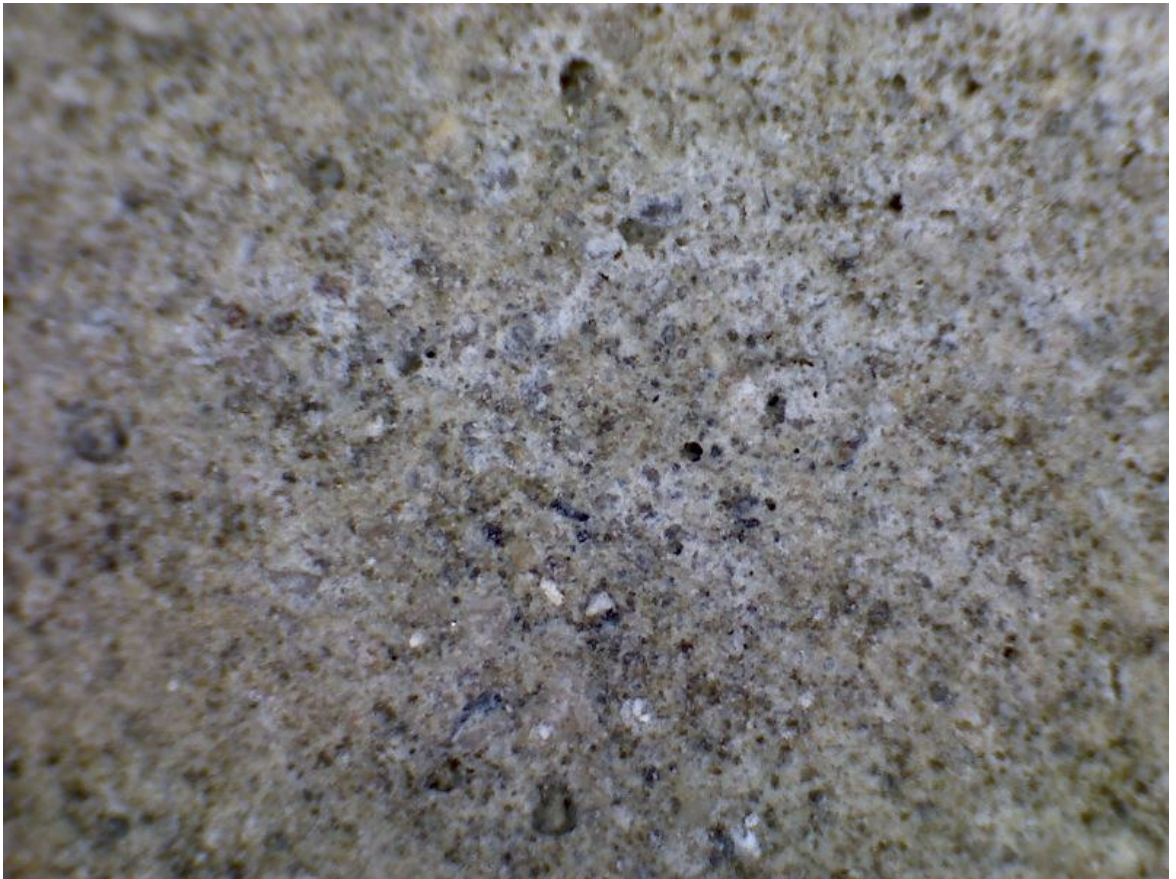


Figure 145: Mid twentieth-century mortar (x50 approx.)

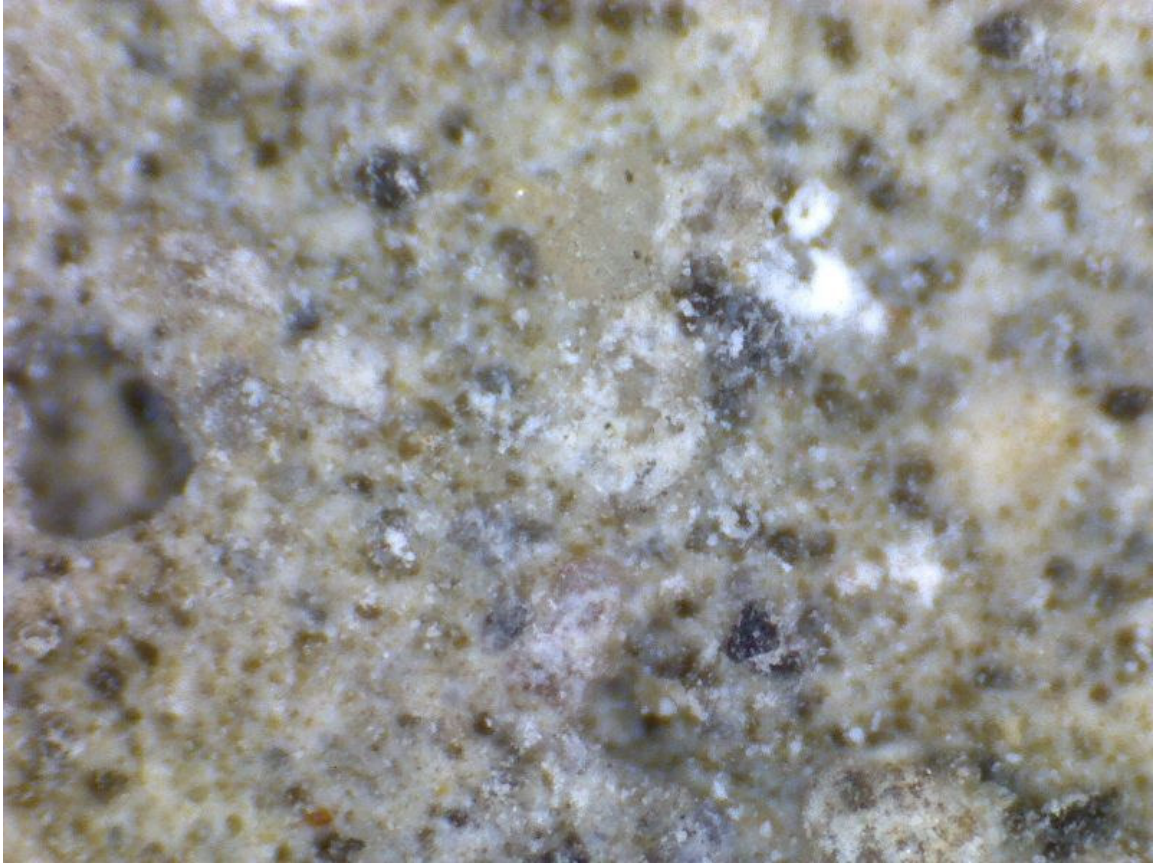


Figure 146: Mid twentieth-century mortar (x200 approx.)

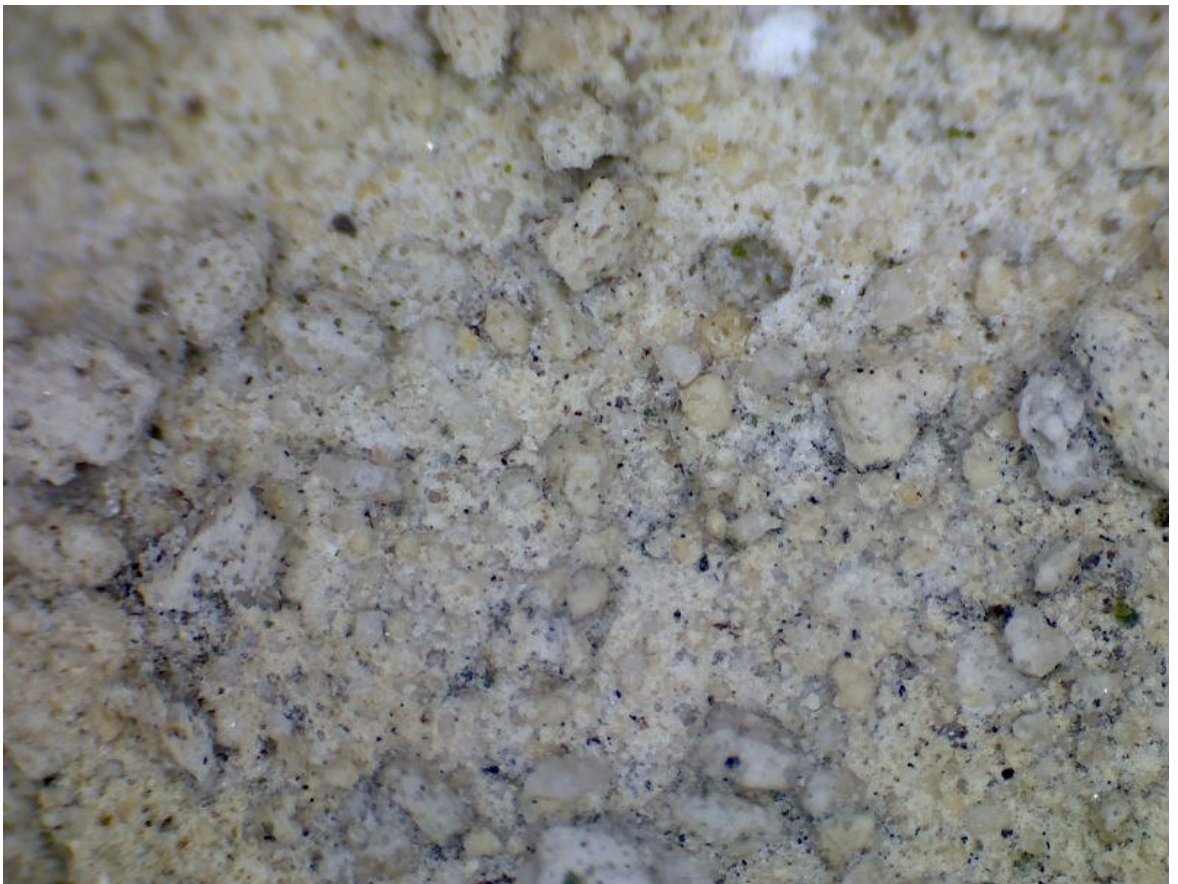


Figure 147: Late twentieth-century mortar (x50 approx.)

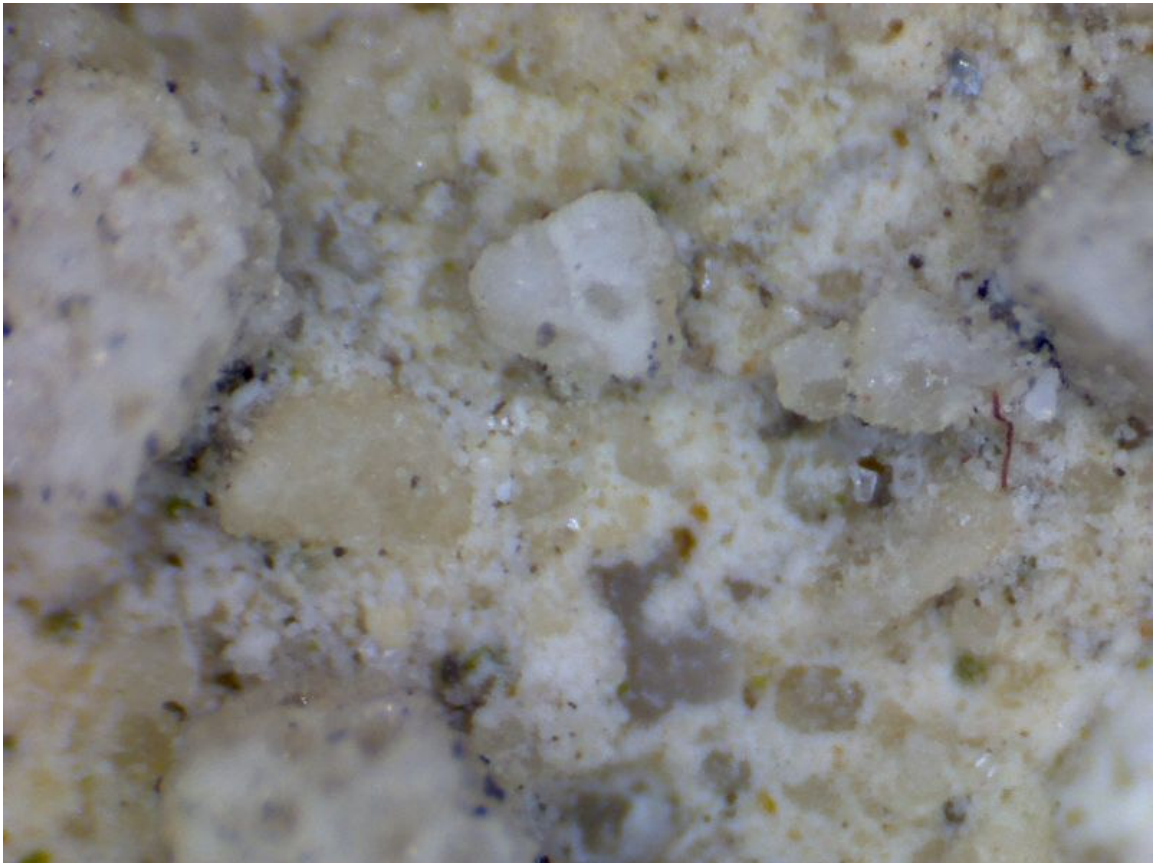


Figure 148: Late twentieth-century mortar (x200 approx.)

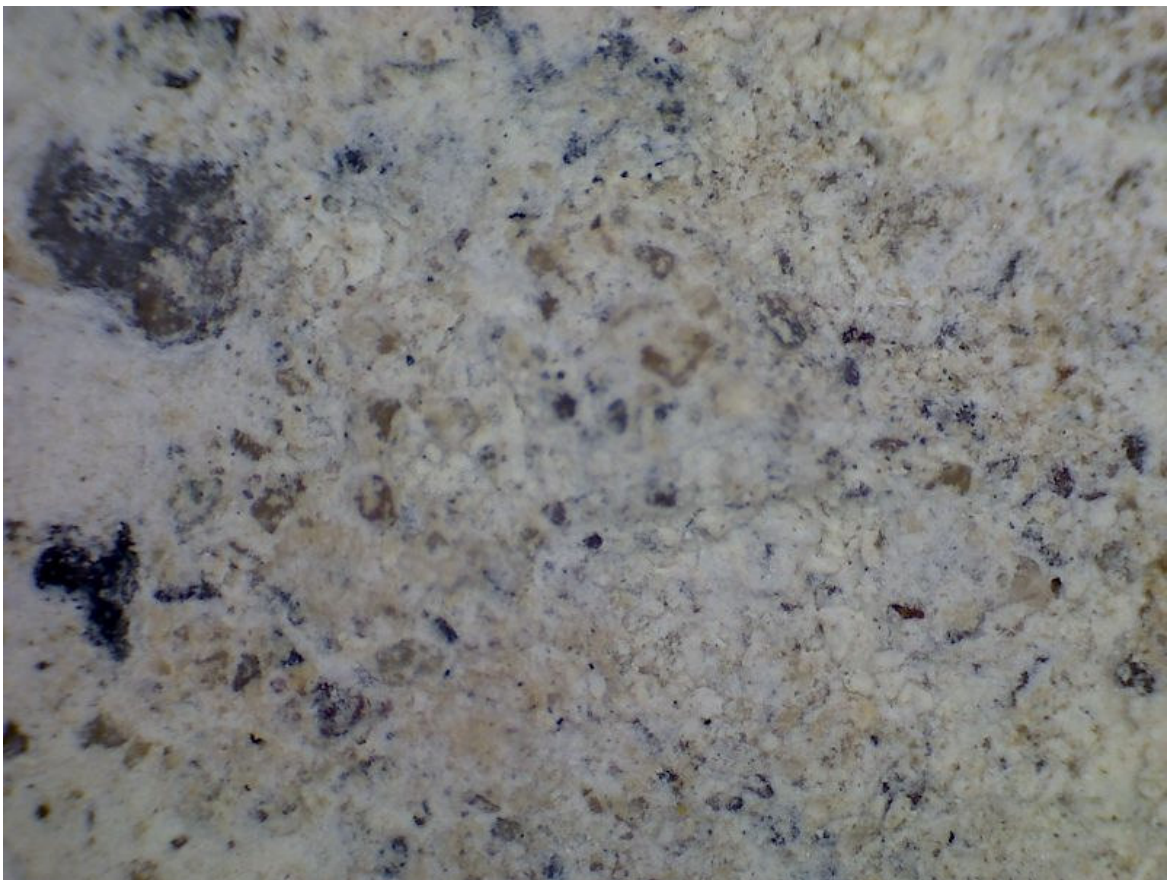


Figure 149: Current bedding and pointing mortar, c.2007 onwards (x50 approx.)

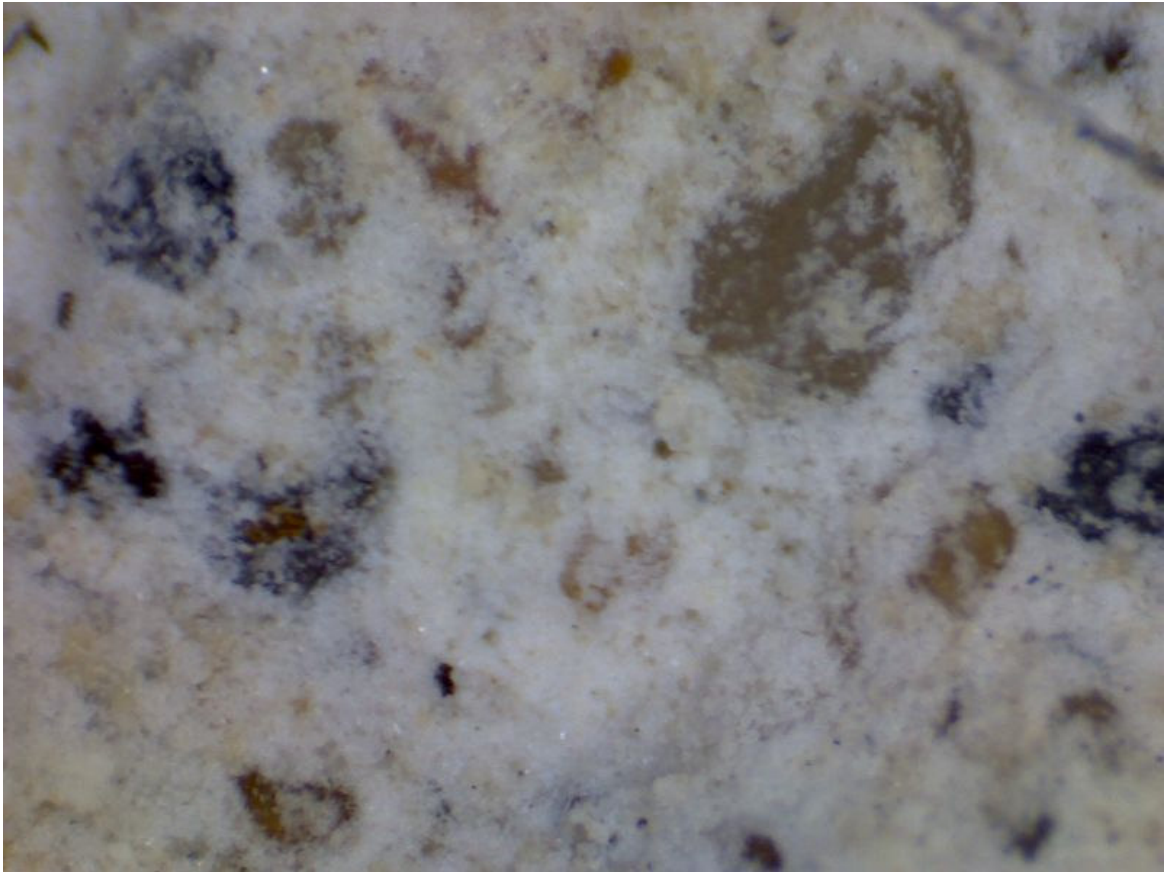


Figure 150: Current bedding and pointing mortar, c.2007 onwards (x200 approx.)



Figure 151: Masonry treated with limewash above south aisle window, easternmost bay of eastern arm



Figure 152: Carved stone treated with linseed oil showing powdering substrate beneath



Figure 153: Great East Window masonry bearing grey-green mineral paint



Figure 154: Great East Window interior, carving treated with limewashes

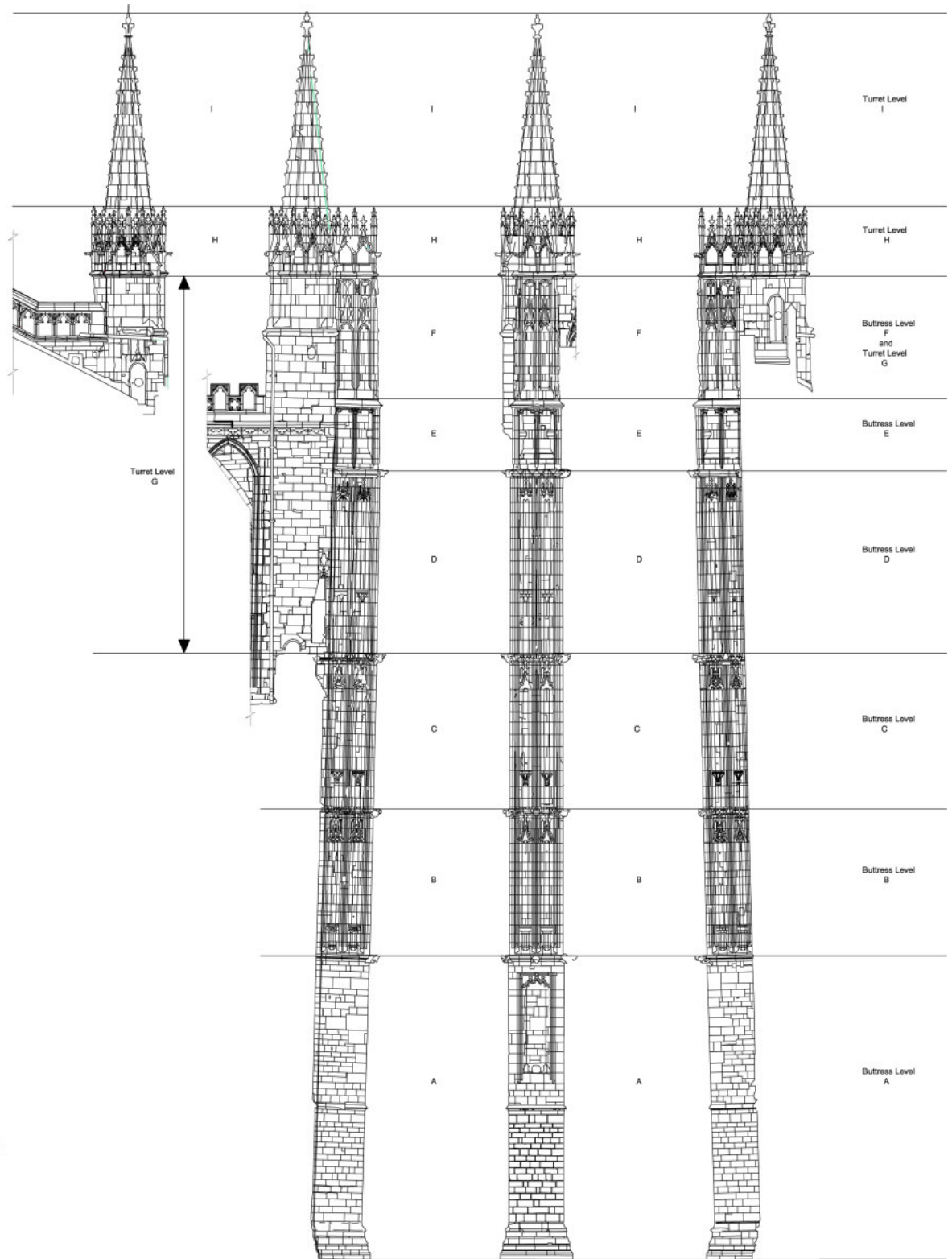


Figure 155: East Front horizontal divisions, Levels A-I (York Minster Stoneyard)



Figure 156: Outside east end, foundations of first buttress west of north-east corner of East Front looking south-east, 1969 (YML/YMEX/6479)



Figure 157: *In situ* Roman masonry beneath north-aisle wall west of north-east turret of East Front, 1969 (YML/YMEX/6492)



Figure 158: Foundations of north-east turret, East Front, 1968 (YML/YMEX1968/YM889)



Figure 159: Foundations of south-east turret looking north-east, 1969 (YML/YMEX/6482)



Figure 160: Foundations of first buttress west of south-east turret, 1969 (YML/YMEX/6481)

YORK MINSTER
EAST FRONT EXPLORATORY EXCAVATIONS PRIOR TO 1968 UNDERPINNING

SECTION EE/IA
E-W SECTION WITHIN NE ANGLE OF BUTTRESS S OF GREAT EAST WINDOW

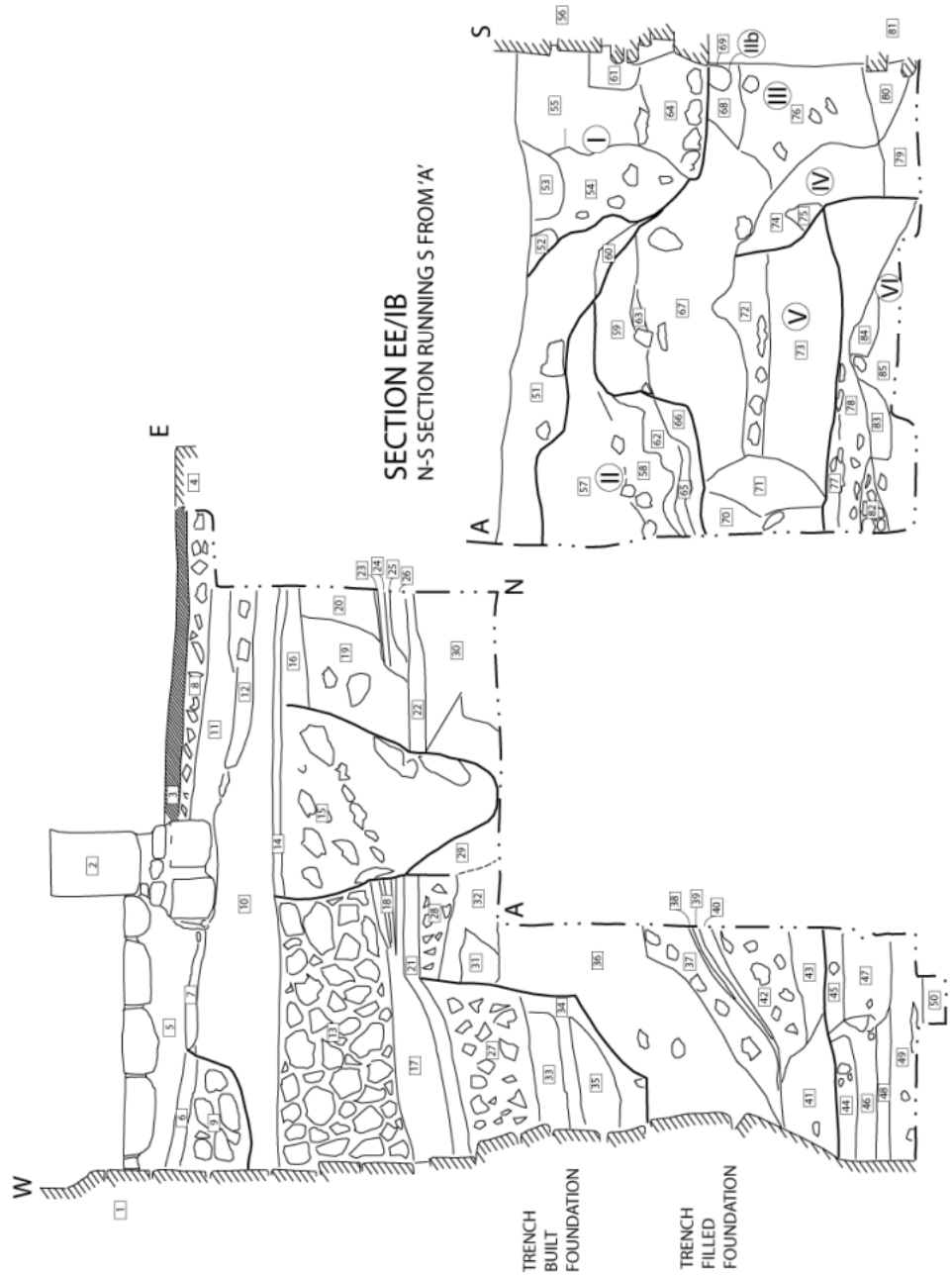
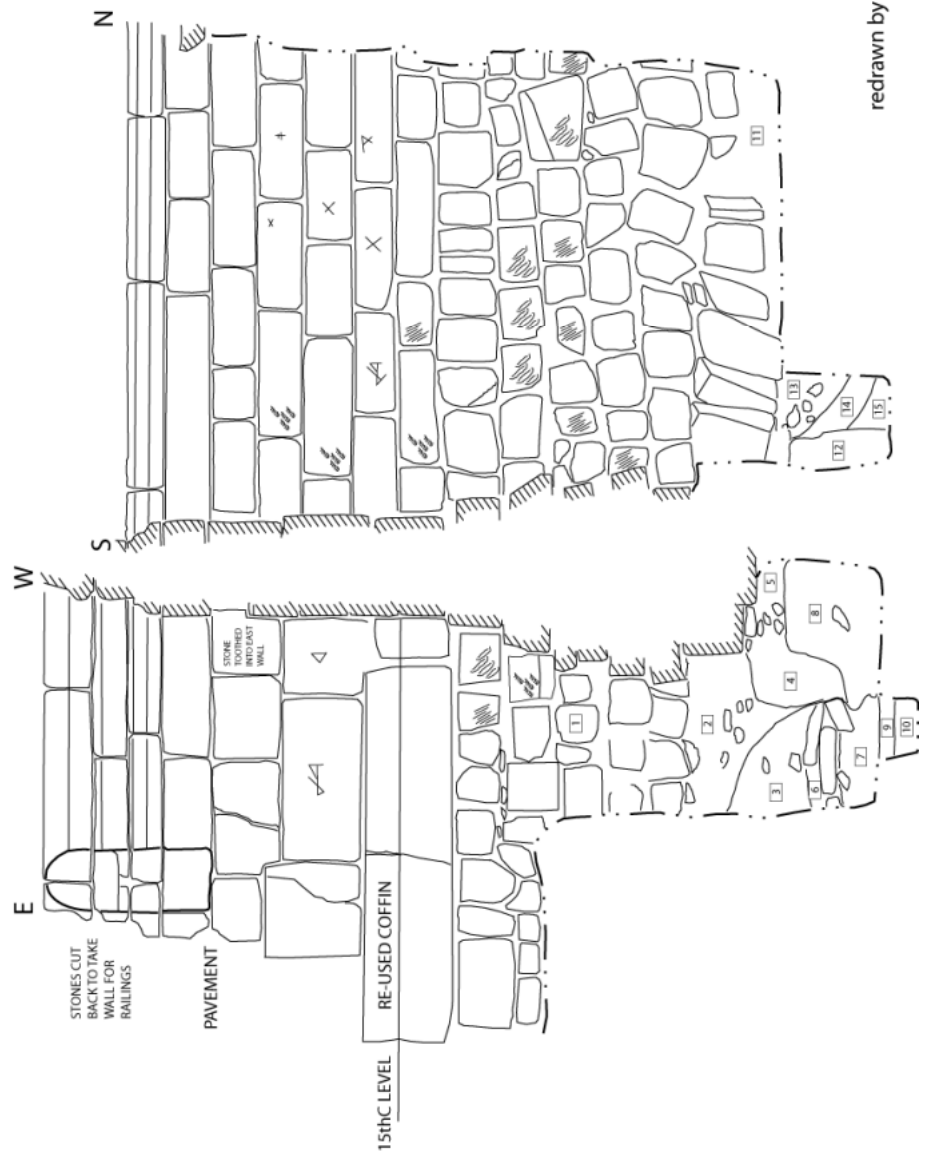


Figure 161: East Front foundations, 1968 (YML/EE/IA)

YORK MINSTER
EAST FRONT EXPLORATORY EXCAVATIONS PRIOR TO 1968 UNDERPINNING

SECTION EE/IC + IS
TRENCH BY BUTTRESS
S + W SECTIONS



CONTEXTS

- 1 - Burnt yellow limestone
- 2 - Dark soil with mortar clay and rubble
- 3 - Black soil with occasional clay and rubble
- 4 - Sandy fill with much mortar and Roman rubble
- 5 - Dark soil
- 6 - Black soil
- 7 - Black soil with red clay lumps
- 8 - Tipped clay
- 9 - Black soil continuing under tipped clay
- 10 - Natural clay
- 11 - Soil
- 12 - Tipped clay
- 13 - Dark soil
- 14 - Sandy fill
- 15 - Black soil

TOOLING

- 11thC axe
- 12thC axe
- 14thC claw

redrawn by AH Jul 2009 from original sketch elevations

Figure 162: East Front foundations, 1968 (YML/EE/IC+IS)

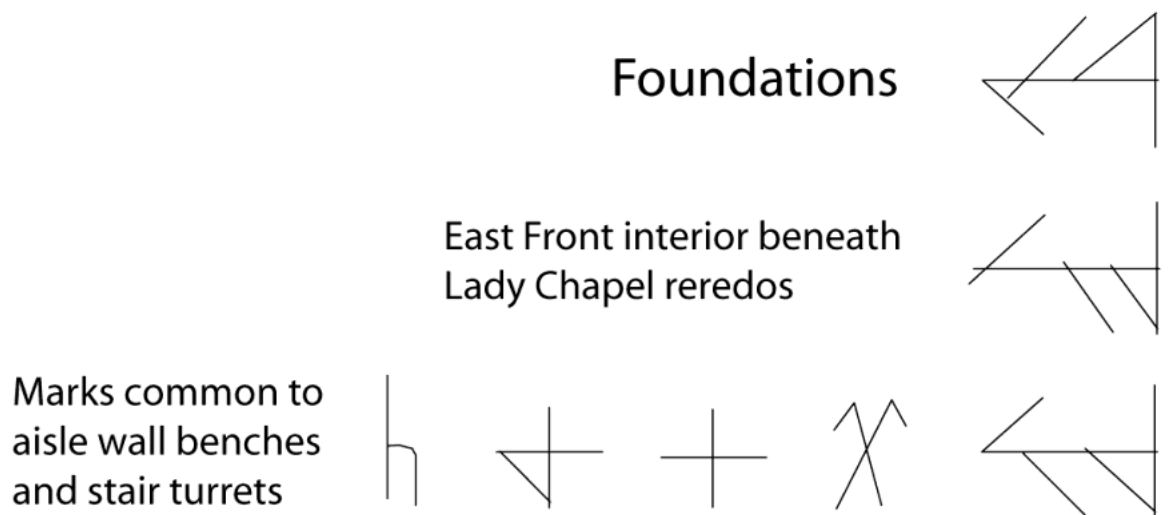


Figure 163: Masons' marks common to East Front foundations and Thoresby's east end

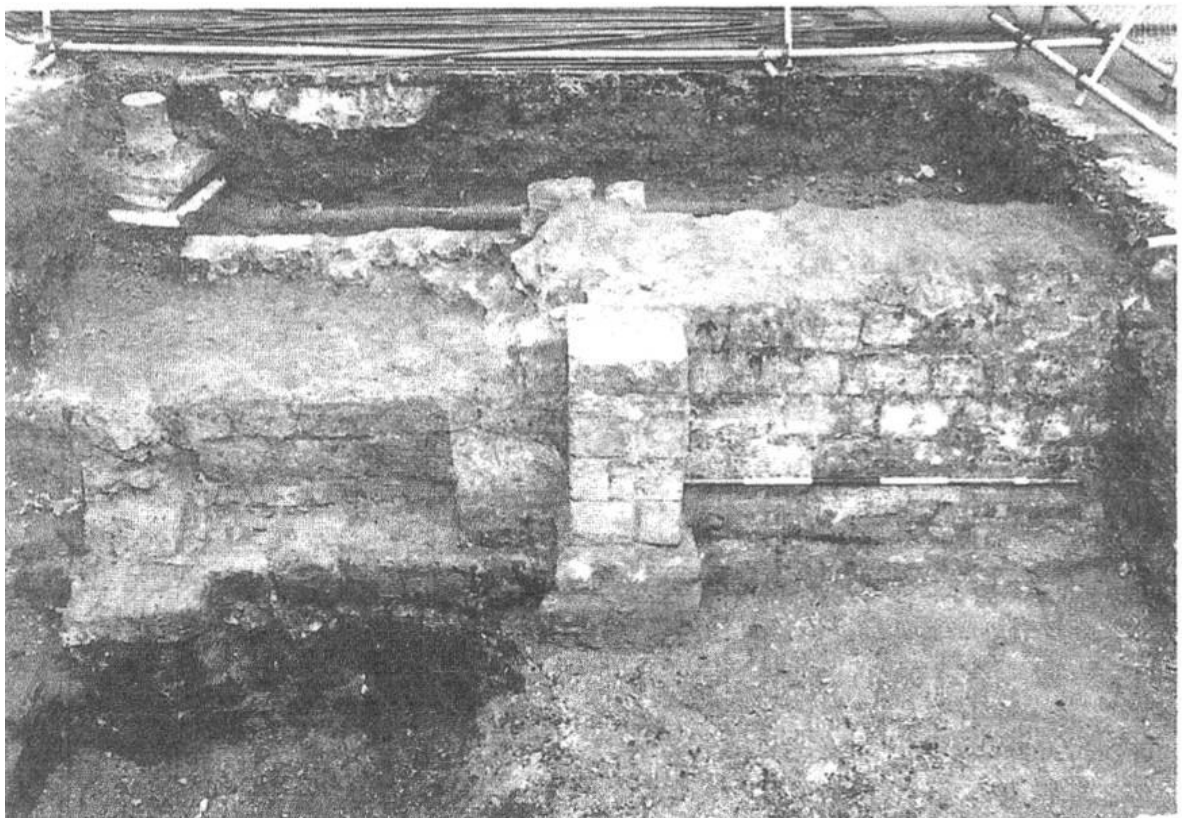


Figure 164: Foundations of St Mary ad Valvas during excavation, 1968 (Wilson and Mee 1998, 110, Figure 85)

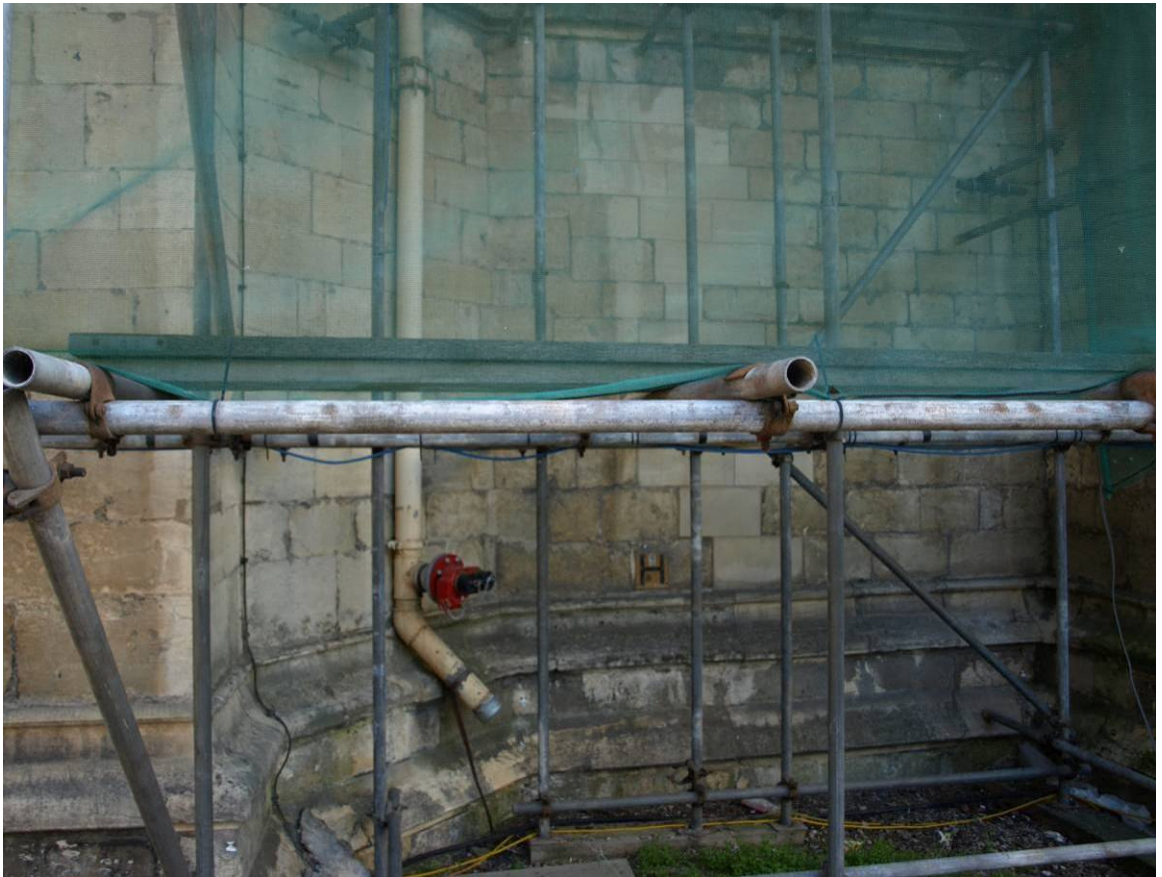


Figure 165: Easternmost bay between East Front and north aisle showing mis-coursing of ashlars, Level A

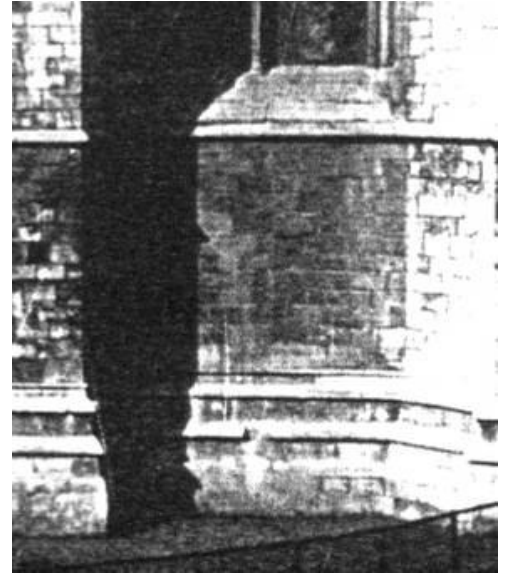
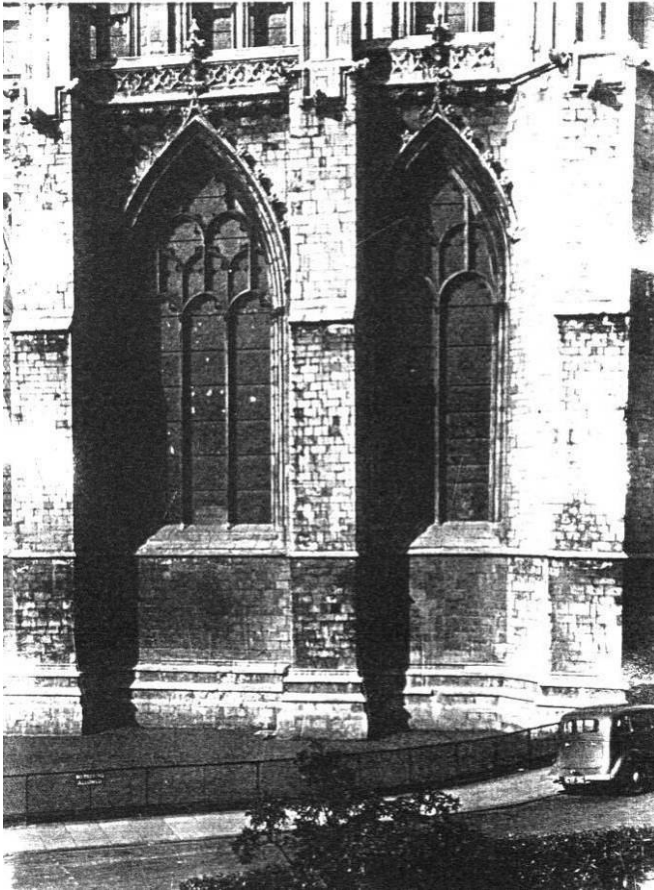


Figure 166: South aisle, 1950s; detail shows mis-coursing in easternmost bay (YML/Acc2002/66/1/21-40)



Figure 167: East Front, east window of south aisle, Level B



Figure 168: East Front, east window of south aisle, tracery, Level B



Figure 169: East Front, east window in south aisle, capital detail north side, Level A



Figure 170: East Front, east window of south aisle, fourteenth-century label detail, Level B



Figure 171: East Front, east window of south aisle, nineteenth-century label detail, Level B



Figure 172: East Front, east window of south aisle, stonework and sill detail, Level A



Figure 173: East Front, east window of north aisle, Level B



Figure 174: East Front, east window of north aisle, tracery, Level B



Figure 175: East Front, east window in north aisle, capital detail, north side, Level A



Figure 176: East Front, east window of north aisle, ?nineteenth-century label detail, Level B



Figure 177: East Front, east window in north aisle, ?nineteenth-century label detail, Level B



Figure 178: East Front, east window in north aisle, sill level, Level A

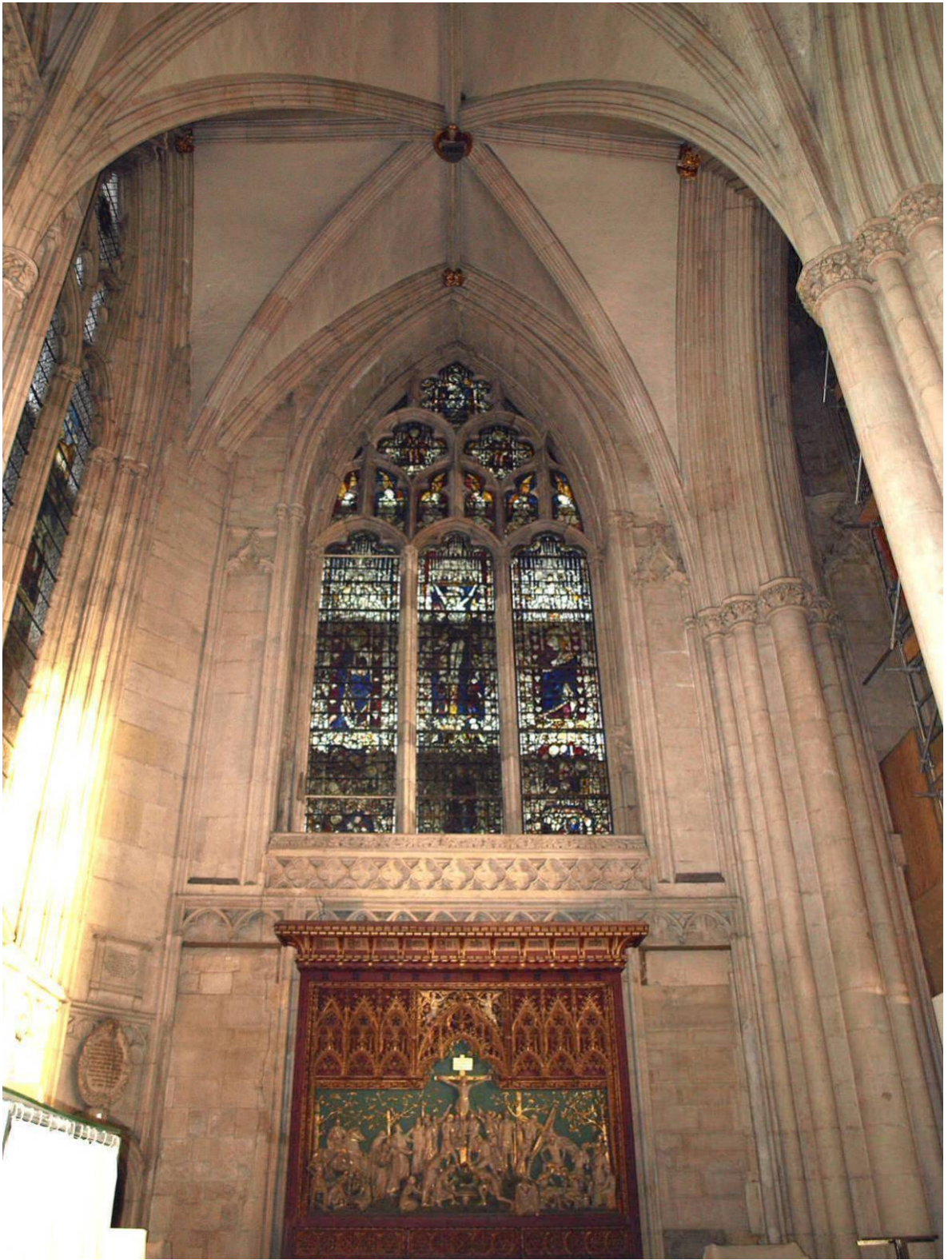


Figure 179: St. Stephen's Chapel, east wall

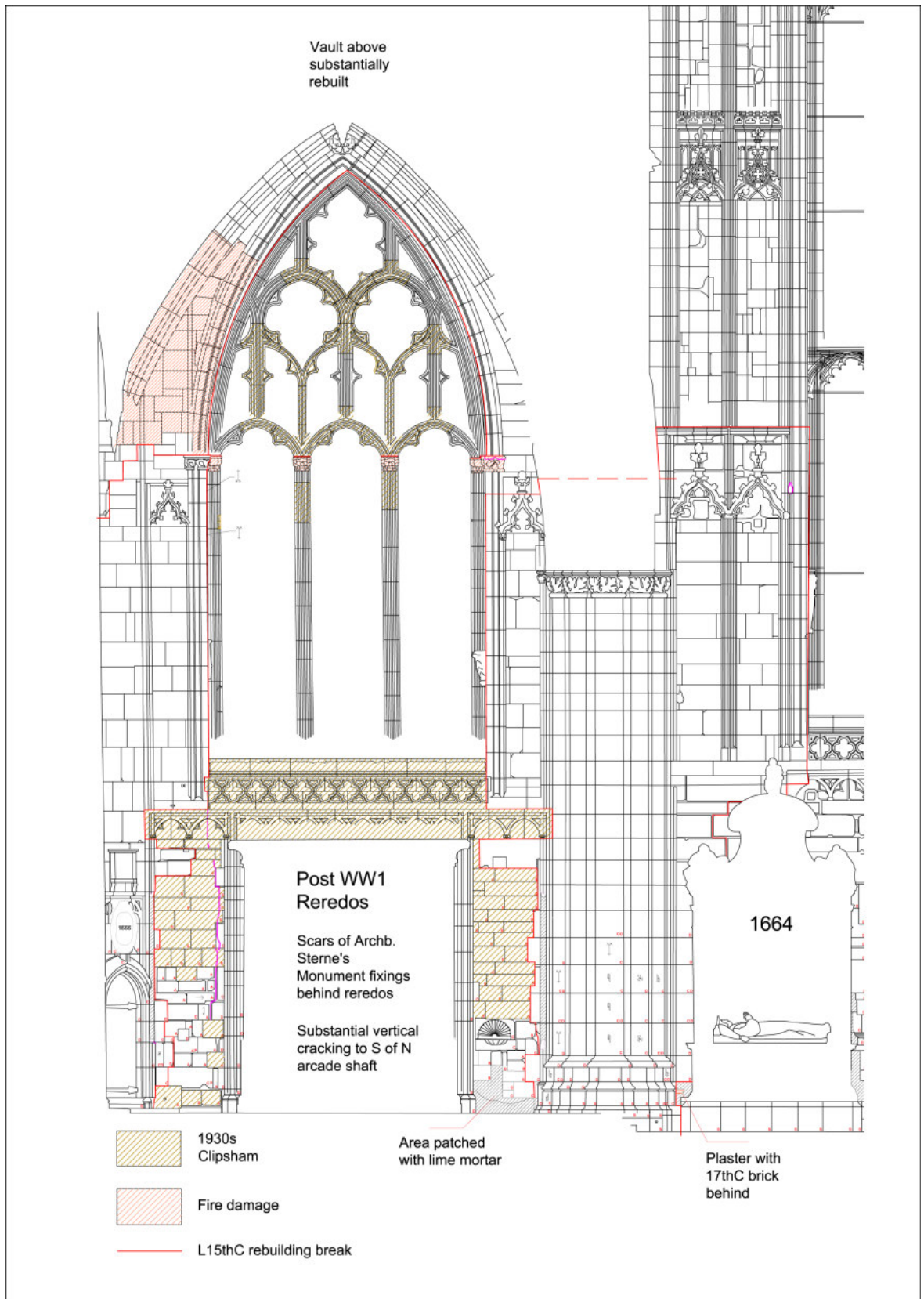


Figure 180: St. Stephen's Chapel, east wall showing historic repairs (Photogrammetry - the Downland Partnership/Dean and Chapter of York Minster)

YORK MINSTER
EAST FRONT INTERIOR
 Sill-level walkway

North passage
 West wall
 East facing elevation

Drawn by AH @ 1:20
 Digitised by AH
 August 2007

TO
 GREAT EAST
 WINDOW SILL

TOOLING AND PHASING

-  12thC axe
-  14th-15thC claw
-  15thC punch
-  15thC drag
-  15thC re-building using Huddleston stone



Figure 181: East Front interior, north passage at sill level, west wall, showing rear faces of reconstructed masonry

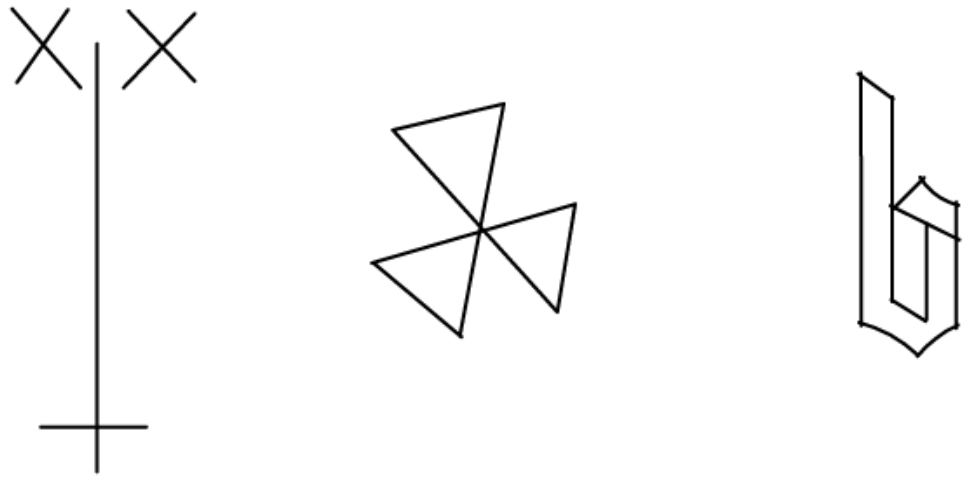


Figure 182: St. Stephen's Chapel, masons' marks associated with Huddleston stonework



Figure 183: East Front, south turret niche, Level A

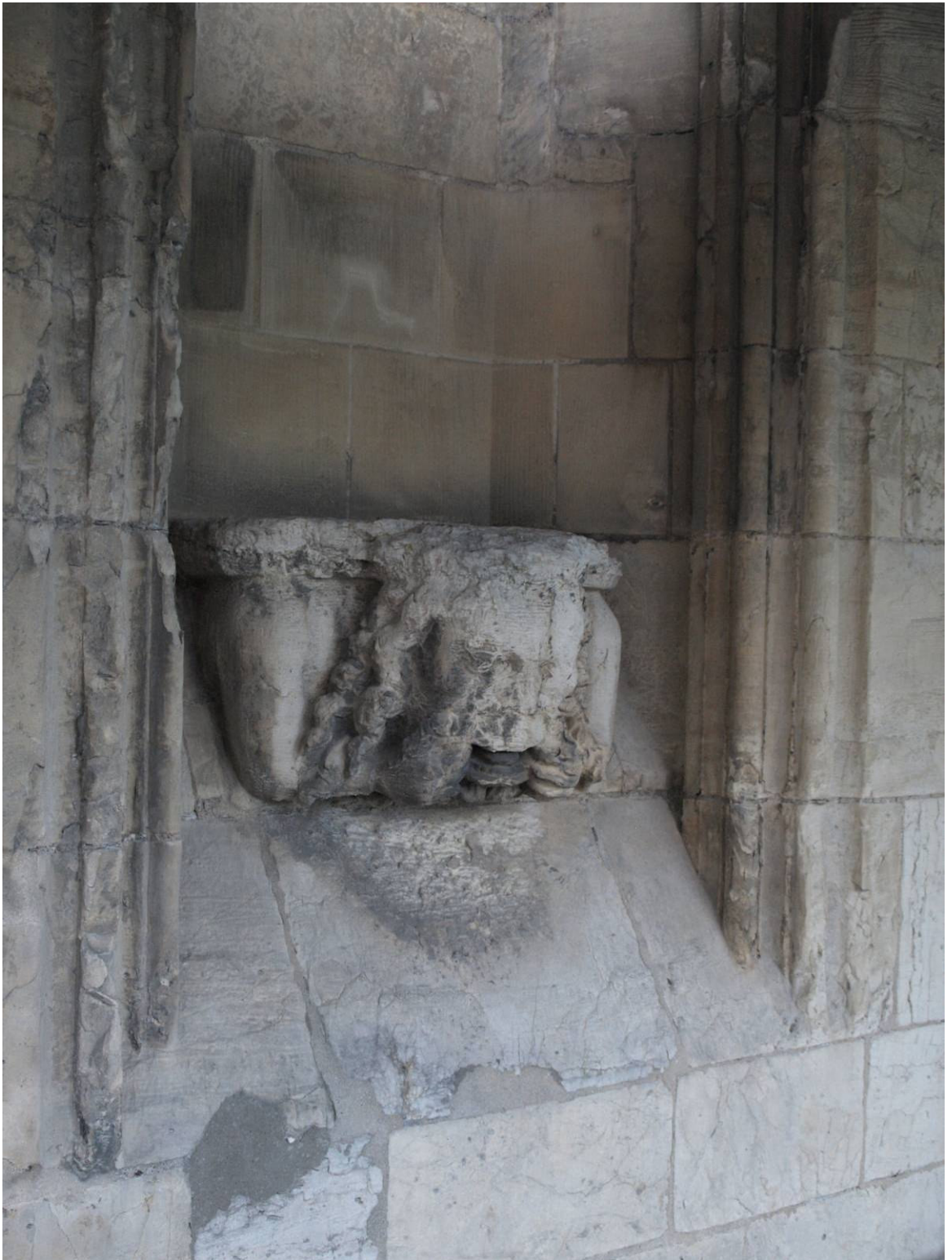


Figure 184: East Front, base of south turret niche, Level A

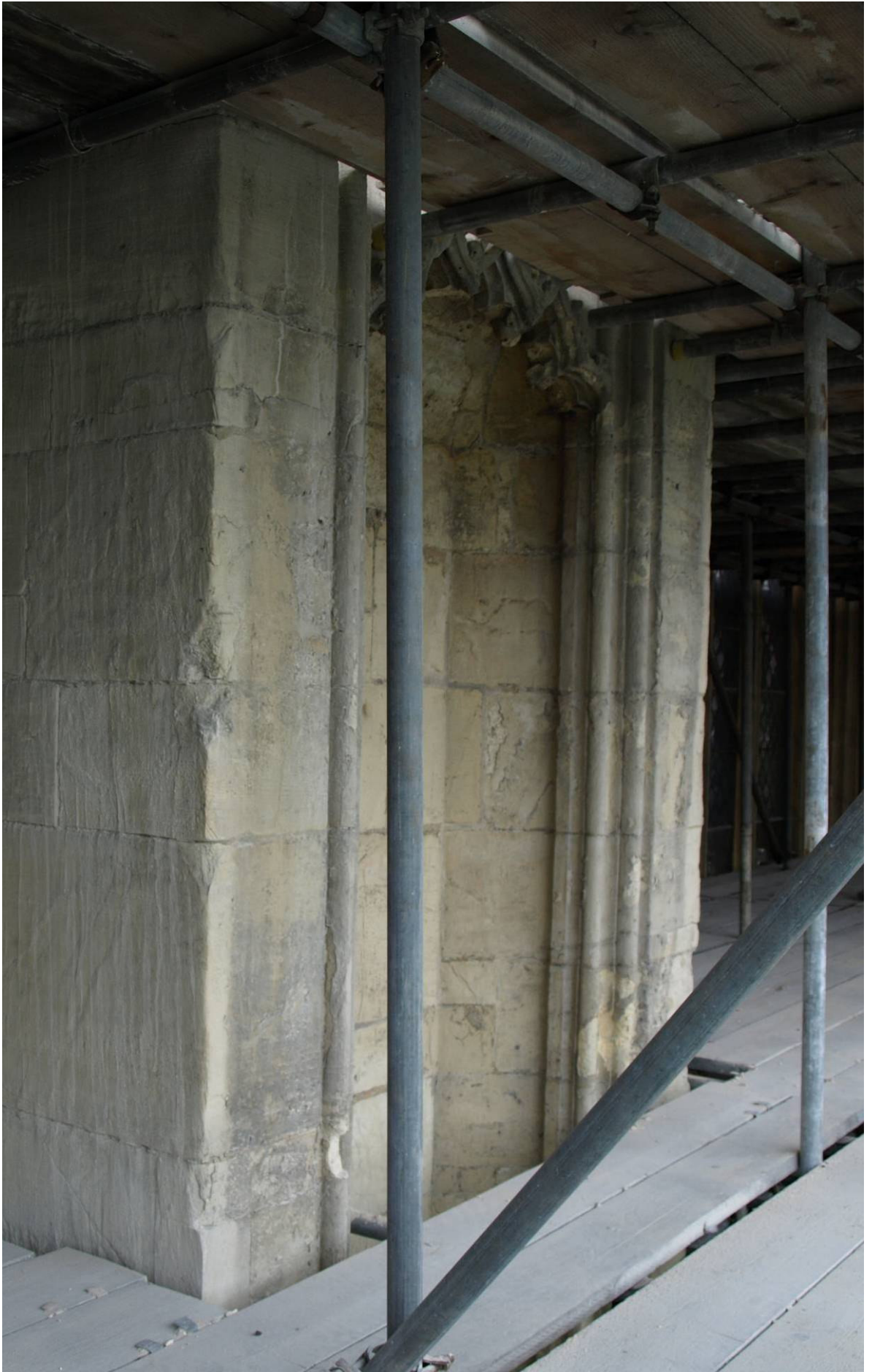


Figure 185: East Front, niche in south buttress, Level A



Figure 186: East Front, detail of canopy in south buttress showing previous surface repair and decaying carvings, Level A



Figure 187: East Front, base of niche in south buttress, Level A

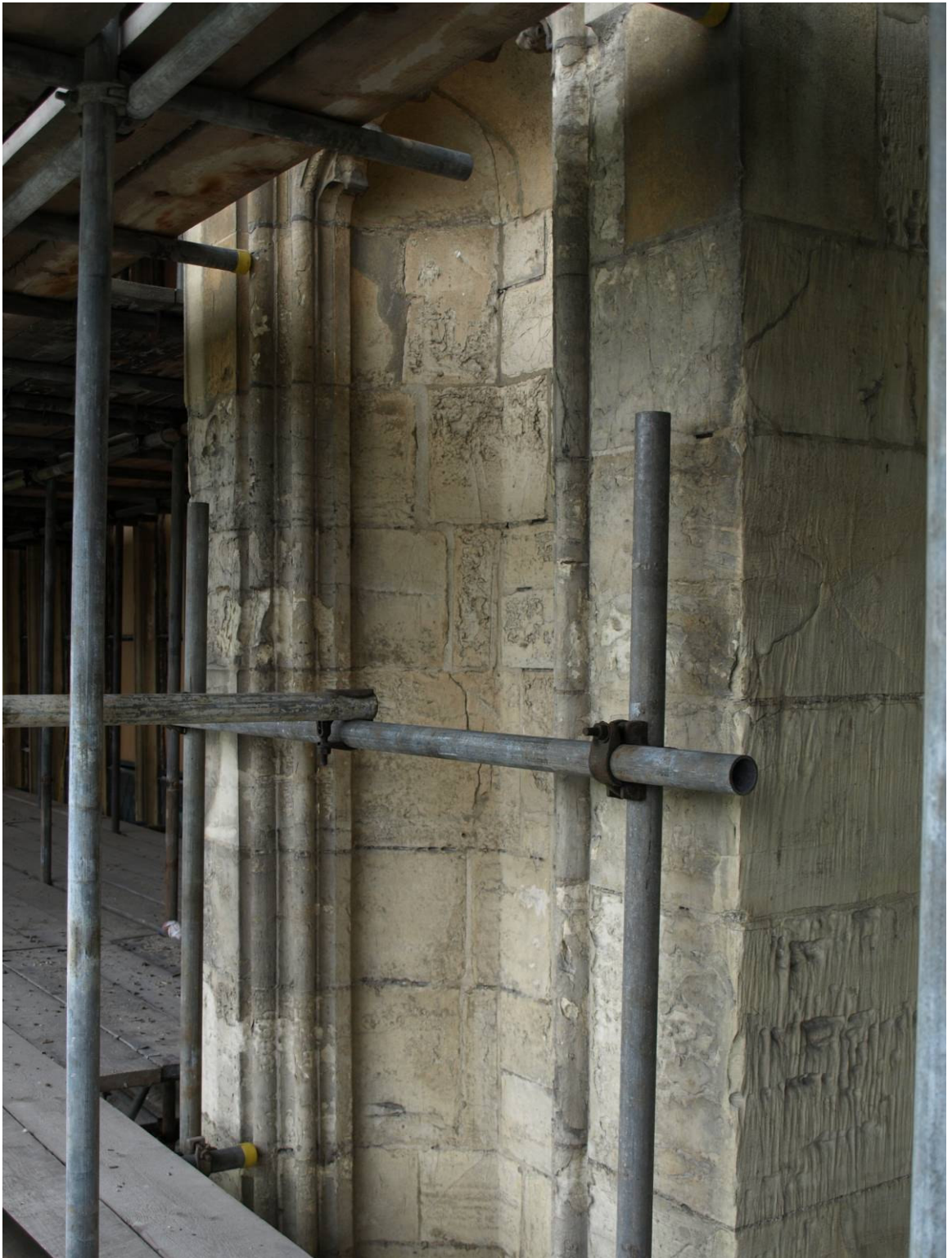


Figure 188: East Front, niche in north buttress, Level A

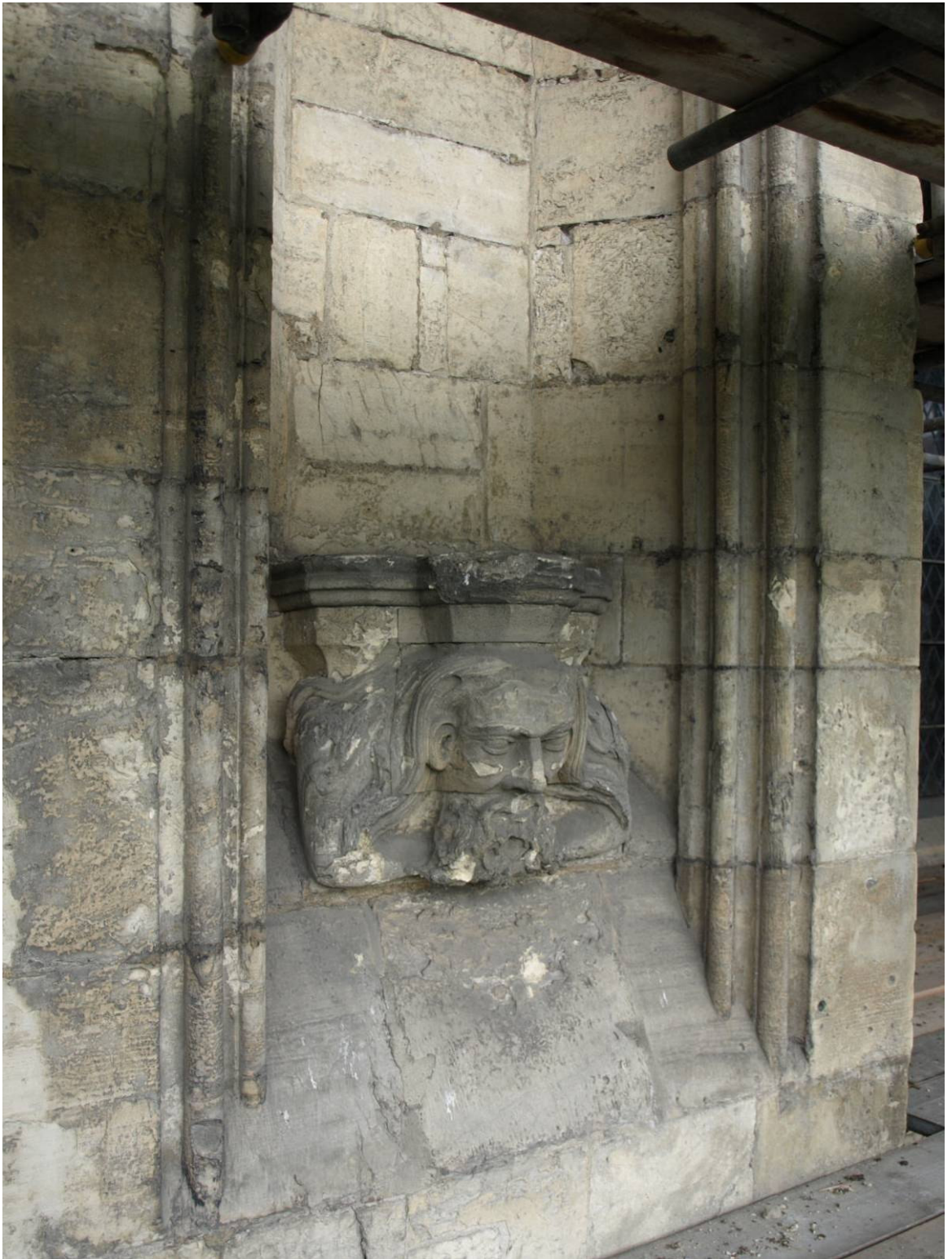


Figure 189: East Front, base of niche in north buttress, Level A



Figure 190: East Front, canopy in north-east turret, Level A



Figure 191: East Front, detail of holes for statuary fixings in niche in north-east turret, Level A

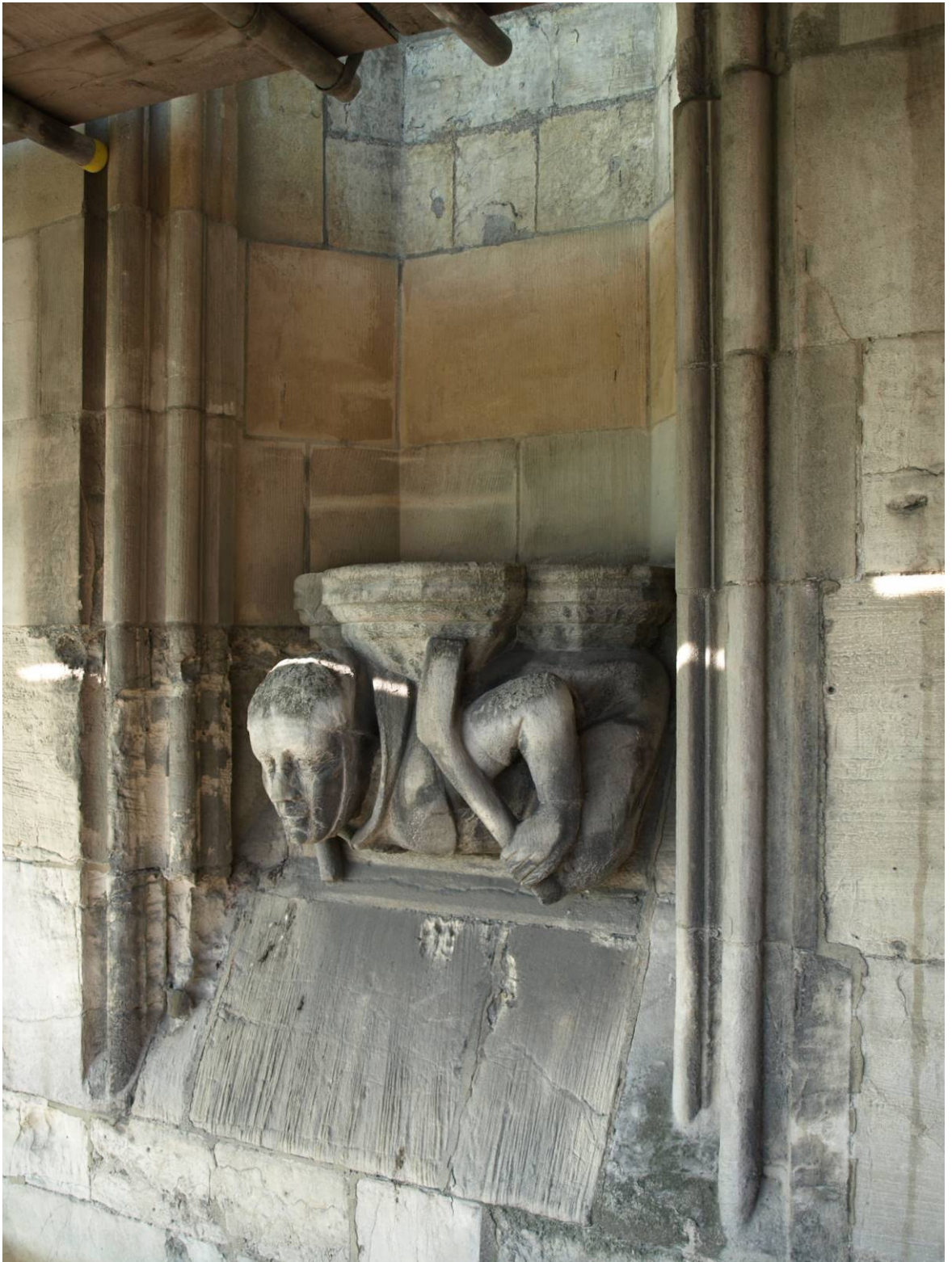


Figure 192: East Front, base of niche in north-east turret, Level A



Figure 193: East Front, Percy Helm above niche in south-east turret, Level A



Figure 194: East Front, detail of metal fixing for statuary in rear of niche in south-east turret, Level A



Figure 195: East Front, detail of metal fixing for statuary in right-hand jamb of niche in south-east turret, Level A



Figure 196: East Front, window in south-east turret, Level A



Figure 197: East Front, canopy above niche to south of Great East Window, Level A



Figure 198: East Front, detail of canopy above niche to south of Great East Window, Level A



Figure 199: East Front, base of niche to south of Great East Window, Level A



Figure 200: East Front, canopy above niche to north of Great East Window, Level A



Figure 201: East Front, canopy above niche to north of Great East Window, Level A



Figure 202: East Front, base of niche to north of Great East Window, Level A



Figure 203: Great East Window sill, with carved heads beneath, Level A

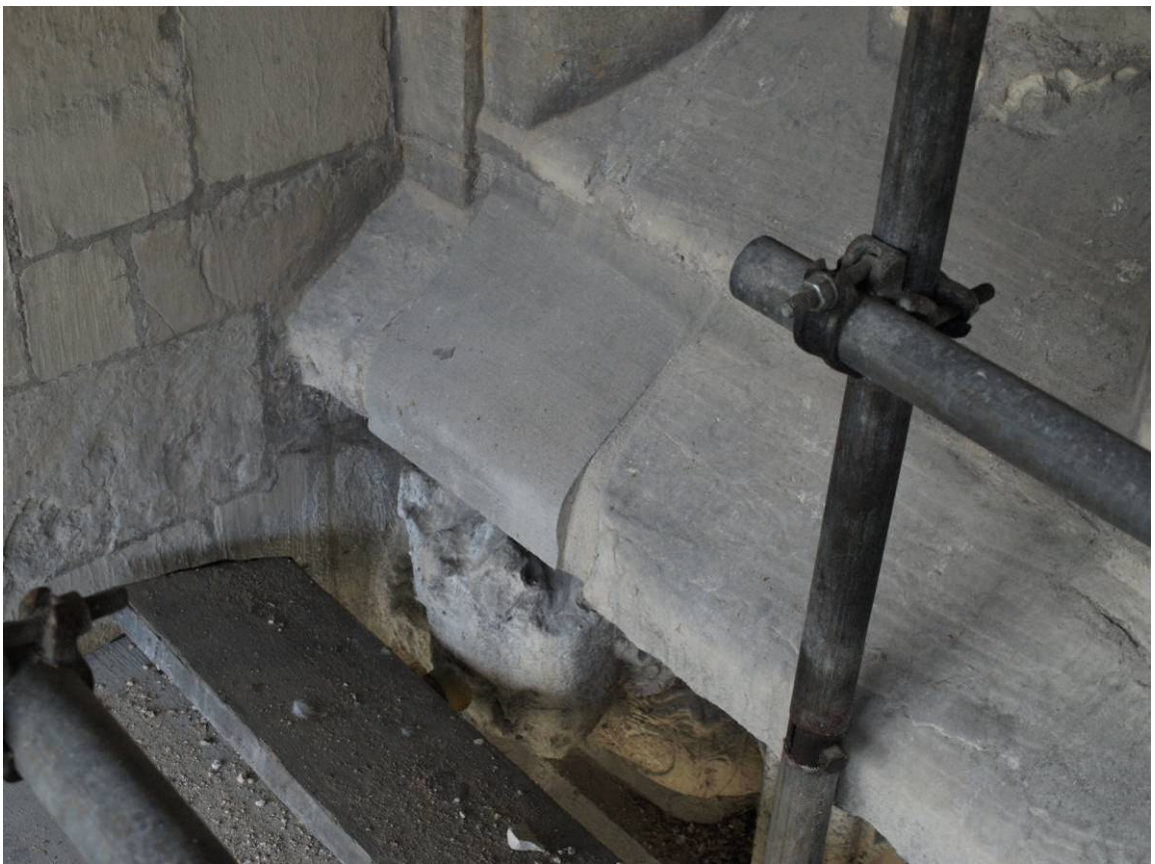


Figure 204: East Front, carved heads beneath sill of Great East Window showing bond between south carving and south buttress, Level A



Figure 205: East Front, carved heads beneath sill of Great East Window showing bond between north carving and north buttress, Level A



Figure 206: Carved cornice-detail, easternmost bay of south aisle, Level B



Figure 207: Junction between south-aisle cornice and south-east turret, Level B



Figure 208: Junction between north-aisle cornice and north-east turret, Level B



Figure 209: Easternmost bay, south-aisle parapet, Level B



Figure 210: Easternmost bay, north-aisle parapet, Level B



Figure 211: East Front, recesses in south-east turret, Level B



Figure 212: East Front, recesses in north-east turret, Level B

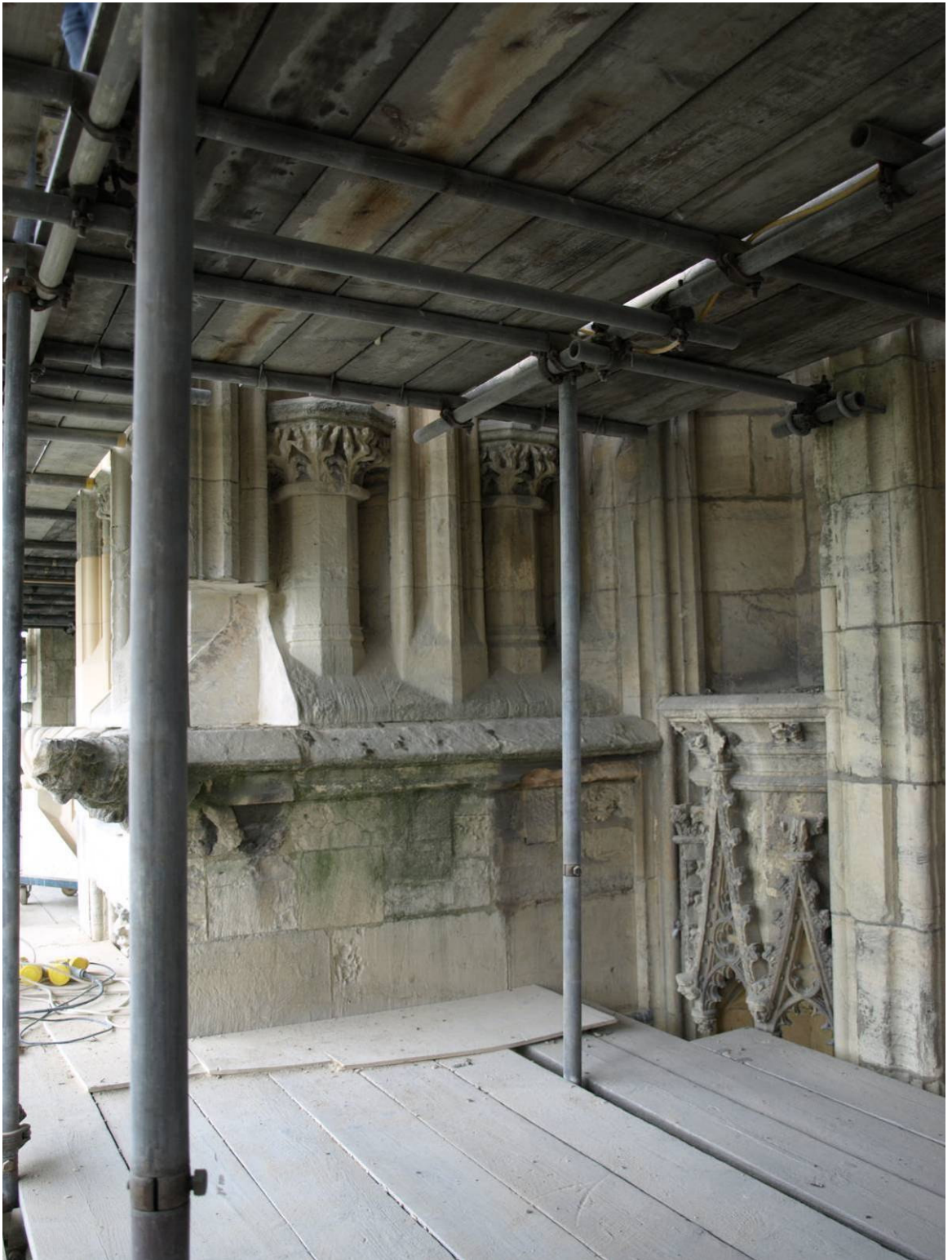


Figure 213: East Front, niche-bases and columns within south buttress and to south of Great East Window, Level B



Figure 214: East Front, south-buttress column detail, Level B

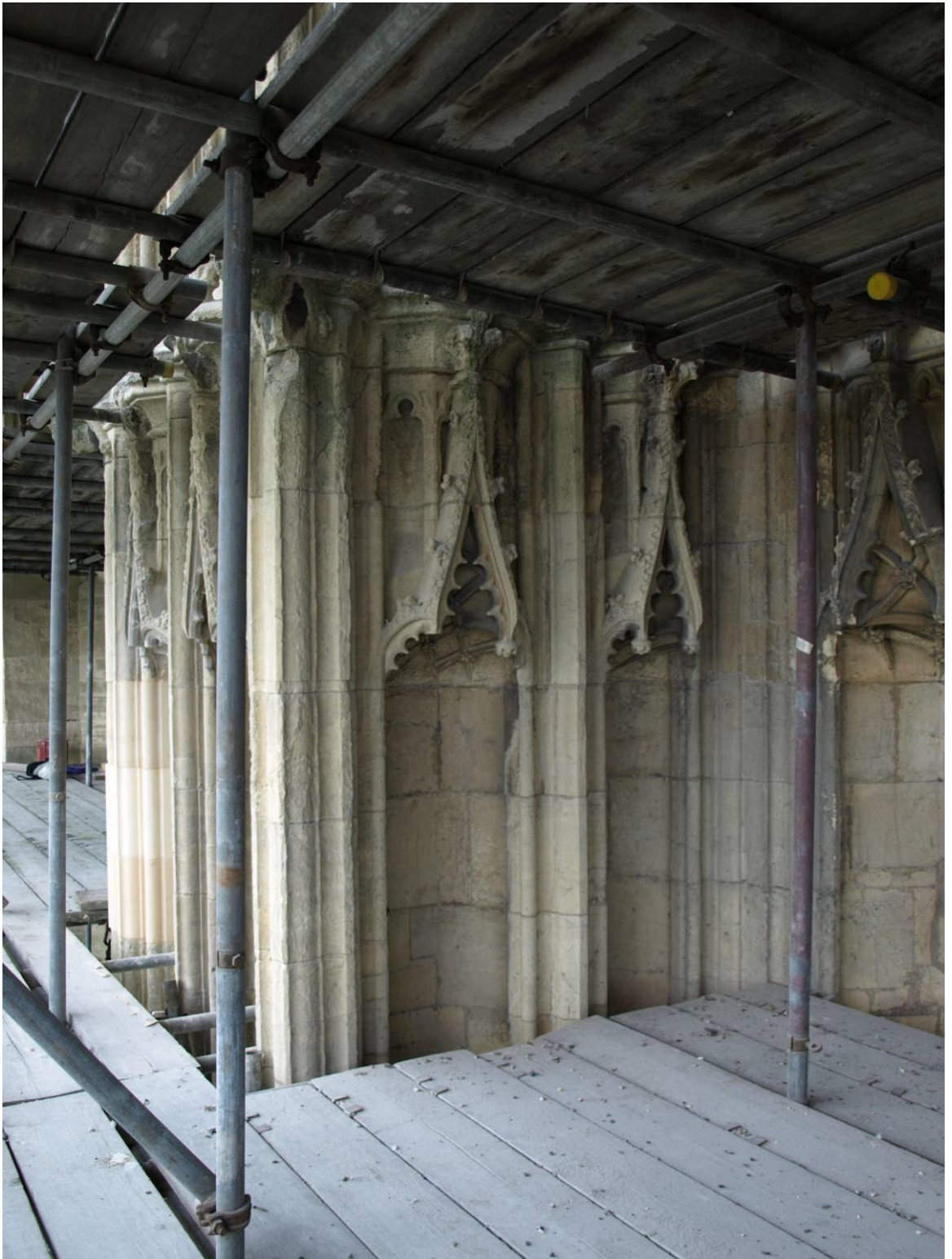


Figure 215: East Front, canopies in south buttress and adjacent to Great East Window, Level B



Figure 216: East Front, canopy in south buttress, Level B

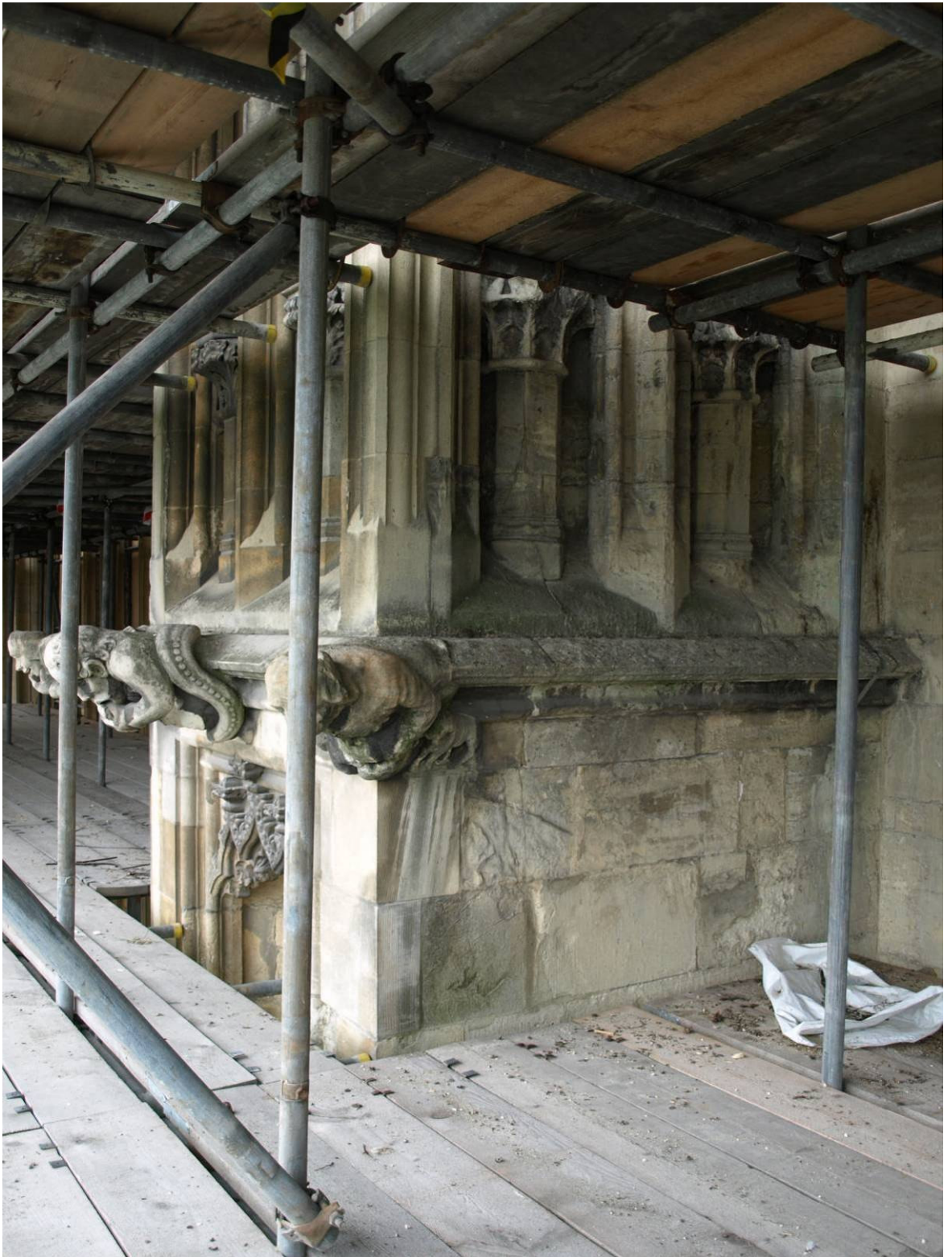


Figure 217: East Front, niche-bases and columns within north buttress, Level B



Figure 218: East Front, north buttress, New Ketton column detail, Level B



Figure 219: East Front, north-buttruss column detail, ?fourteenth century, Level B

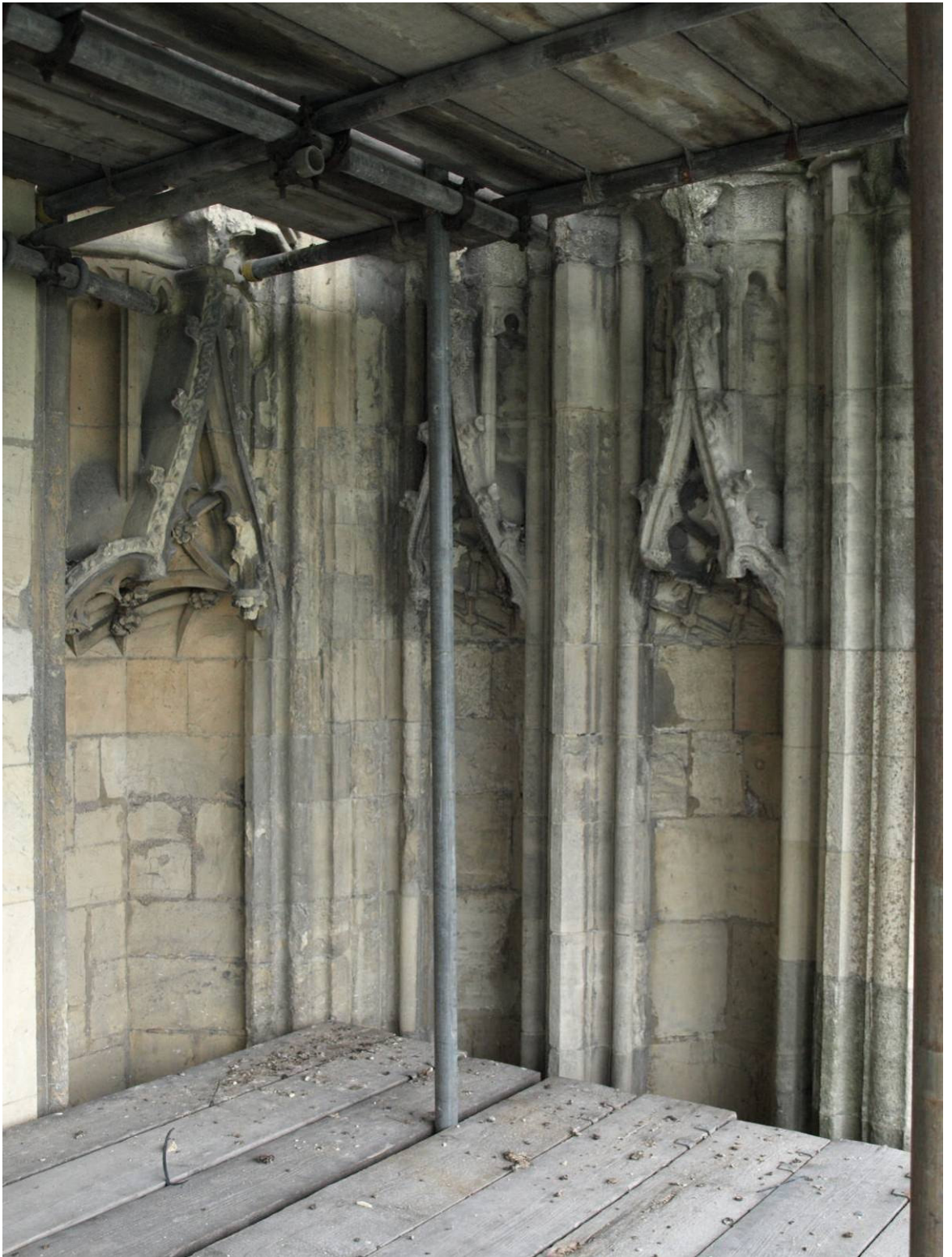


Figure 220: East Front, canopies of niches in north buttress and adjacent to Great East Window, Level B



Figure 221: East Front, detail of canopy in north buttress, Level B



Figure 222: East Front, cusped niches in south-east turret and masonry above south aisle, Level C



Figure 223: East Front, cusped niches in north-east turret and masonry above north aisle, Level C



Figure 224: East Front, junction between south-east turret and masonry above south aisle, Level C



Figure 225: East Front, niche consoles in south buttress and adjacent to Great East Window, Level C



Figure 226: East Front, south-buttress nineteenth-century console detail, Level C



Figure 227: East Front, south-buttness fourteenth-century console detail, Level C

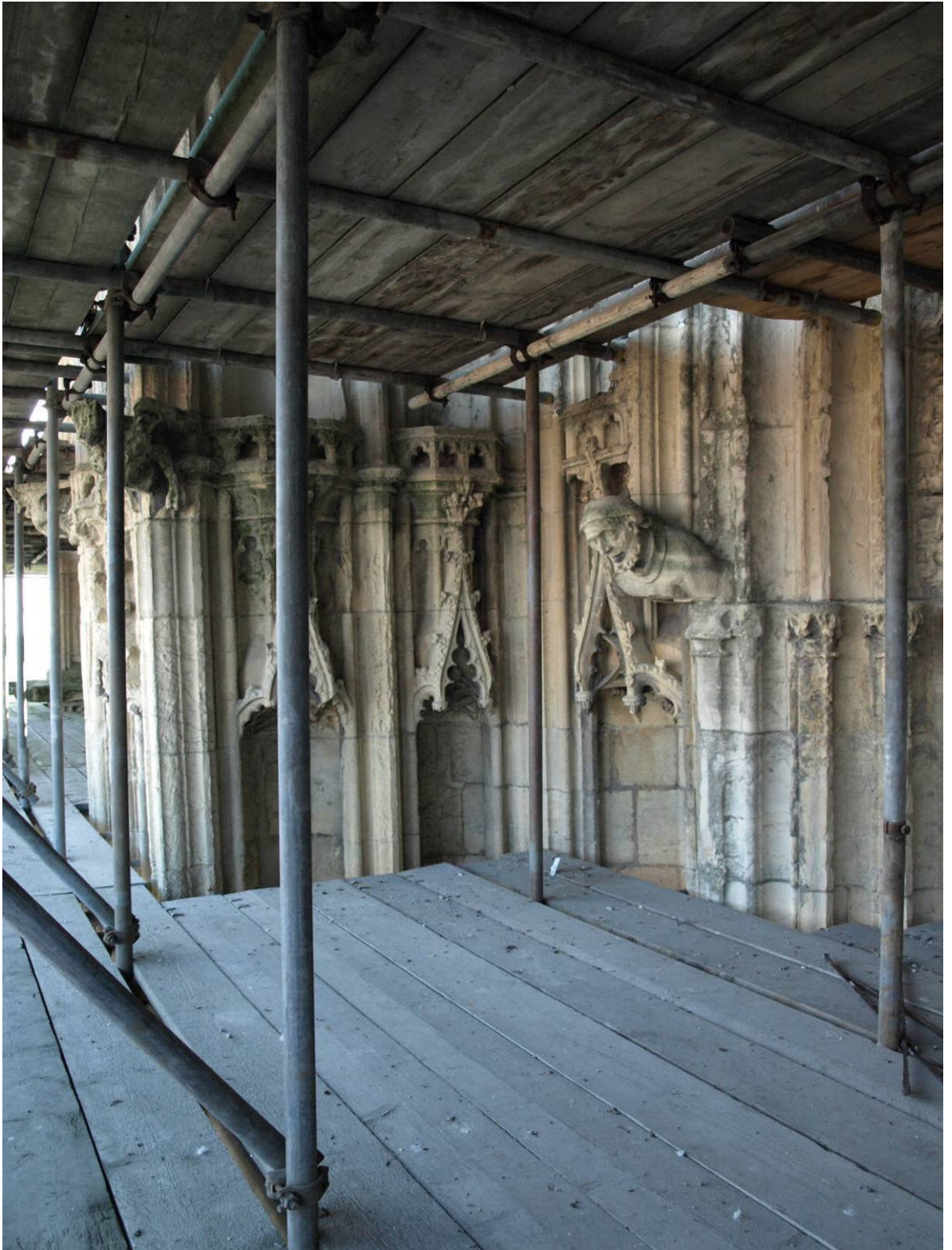


Figure 228: East Front, canopies in south buttress and adjacent to Great East Window, Level C



Figure 229: East Front, niche-canopy detail in south buttress, Level C



Figure 230: East Front, niche-consols in north buttress and adjacent to Great East Window, Level C

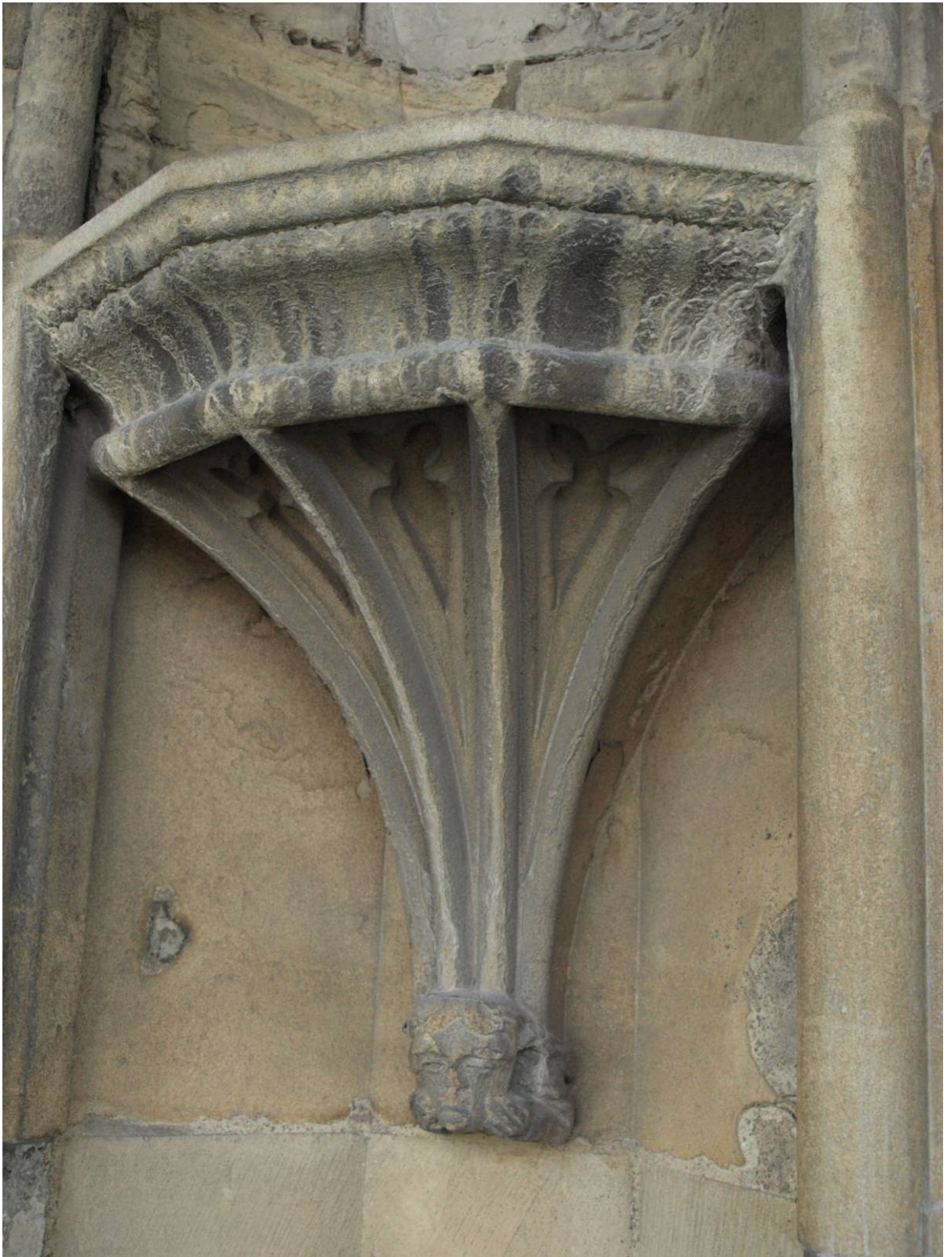


Figure 231: East Front, north-buttress, New Ketton console detail, Level C



Figure 232: East Front, north-buttress nineteenth-century console detail, Level C

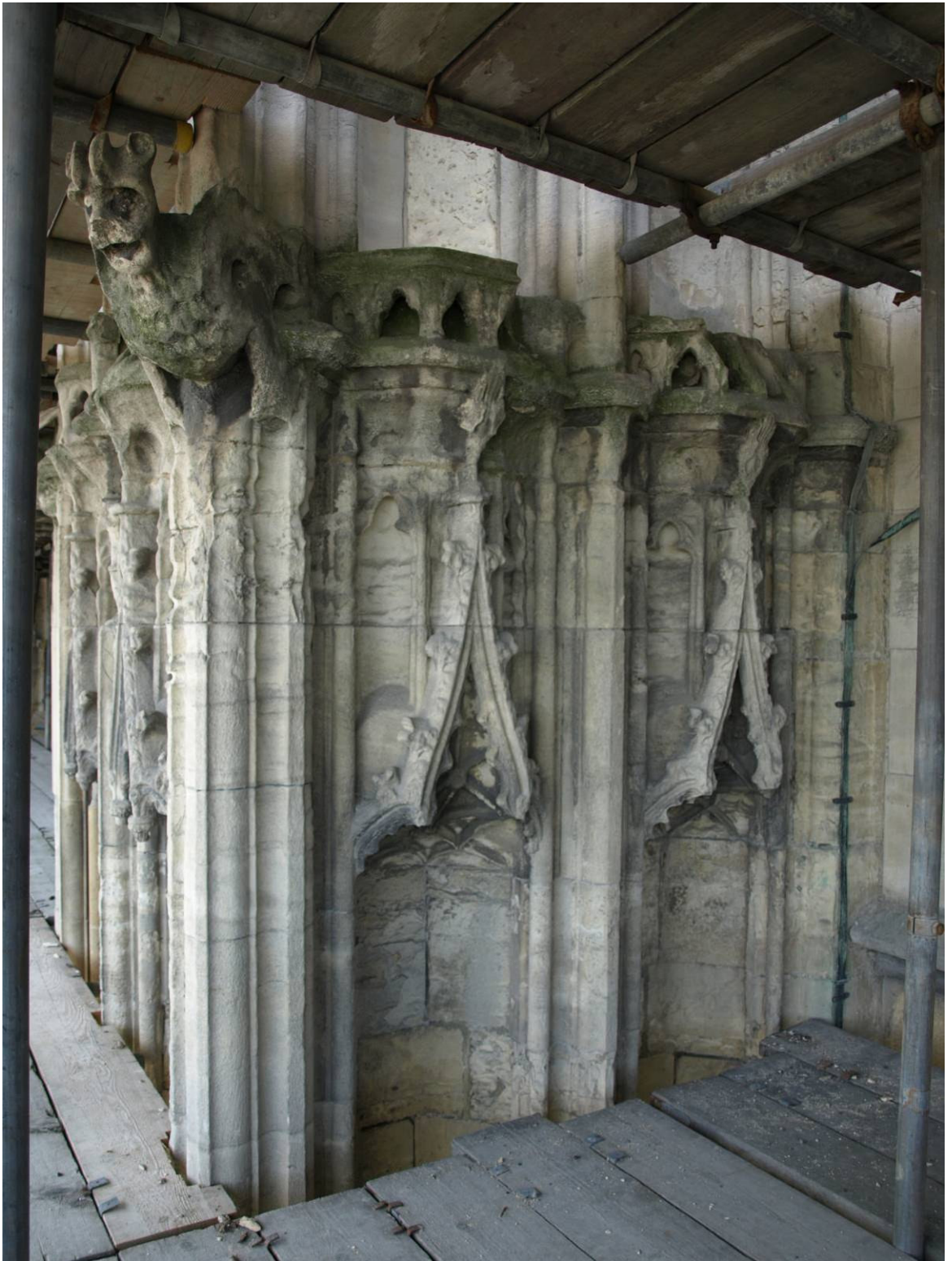


Figure 233: East Front, canopies in north buttress, Level C

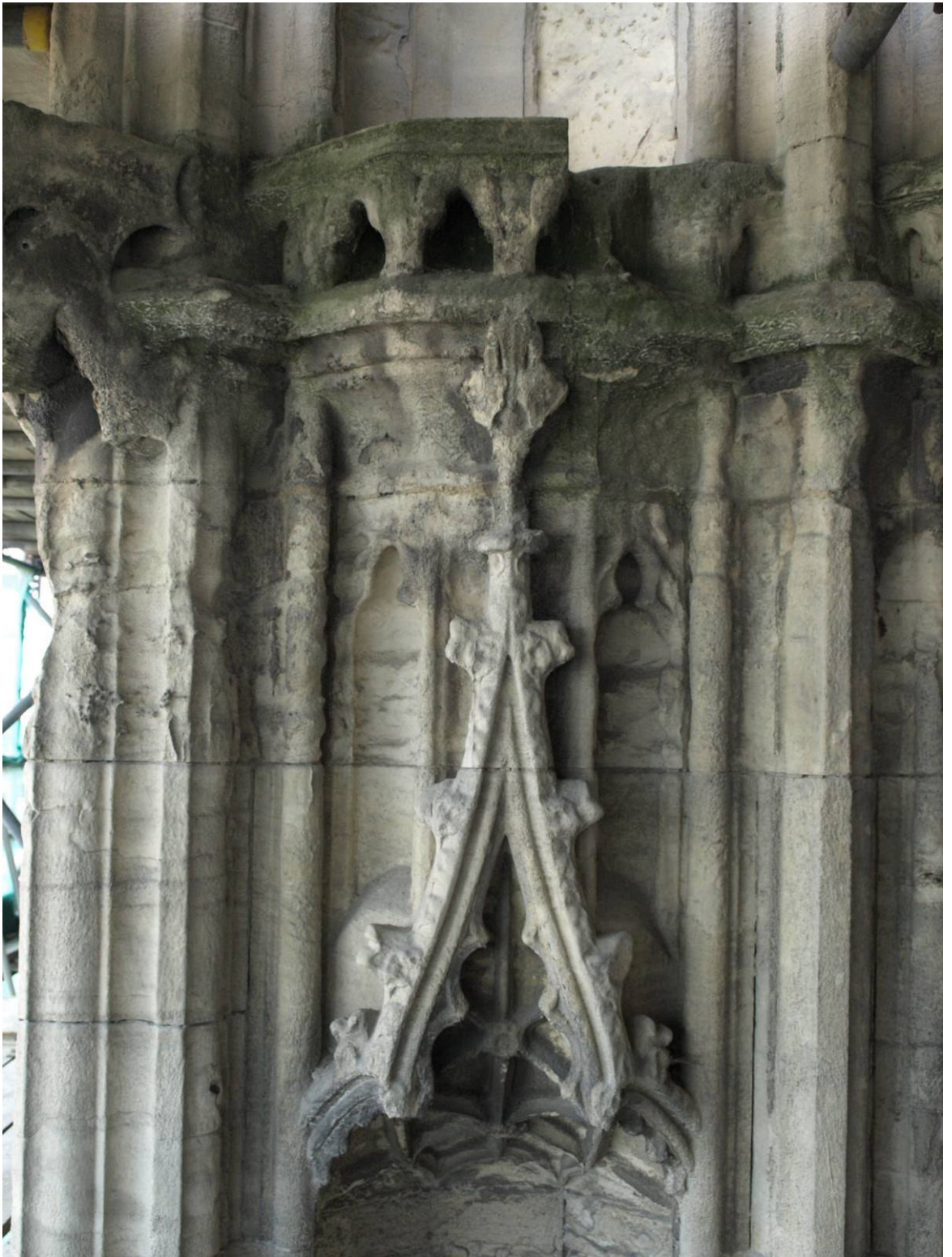


Figure 234: East Front, canopy detail in north buttress, Level C



Figure 235: Lady Chapel, fourteenth-century statue-base, south arcade bay 2



Figure 236: Eastern termination of triforium above south arcade of Thoresby's east end, looking east



Figure 237: Thoresby's east end, south-aisle roof space looking to rear of East Front and tothing joint within angle between aisle wall and triforium



Figure 238: Thoresby's east end, north-aisle roof space looking to rear of East Front and tothing joint within angle between aisle wall and triforium



Figure 239: Thoresby's east end, south-aisle roof space looking to rear of East Front and off-setting in aisle wall



Figure 240: East Front, south-east turret, upper masonry, Level D



Figure 241: East Front, parapet gablets above south aisle, Level D



Figure 242: East Front above south-aisle roof, disused stoolings to rear of parapet, Level D



Figure 243: East Front, upper section of north-east turret, Level D



Figure 244: East Front, north-east turret New Ketton grotesque detail, Level D



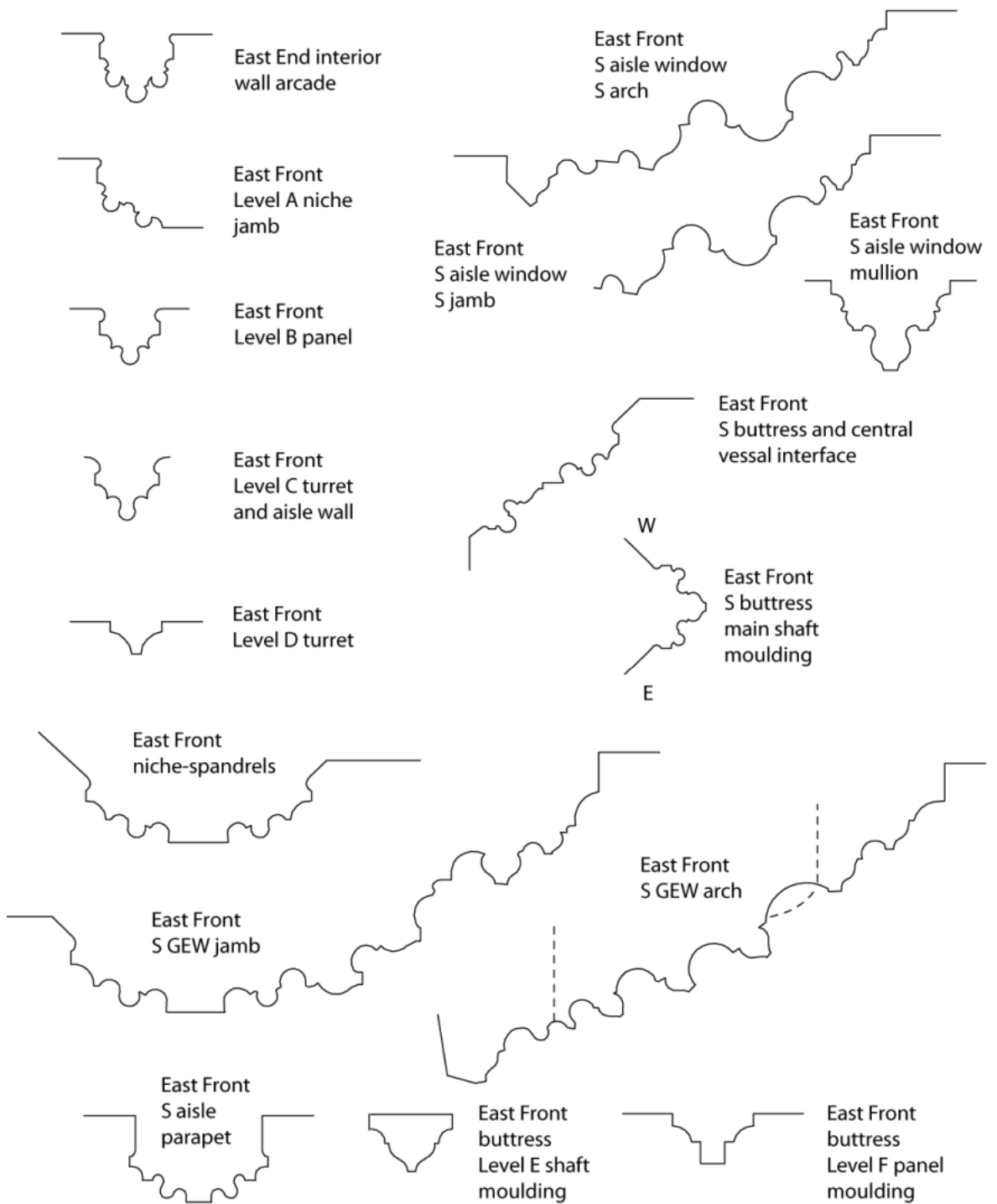
Figure 245: East Front, north-east turret nineteenth-century grotesque detail, Level D



Figure 246: East Front, parapet gablets above north aisle, Level D



Figure 247: Thoresby's east end, north aisle pinnacles



YORK MINSTER - East Front
 Moulding schemes (sketched - not to scale)
 Orientation N-S unless otherwise shown
 AH August 2010

Figure 248: Moulding schemes

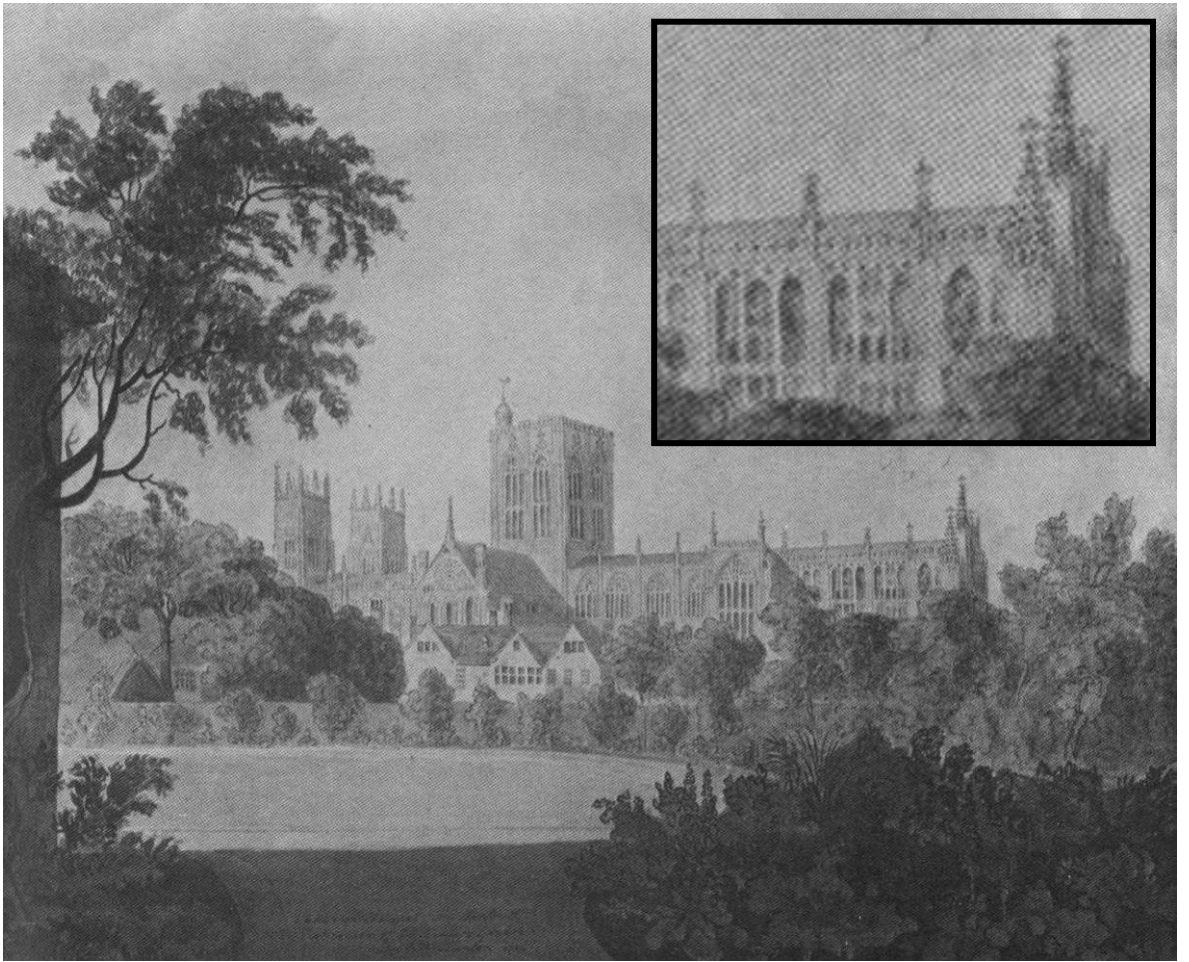


Figure 249: John Hunter - The Minster, 'Taken on the spot from the South-East corner of Dr Hunter's Garden', 1784, detail in inset (Murray et al 1990, 113, No. 97)

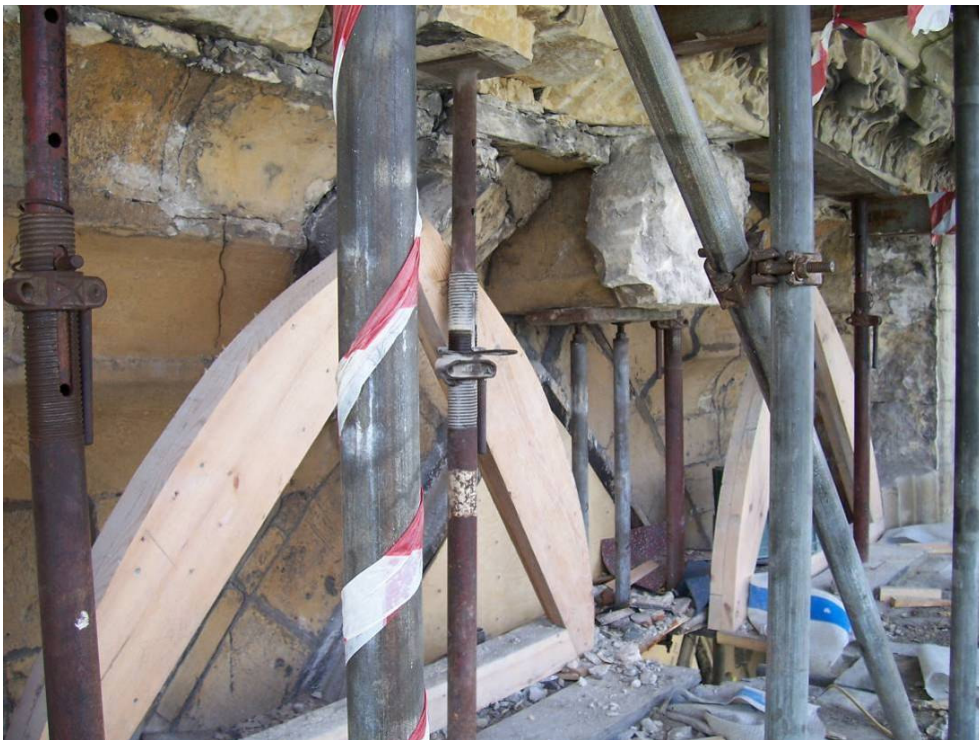


Figure 250: Thoresby's east end, north clerestory, easternmost bay during reconstruction, April 2006

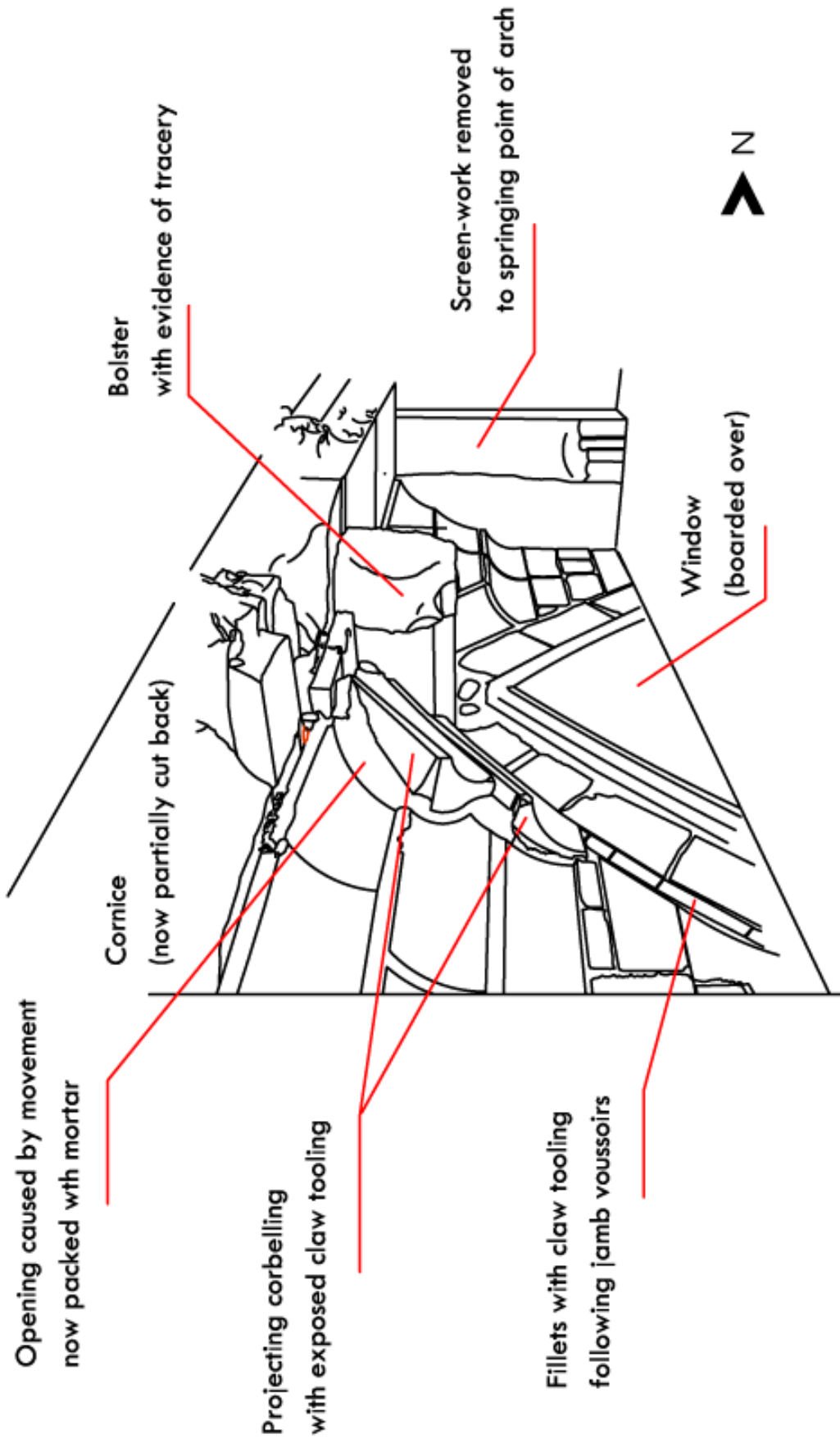


Figure 251: Thoresby's east end, sketch of masonry behind blind north-clerestory screenwork during repair, April 2006



Figure 252: Thoresby's east end, north clerestory bay 2



Figure 253: Thoresby's east end, easternmost bay, ?medieval infill to separated masonry with later 1950s cement patching

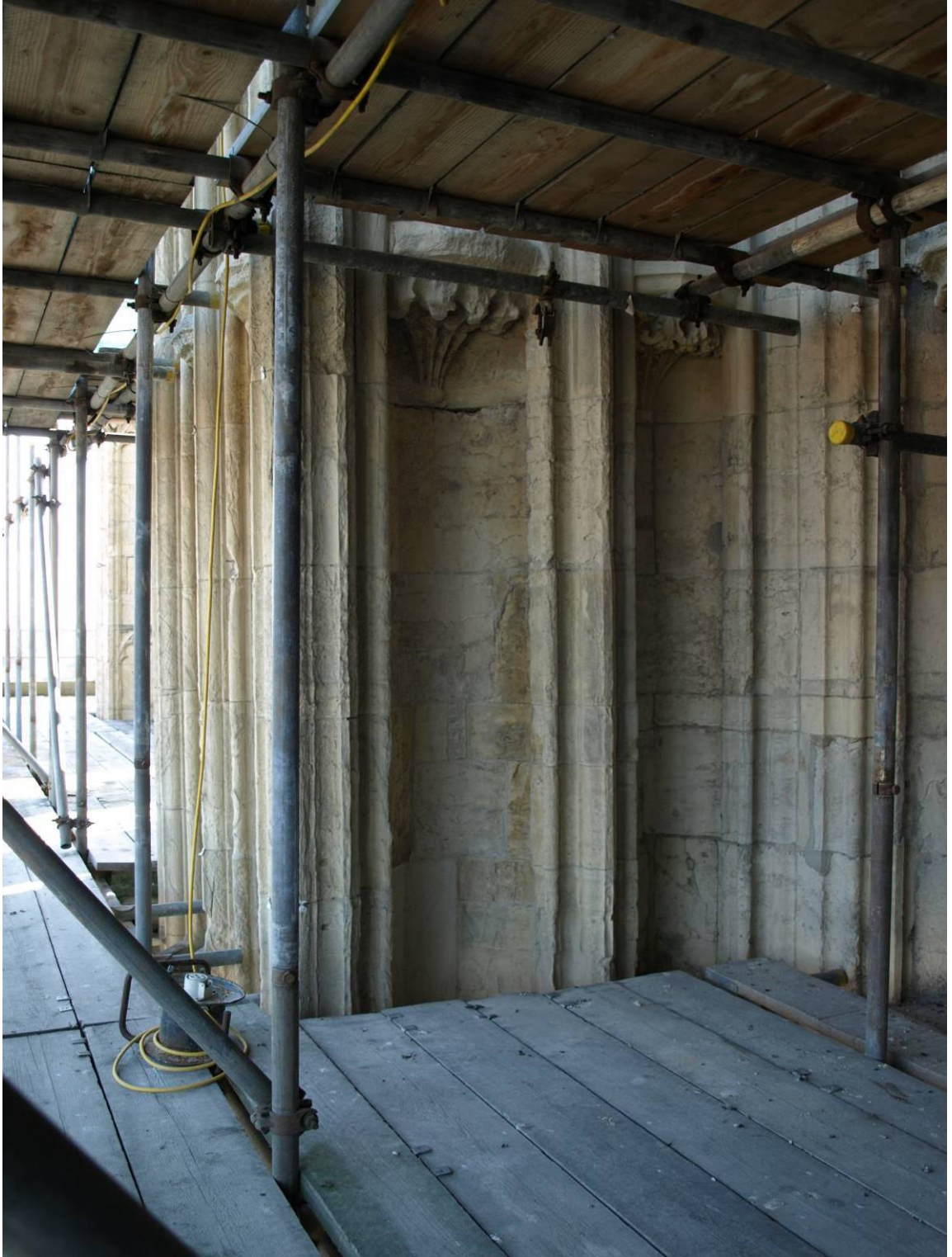


Figure 254: East Front, foliated niche-pedestals in south buttress, Level D



Figure 255: East Front, fourteenth-century niche-pedestal in south buttress, Level D

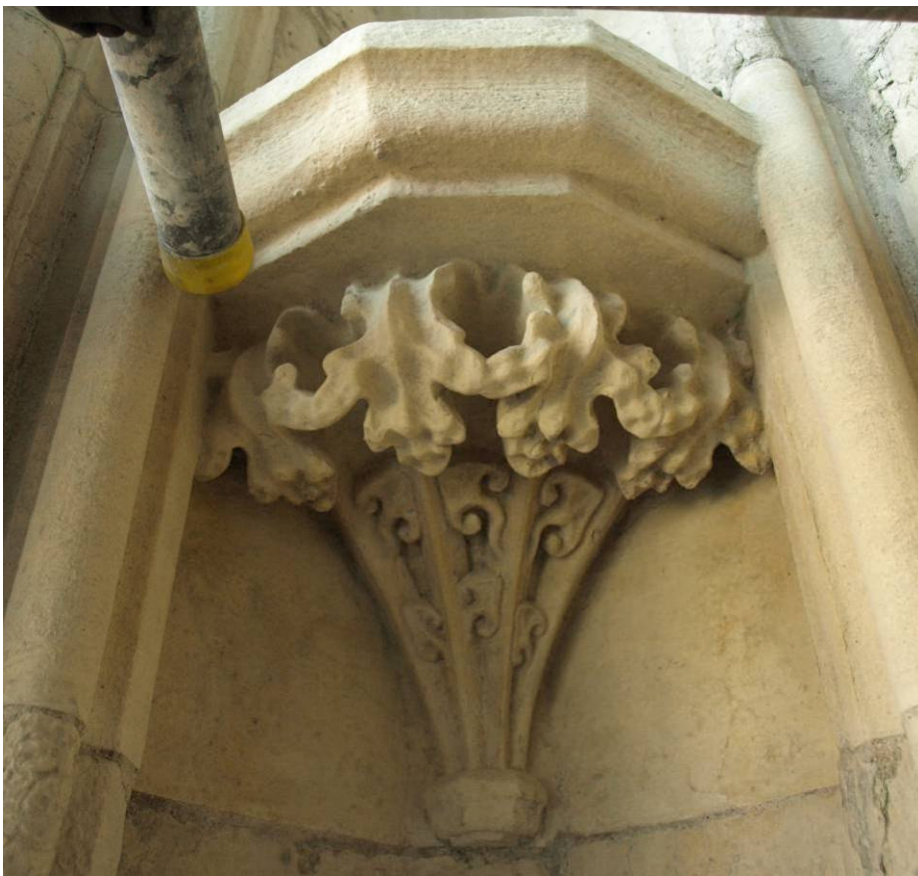


Figure 256: East Front, nineteenth-century niche-pedestal in south buttress, Level D



Figure 257: East Front, foliated niche-pedestals in north buttress, Level D



Figure 258: East Front, nineteenth-century niche-pedestal in north buttress, Level D



Figure 259: East Front, nineteenth-century niche-pedestal in north buttress, Level D



Figure 260: East Front, niche canopies in south buttress, Level D



Figure 261: East Front, nineteenth-century canopy in south buttress, Level D

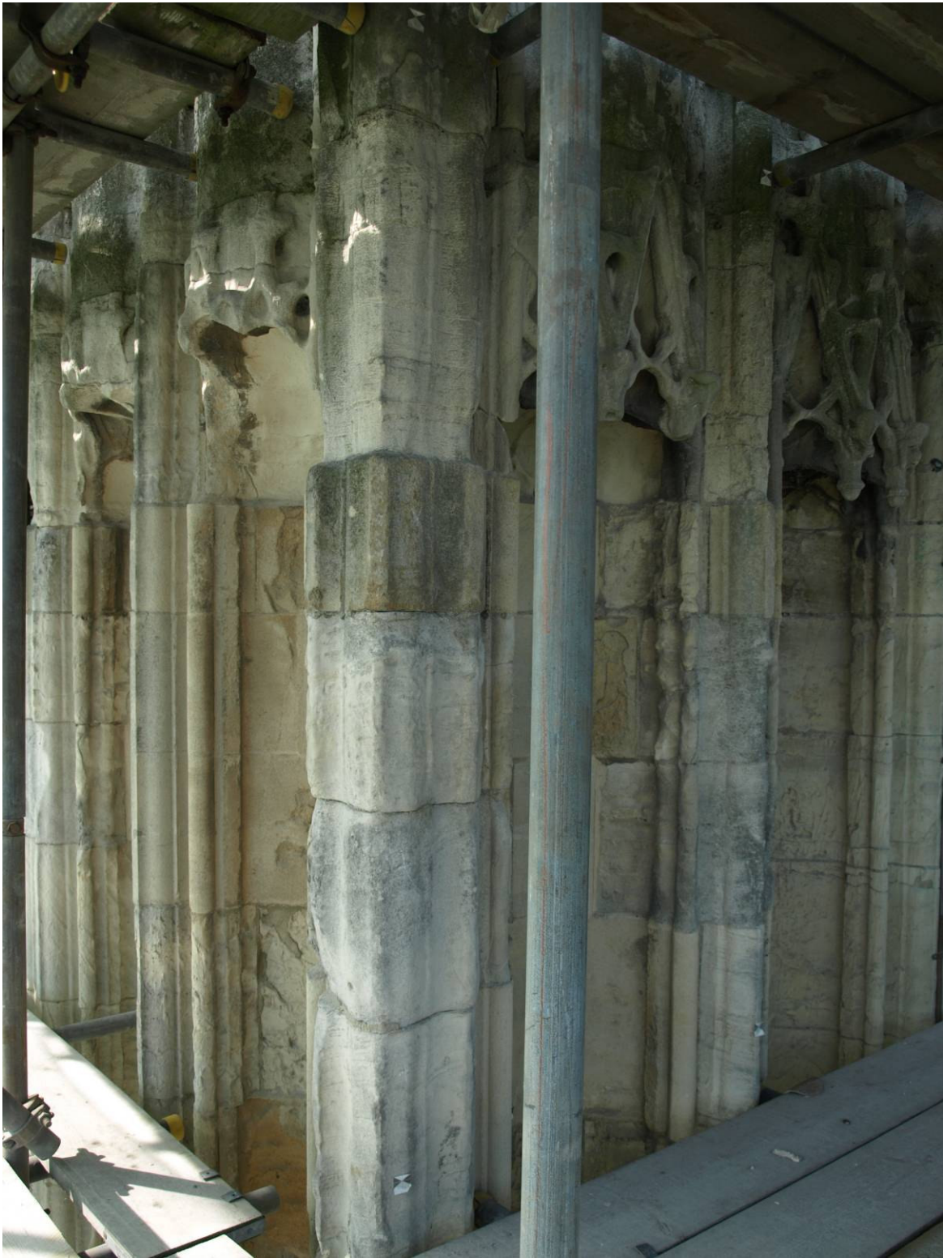


Figure 262: East Front, canopies in north buttress, Level D

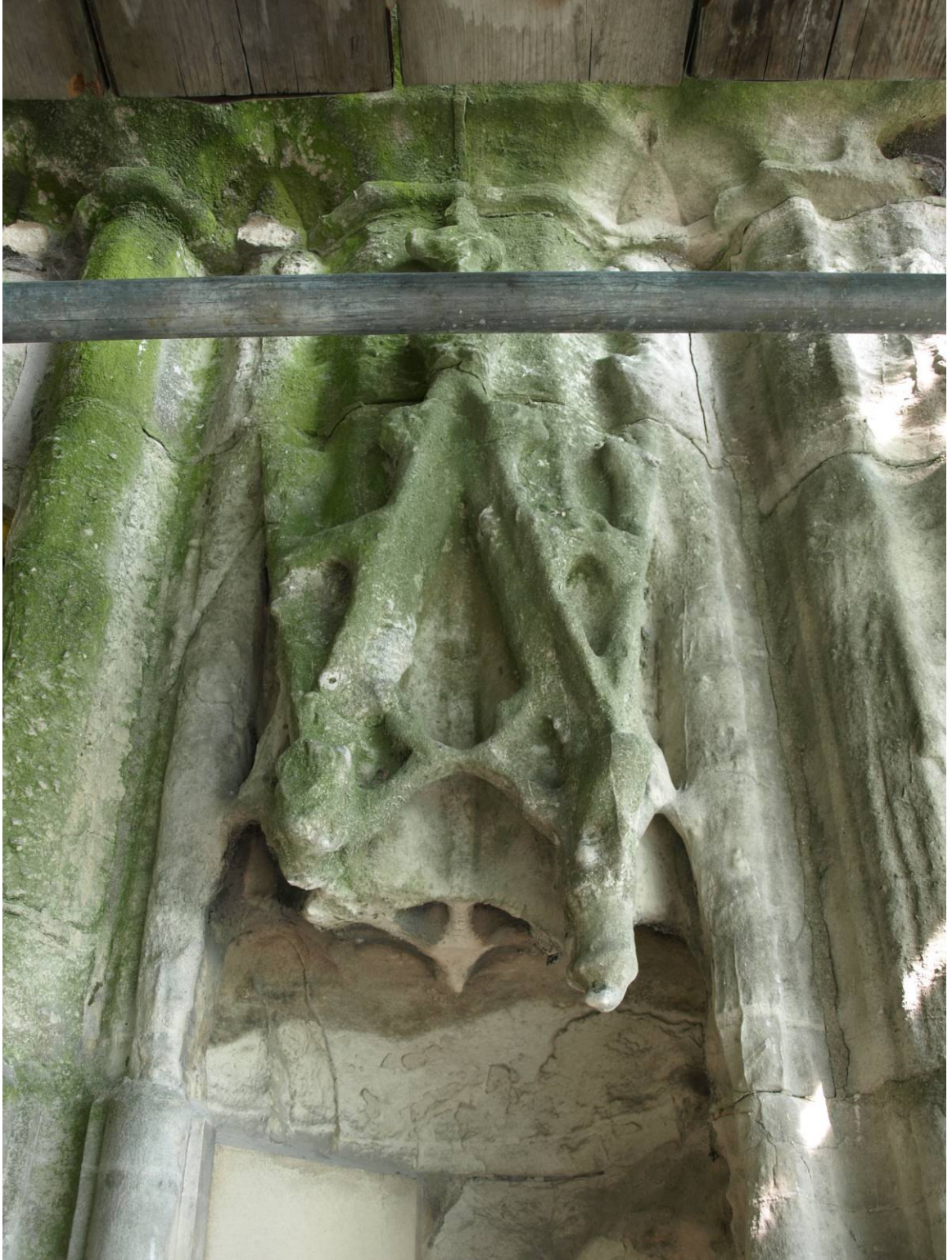


Figure 263: East Front, nineteenth-century canopy in north buttress, Level D

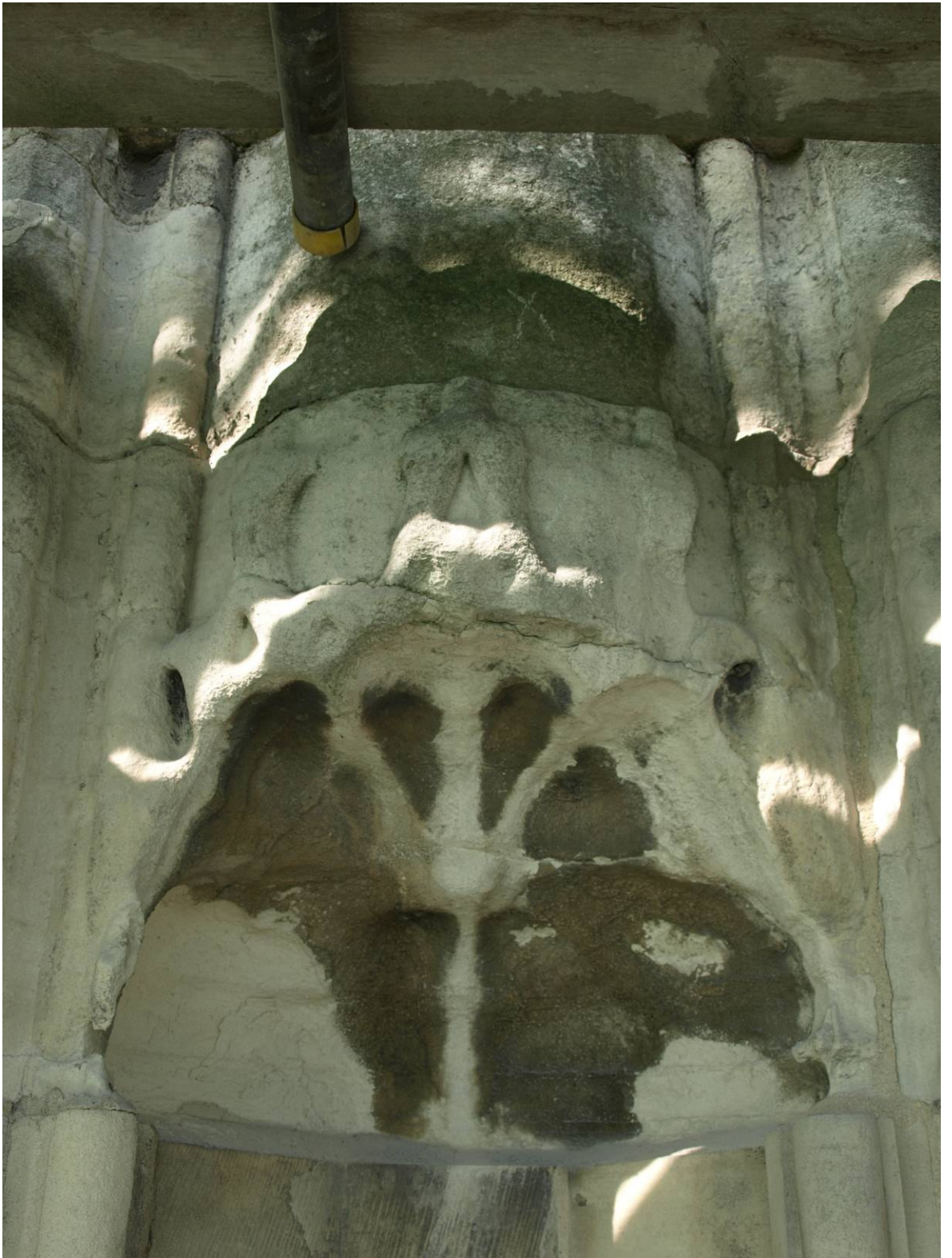


Figure 264: East Front, nineteenth-century canopy in north buttress, Level D



Figure 265: East Front interior, fourteenth-century niche detail



Figure 266: East Front interior, fourteenth-century niche detail



Figure 267: East Front interior, fourteenth-century niche detail



Figure 268: East Front interior, fourteenth-century door-head detail



Figure 269: Arch construction at Liverpool Cathedral, (Kennerley 1991, 90)



Figure 270: East Front, fourteenth-century niche-pedestal with later repairs, south side of Great East Window, Level D



Figure 271: East Front, nineteenth-century niche-pedestal, north side of Great East Window, Level D



Figure 272: Thoresby's east end, south-clerestory cornice, 1830s



Figure 273: Thoresby's east end, north-clerestory cornice, 1830s with recent replacements (2006)



Figure 274: East Front, west face at main parapet level, south side



Figure 275: East Front, west face, entrance to north buttress stair-turret at main parapet level



Figure 276: East Front, west face at main parapet level, north side



Figure 277: Roof space, Thoresby's east end; interior face of East Front illustrating fire damage adjacent to nineteenth-century replacement ashlar



Figure 278: East Front, south-butress corona, Level H



Figure 279: East Front, north-butress corona, Level H



Figure 280: East Front, south-buttress spirelet, Level I



Figure 281: East Front, south-buttress spirelet, Level I, showing differentiation between nineteenth and eighteenth-century stone types and stages in crocket weathering



Figure 282: East Front, Levels H and I of south buttress during dismantling showing eighteenth-century spirelet upon medieval broach stones



Figure 283: East Front, Level H of south buttress during rebuilding showing medieval broach on inner skin with re-clad exterior



Figure 284: East Front, south buttress-turret Level G during dismantling showing indented nineteenth-century stringcourse

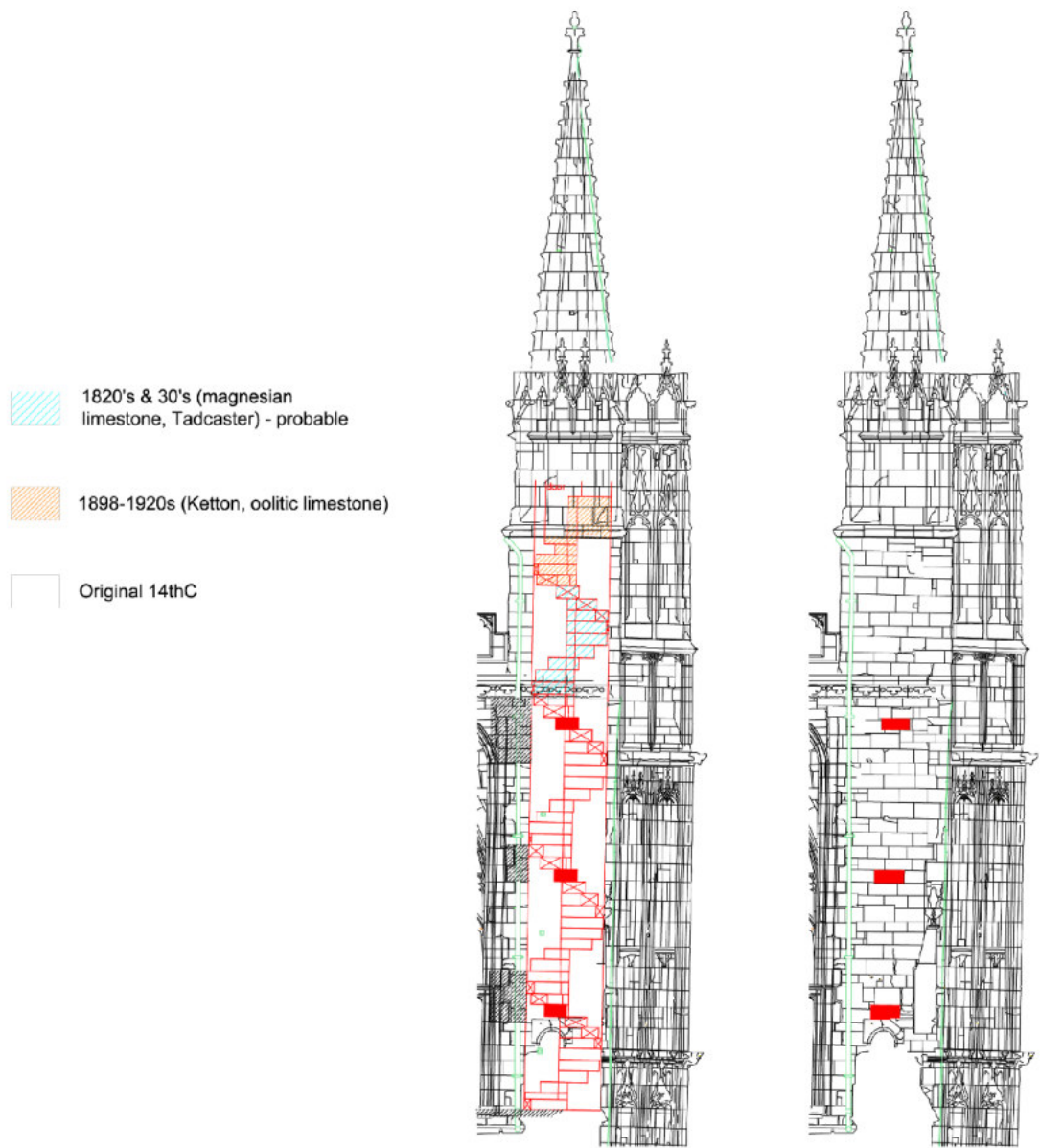


Figure 285: East Front, south buttress, south elevation. Cut-away drawing prepared by John David, historic repair annotation by the author

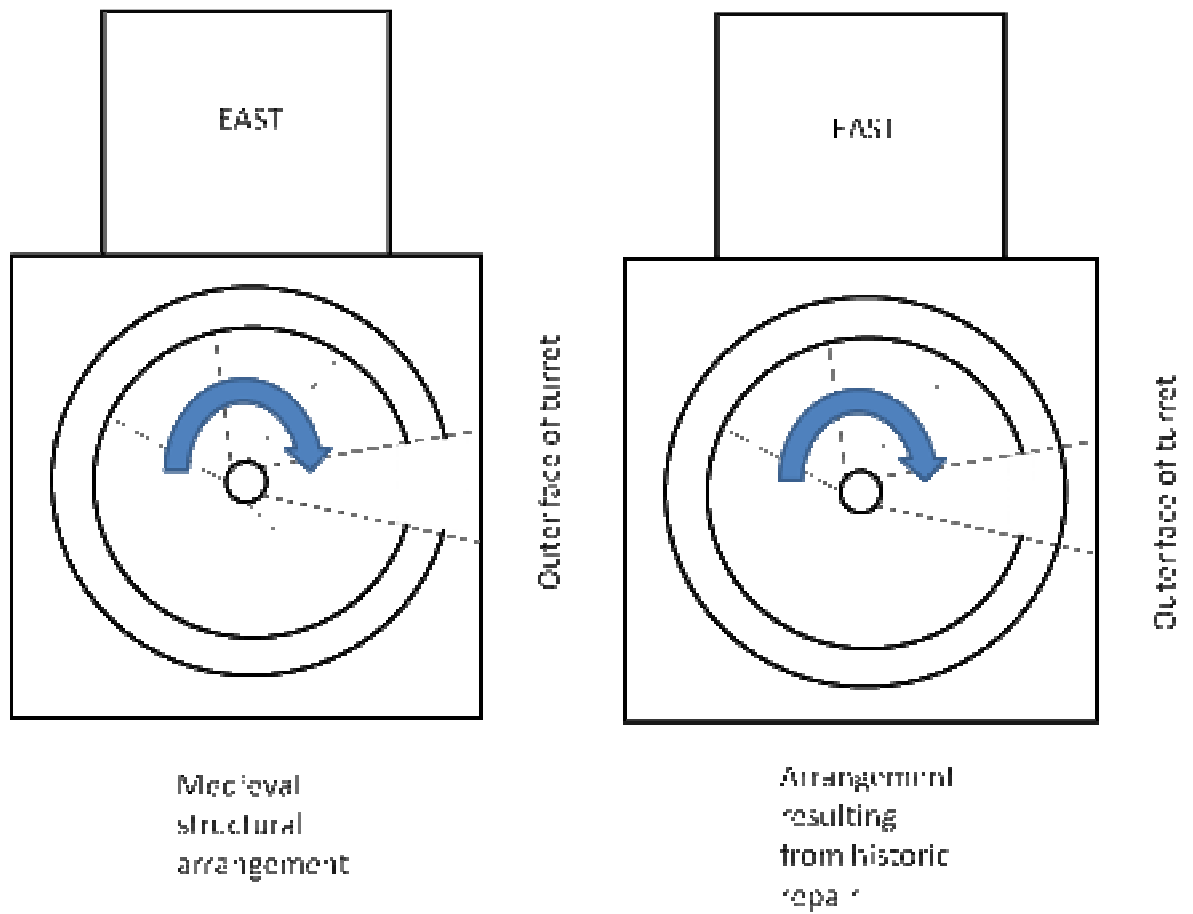


Figure 286: East Front, schematic plan through south buttress showing evolution of structural arrangement



Figure 287: Removed stringcourse stone from beneath south-buttress corona, showing indented stooling



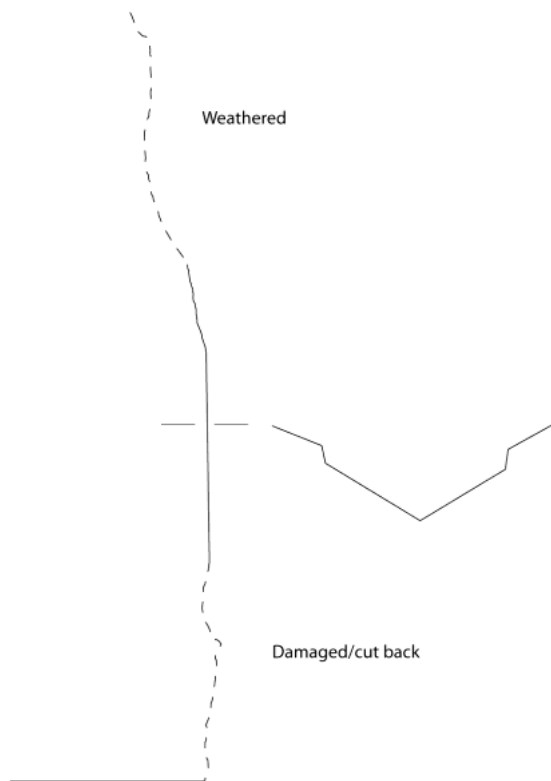
Figure 288: East Front, west face of north buttress showing introduced stooling beneath corona



Figure 289: East Front, south buttress Level G/H, straight-joint between corona and broach



Figure 290: Removed broach-stone from below spirelet, south buttress, showing concealed and damaged moulding



YORK MINSTER - East Front
South buttress, sample 14thC spirelet broach stone
(Level I)
Recorded @1:1
AH August 2009

Figure 291: Profile of spirelet broach-stone, south buttress



Figure 292: East Front, upper section of south buttress before repair, Level F (south-east faces)

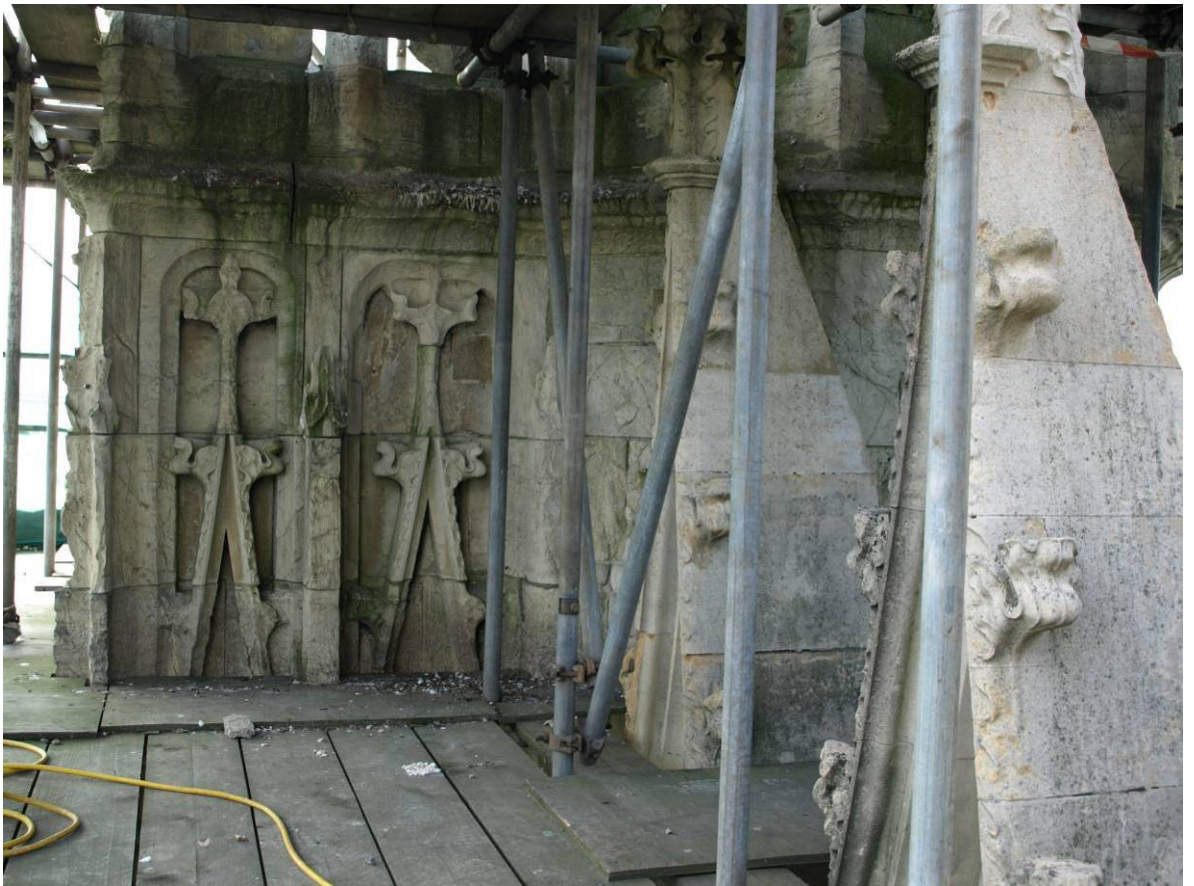


Figure 293: East Front, upper section of south buttress before repair, Level F (north face)

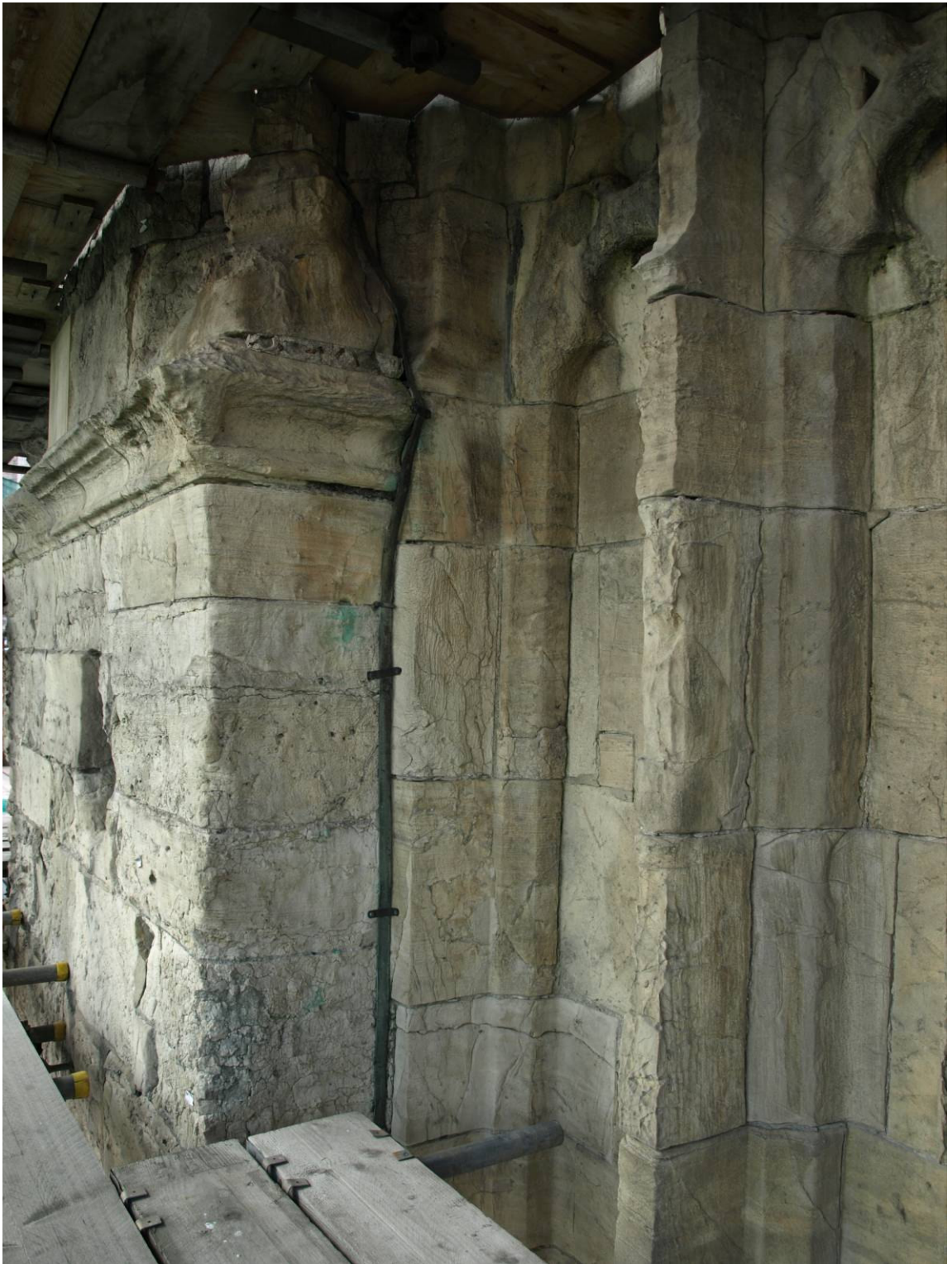


Figure 294: East Front, south buttress before repair, Level F, showing junction between buttress face and south wall of turret (Level G)



Figure 295: Removed nineteenth-century indent from south buttress, Level F, illustrating shallow depth of replacement stone



Figure 296: East Front, south buttress Level F during dismantling showing intact medieval core



Figure 297: Re-used fragments of previous corona (?eighteenth century) found within core of upper courses of south buttress, Level F



Figure 298: Removed medieval core-work from south-buttress Level F showing iron cramp used to secure later cladding



Figure 299: East Front, south buttress before repair, Levels E-F, north-east side

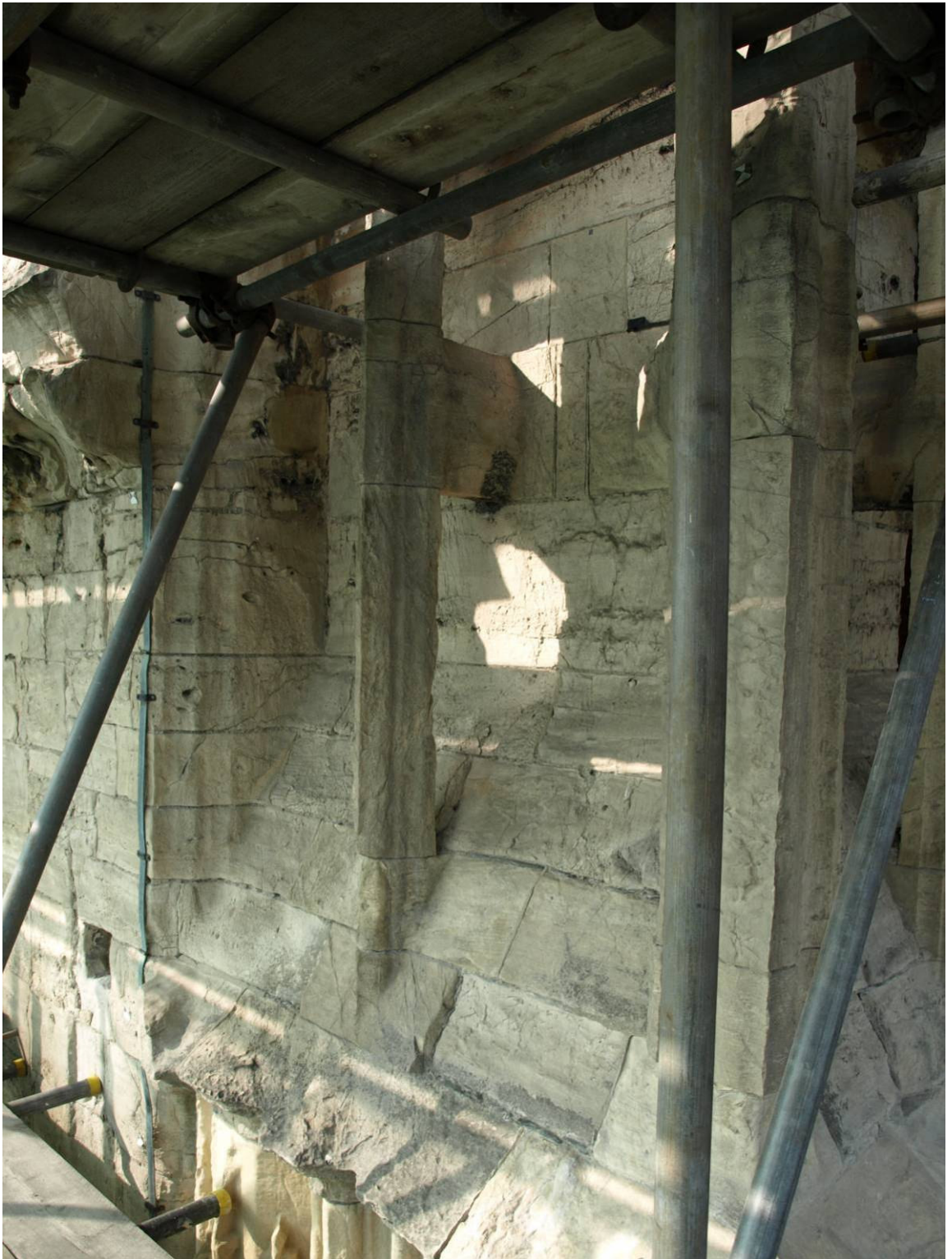


Figure 300: East Front, south buttress before repair, Level E, south side

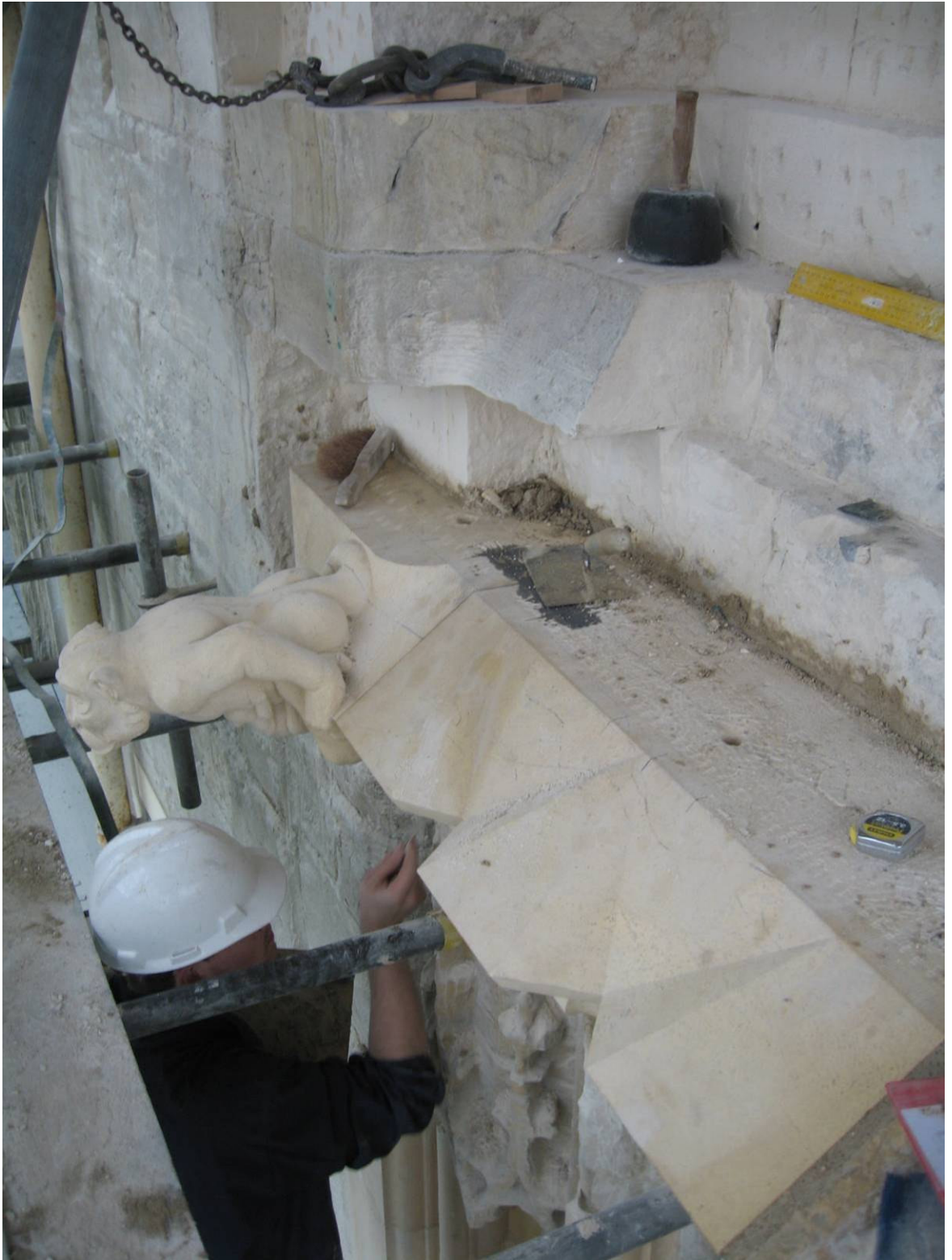


Figure 301: East Front, south buttress Level E (south side) during repair (Andrew Arrol)



Figure 302: East Front, south buttress, Level E during repair (east and north faces) (Andrew Arrol)



Figure 303: East Front, Great East Window exterior, sill, stoolings and mullions



Figure 304: East Front, Great East Window exterior, sill, stooling and mullion detail



Figure 305: East Front, Great East Window exterior, lower transom and mullions

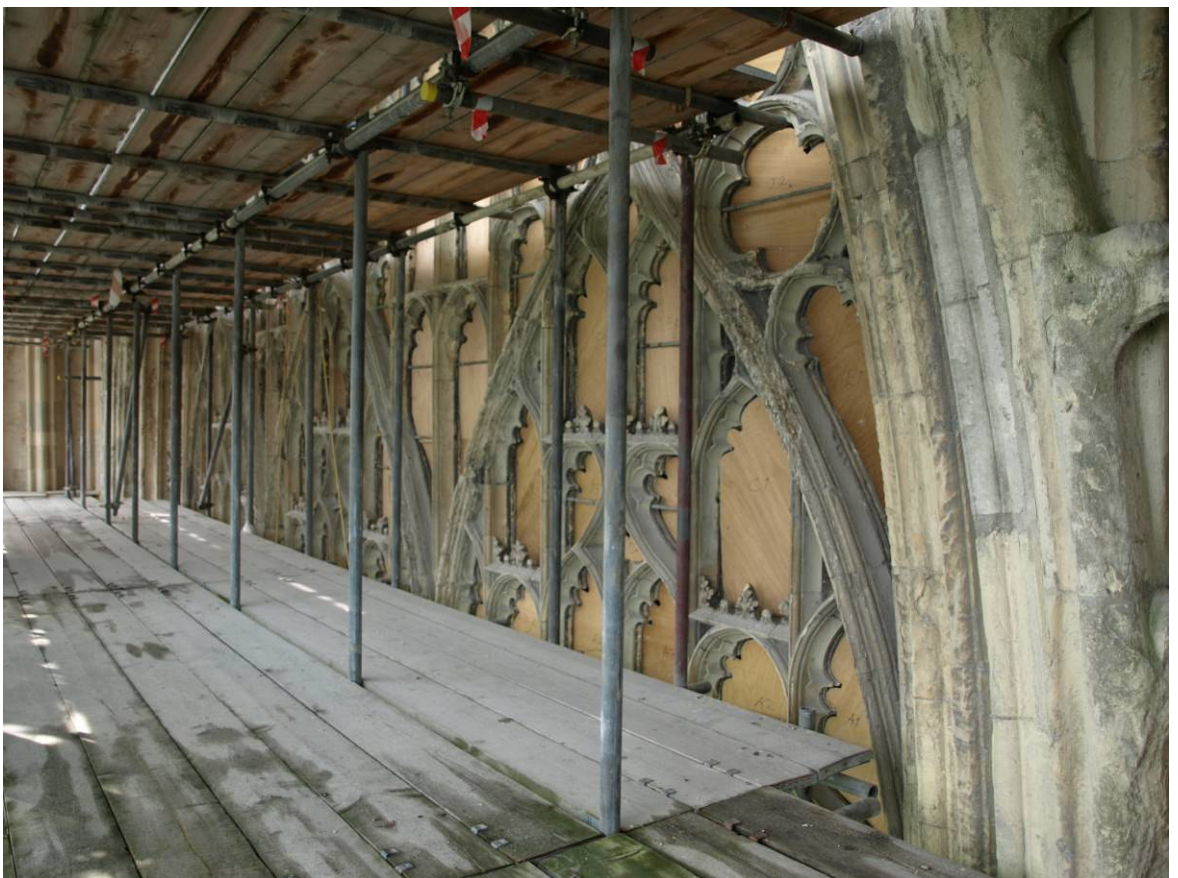
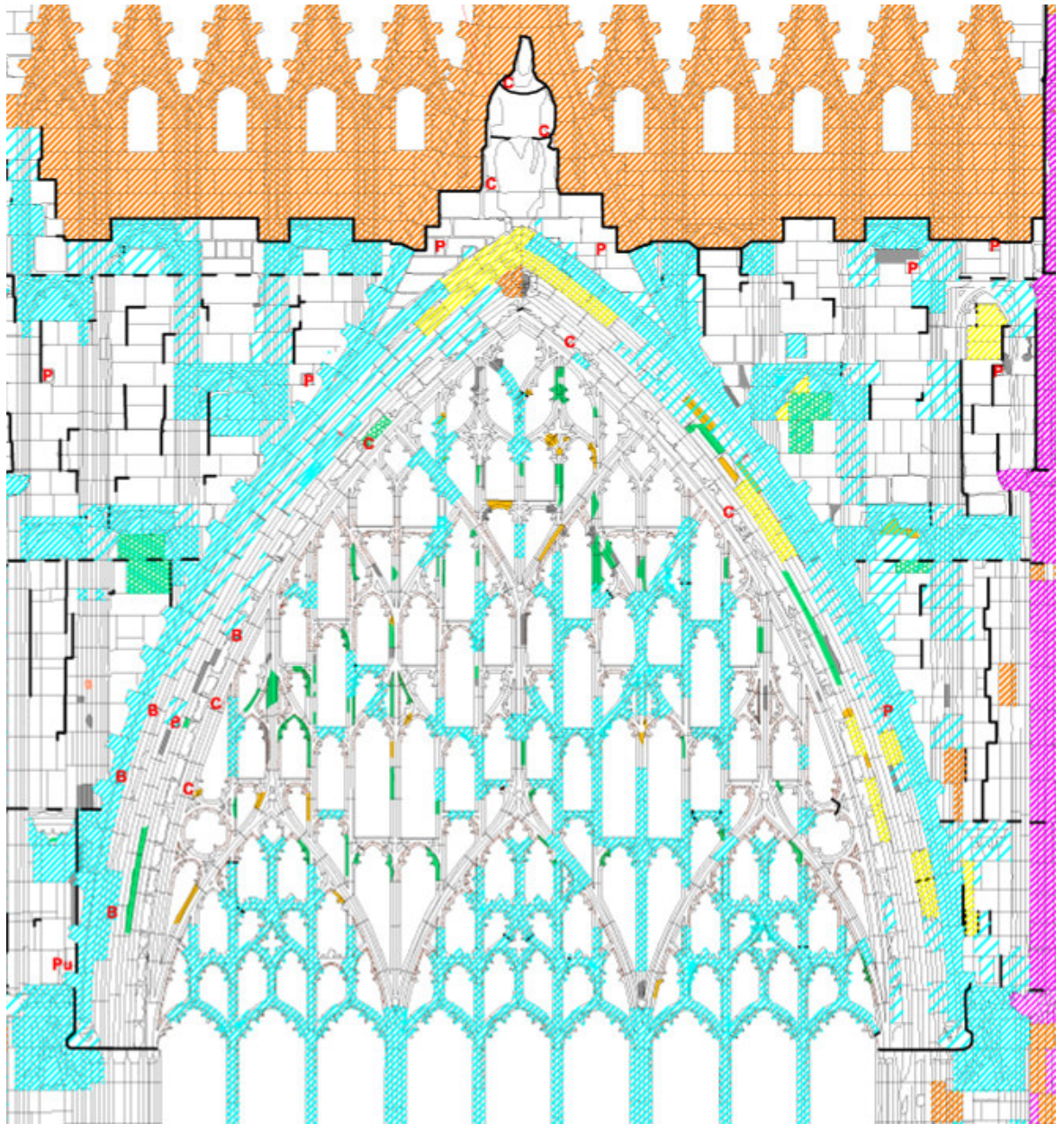


Figure 306: East Front, Great East Window exterior, transition from 1820s tracery to medieval tracery





















	1700s (magnesian limestone, ?Huddleston)		1960s Calcium Silicate Paint
	1820s & 1830s (magnesian limestone, Tadcaster)		Limewash traces
	1820s & 1830s (magnesian limestone, Tadcaster) - probable		Previous lime mortar repair to pre-1820s stone
	1840s - c.1850s (magnesian limestone - Huddleston)		OPC render (1920s and 1950s)
	1840s - c.1850s (magnesian limestone - Huddleston) - probable		Cementitious mortar render (1970s & 1980s)
	1890s - c.1920s (oolitic limestone, New Ketton)		Stone pinked through burning
	1920s - 1950s (oolitic limestone, Clipsham)		Lead
	1970s (magnesian limestone, Cadeby and Huddleston)		Brick/tile
	1980s - 1990s (magnesian limestone, Cadeby)		Iron tie/cramp/insert

Figure 307: Great East Window exterior, tracery level showing intervention



Figure 308: East Front, Great East Window exterior, medieval tracery detail showing typical weathering patterns, surface repairs and protective coatings



Figure 309: Great East Window exterior, tracery detail showing 1820s shallow indent



Figure 310: Great East Window exterior, tracery detail showing 1820s insert



Figure 311: Great East Window interior, detail of medieval foliage



Figure 312: Great East Window interior, detail showing removal of medieval foliage during 1820s, plus 1970s limewash

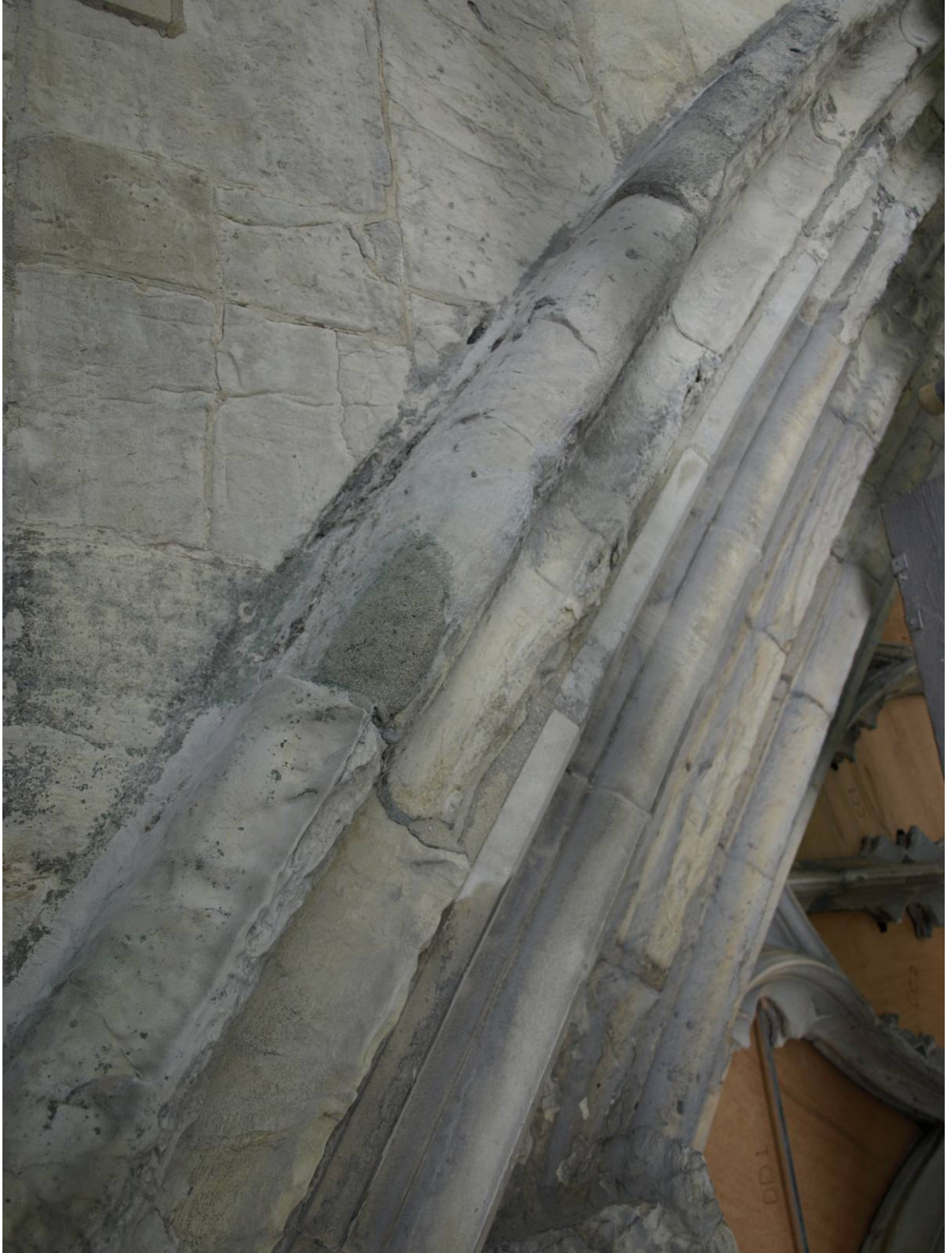


Figure 313: Great East Window exterior, detail of hoodmould on south side showing nineteenth and twentieth-century replacements

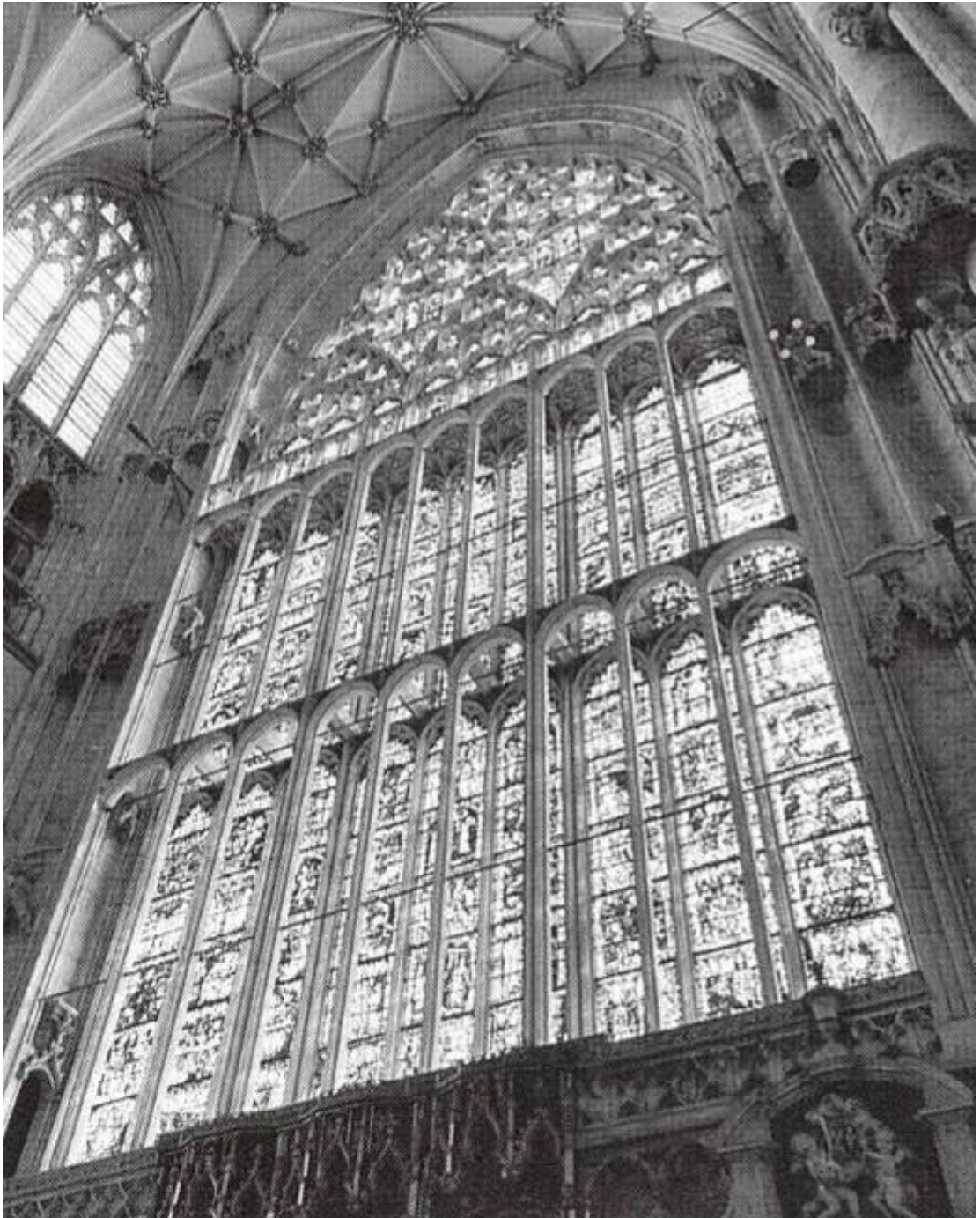


Figure 314: Great East Window interior (Brown 2003, 154, Figure 4.31)

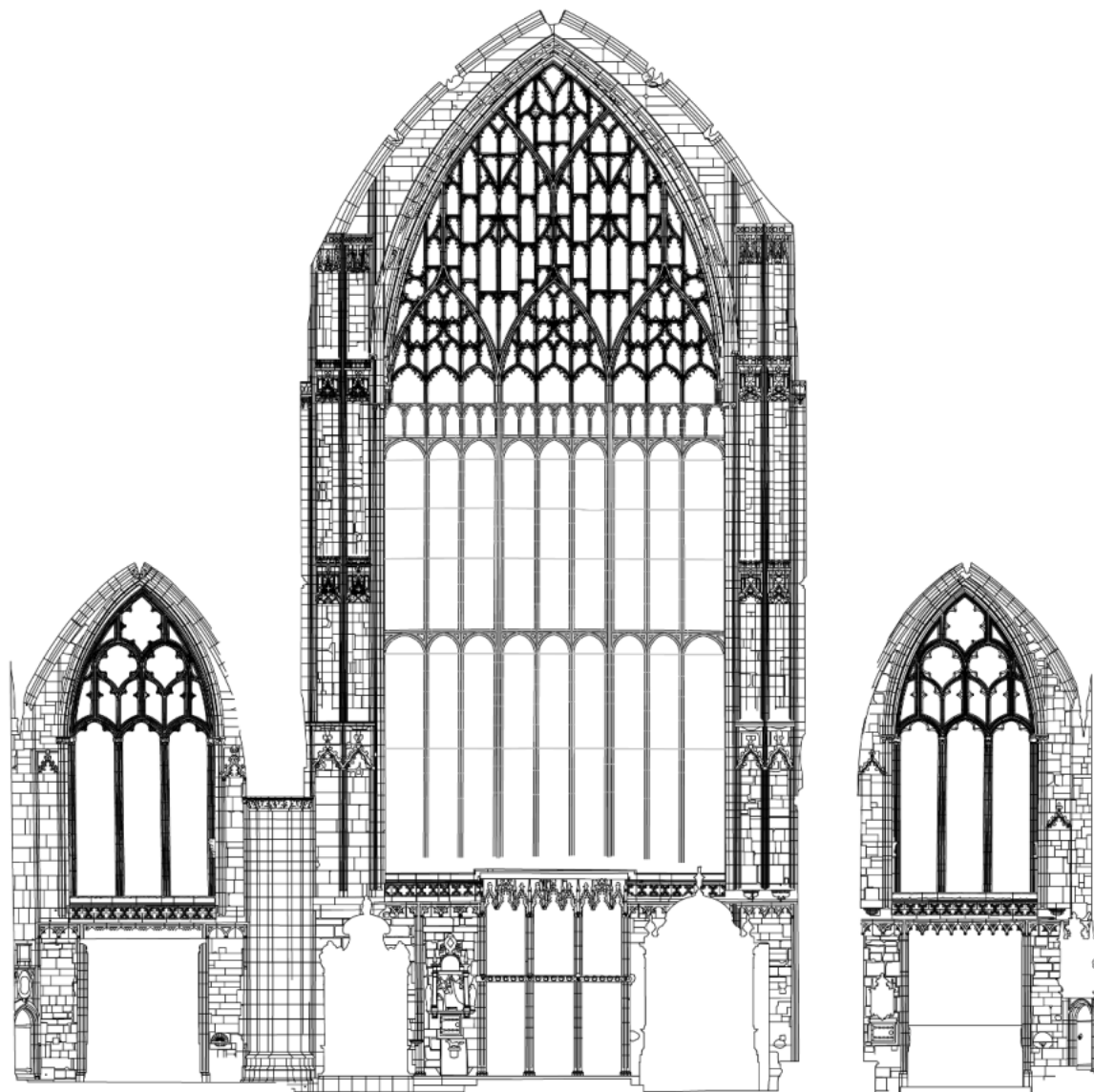


Figure 315: East Front interior, photogrammetric survey (Downland Partnership/Dean and Chapter of York Minster)



Figure 316: Great East Window interior, inner screenwork showing through-stones to outer masonry



Figure 317: Great East Window interior, main transom and walkway, north side



Figure 318: Great East Window interior, detail of underside of walkway (1820s)



Figure 319: Great East Window interior, detail showing cramping of 1820s through-stone



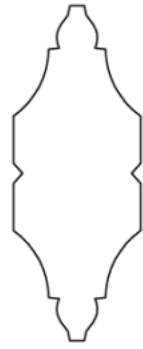
Figure 320: East Front, Great East Window exterior, detail of previous lime-based repairs



Figure 321: East Front, Great East Window exterior, detail of previous surface repairs and coatings



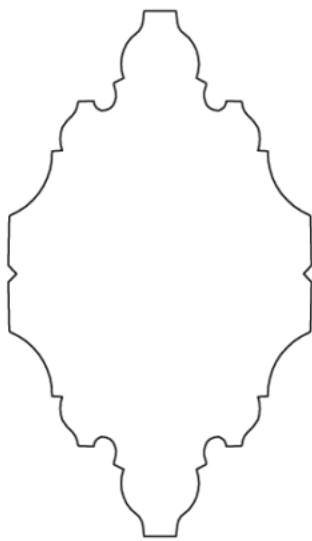
Figure 322: East Front, Great East Window exterior, detail showing Roman Cement repair reinforced with iron nails



Tracery major



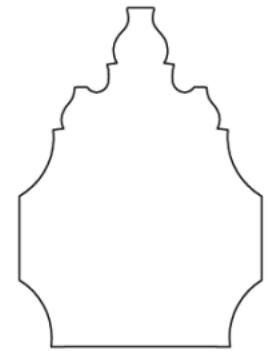
Tracery minor



Major mullion



Major mullion
above gallery
level



Interior mullion
of screenwork

YORK MINSTER - East Front
Great East Window - Principal Mouldings
Drawn @1:1 from the templates of William Shove, 1824-1827
AH August 2010

Figure 323: Great East Window, moulding profiles

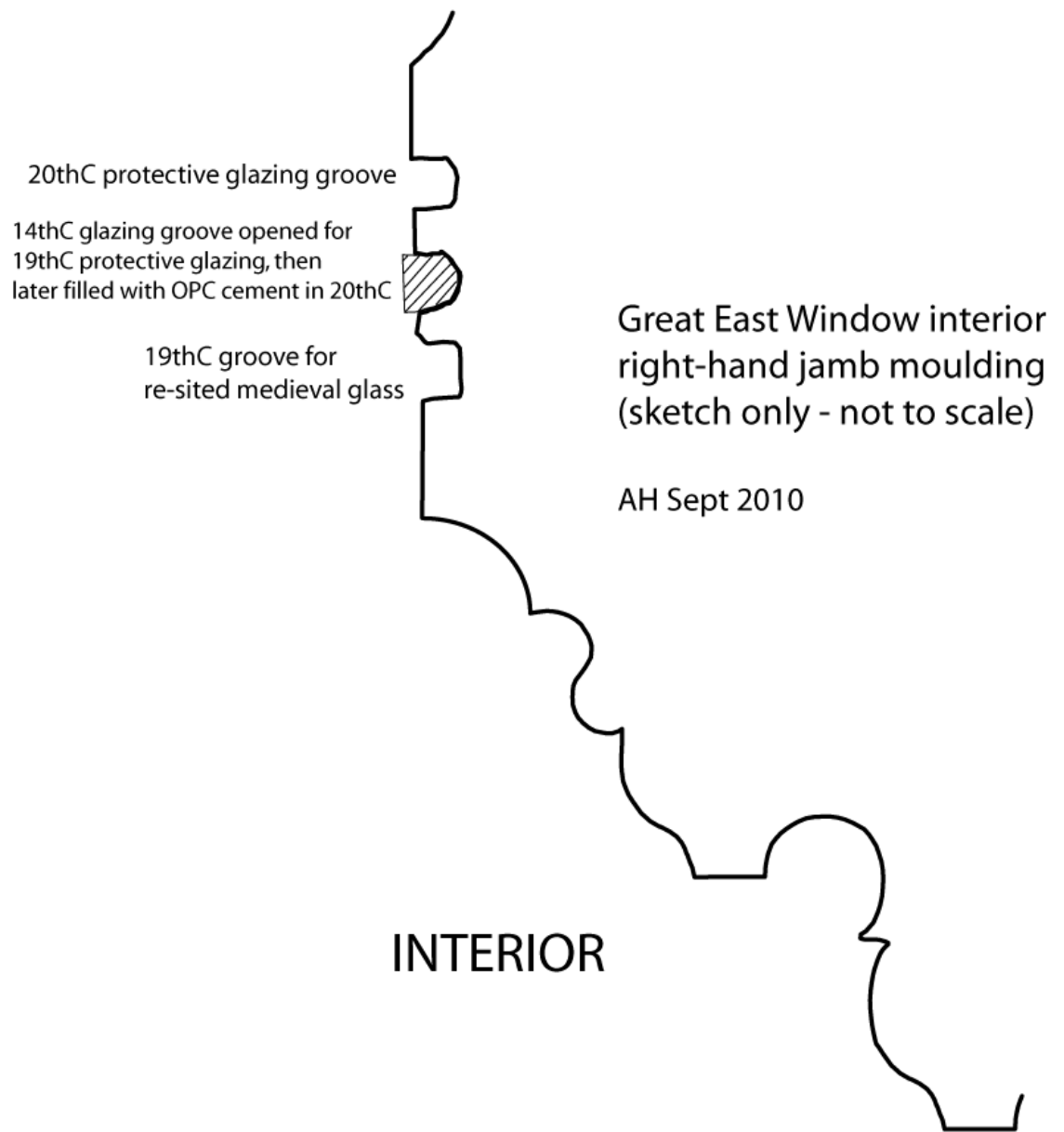


Figure 324: Great East Window interior, sketch of jamb moulding, south side



Figure 325: Great East Window interior, interface between sill and jamb base, south side

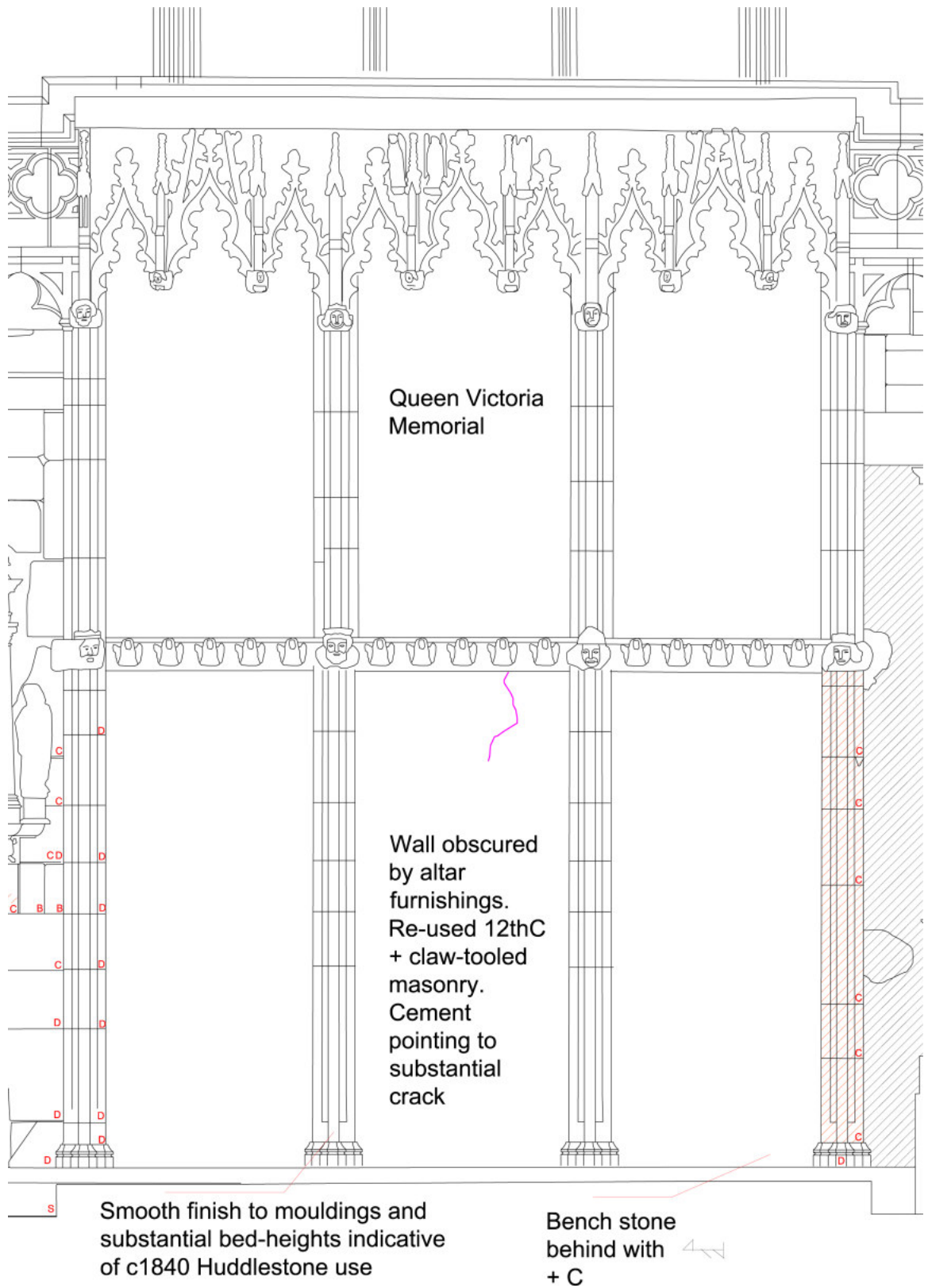


Figure 326: Lady Chapel reredos showing disruption of canopies by interior screenwork and parapet (Photogrammetry - The Downland Partnership/Dean and Chapter of York Minster)



Figure 327: East Front, Great East Window exterior, detail showing relationship between lower transom and jambs, north side



Figure 328: East Front, Great East Window exterior, detail showing relationship between upper transom and jamb, south side



Figure 329: Great East Window interior, detail showing relationship between inner screenwork and iron reinforcement and window aperture, lower transom north side



Figure 330: Great East Window interior, detail showing relationship between inner screenwork and iron reinforcement and window aperture, lower transom south side



Figure 331: Great East Window interior, detail showing relationship between inner screenwork and iron reinforcement and window aperture, upper transom/walkway north side (screenwork masonry is 1820s work)



Figure 332: Great East Window interior, detail showing relationship between inner screenwork and iron reinforcement and window aperture, upper transom/walkway south side (screenwork masonry is 1820s work)

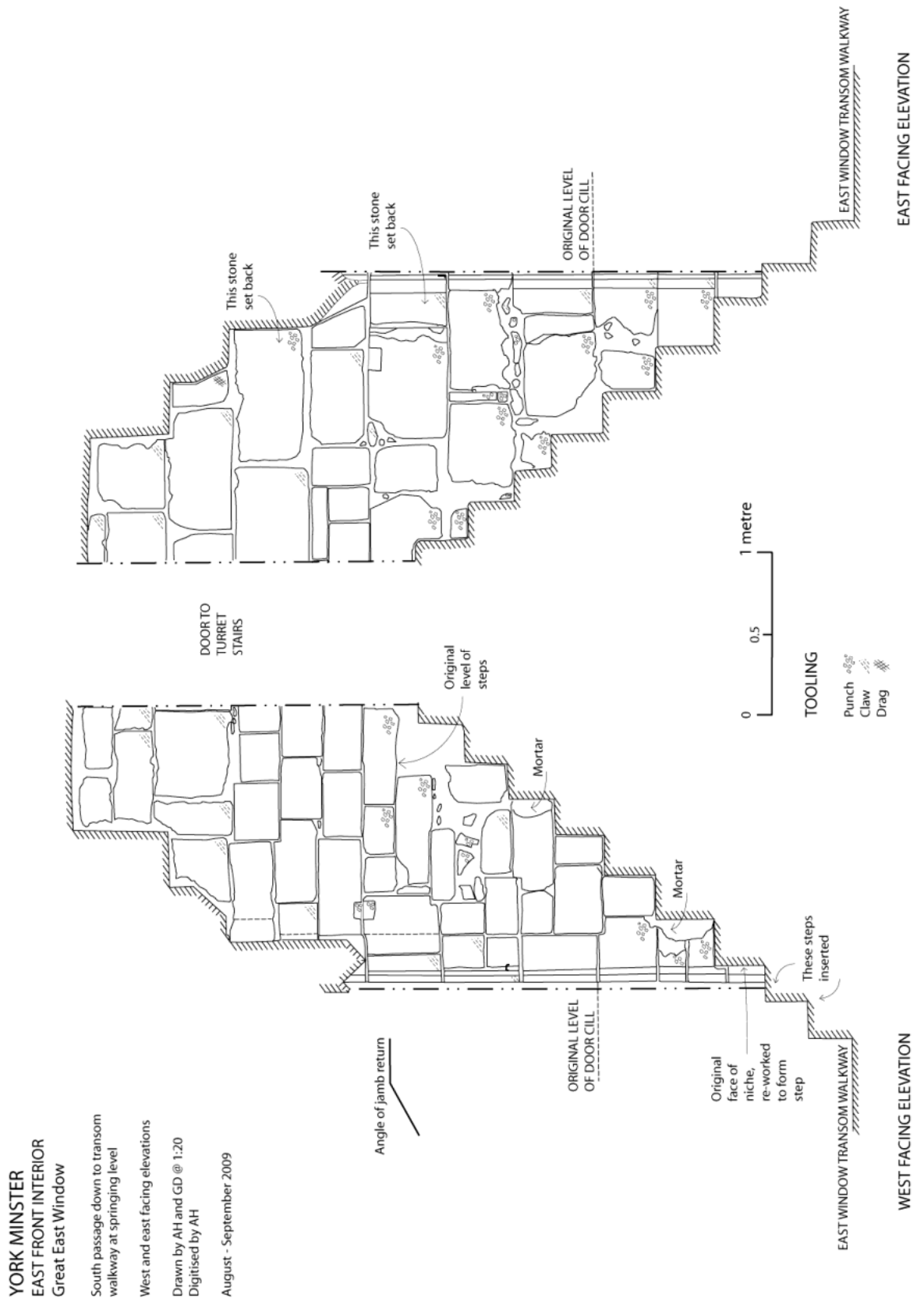


Figure 333: Great East Window interior, south passage to walkway at springing level of Great East Window arch



Figure 334: Great East Window interior, entrance to wall passage at springing level, south side



Figure 335: Great East Window interior, entrance to wall passage at springing level, north side

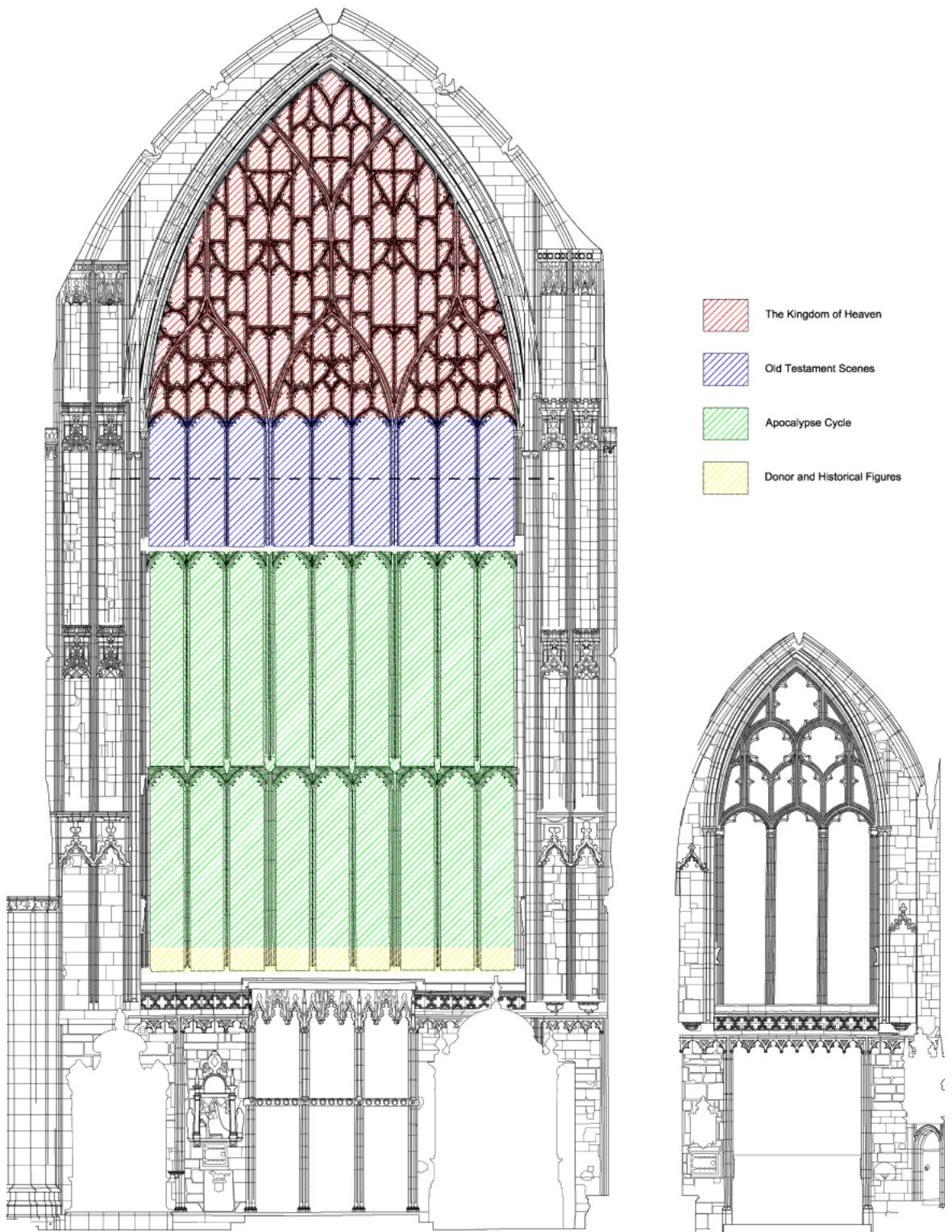


Figure 336: Great East Window, overview of iconography; dashed line indicates intended position of walkway (Photogrammetry - The Downland Partnership/Dean and Chapter of York Minster)

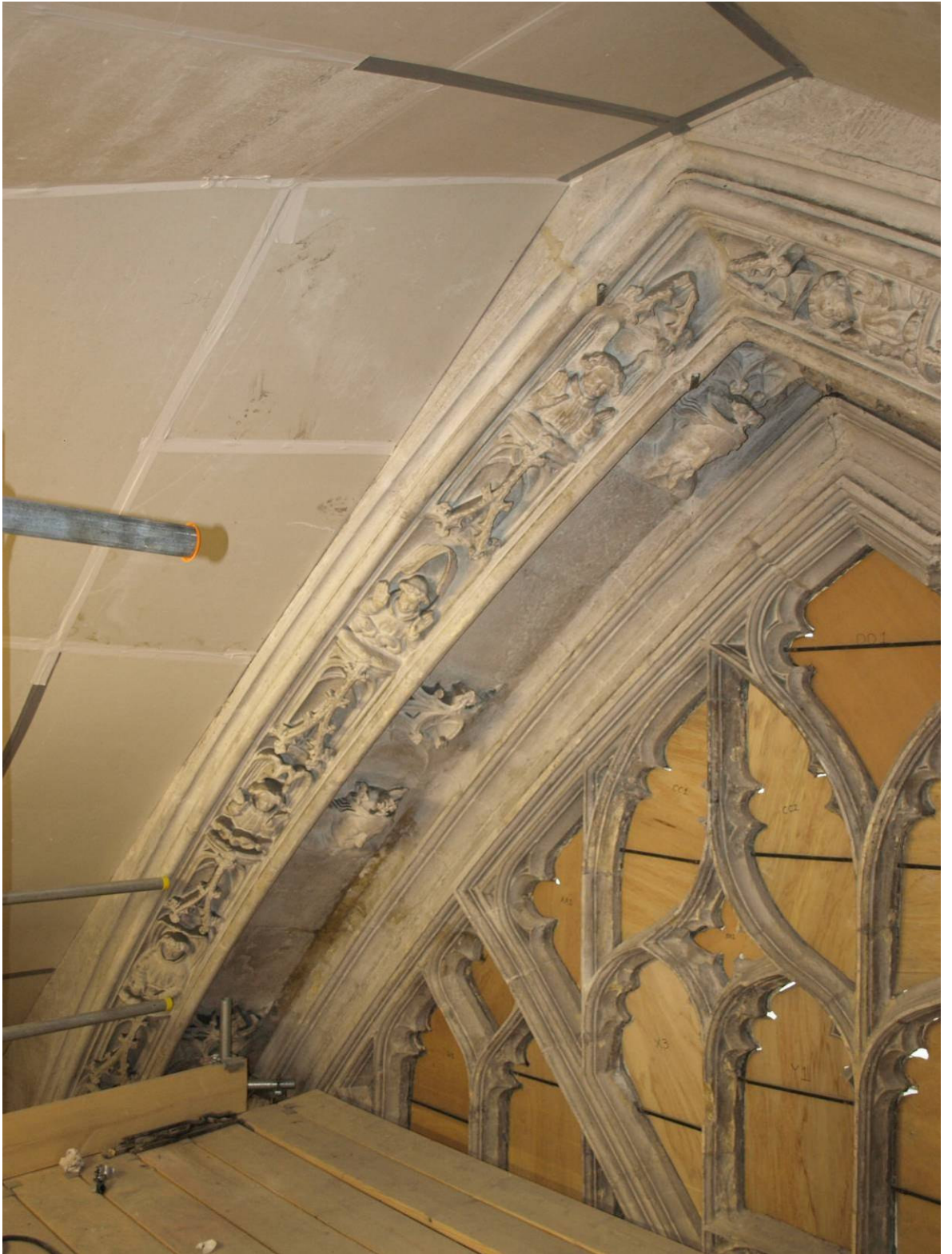


Figure 337: Great East Window interior, apex



Figure 338: Great East Window interior, south side of arch showing relationship between interior and exterior masonry; dashed line marks mortar infill



Figure 339: East Front, Great East Window exterior, off-set punched masonry, south side of arch

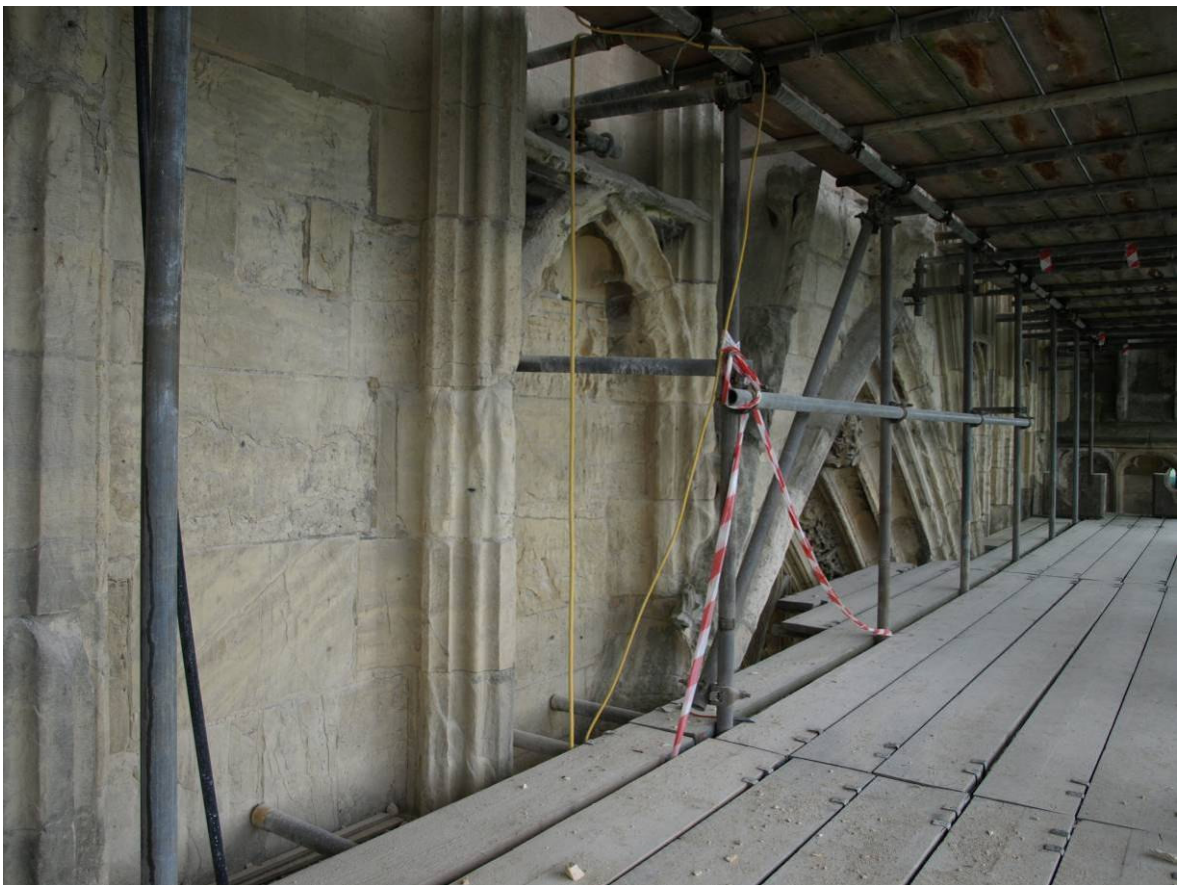


Figure 340: East Front, spandrel-niches surrounding Great East Window



Figure 341: East Front, detail showing relationship between spandrel-niches and Great East Window arch, southside

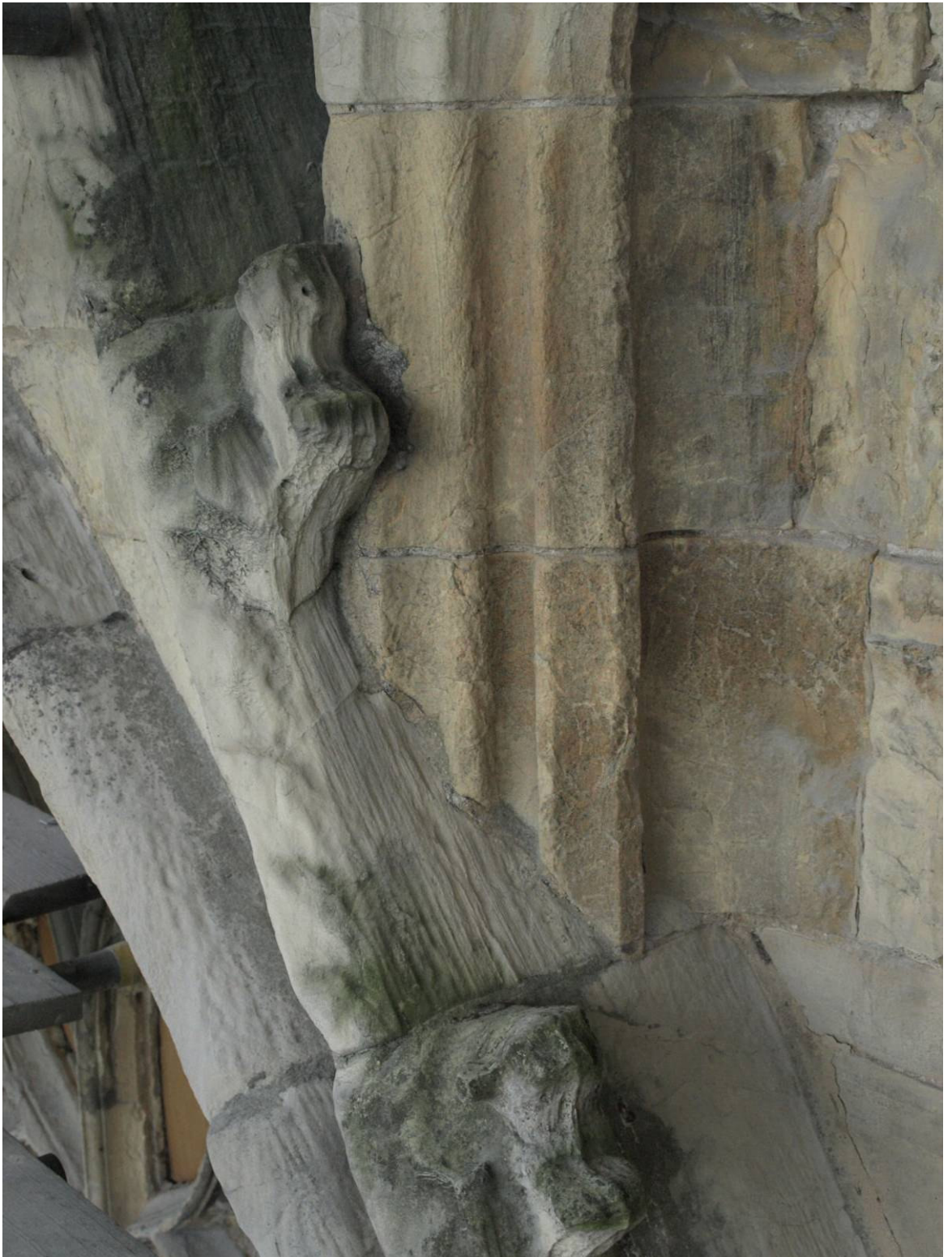


Figure 342: East Front, detail showing relationship between spandrel-niches and Great East Window arch, north side

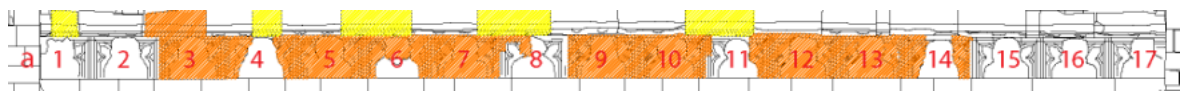
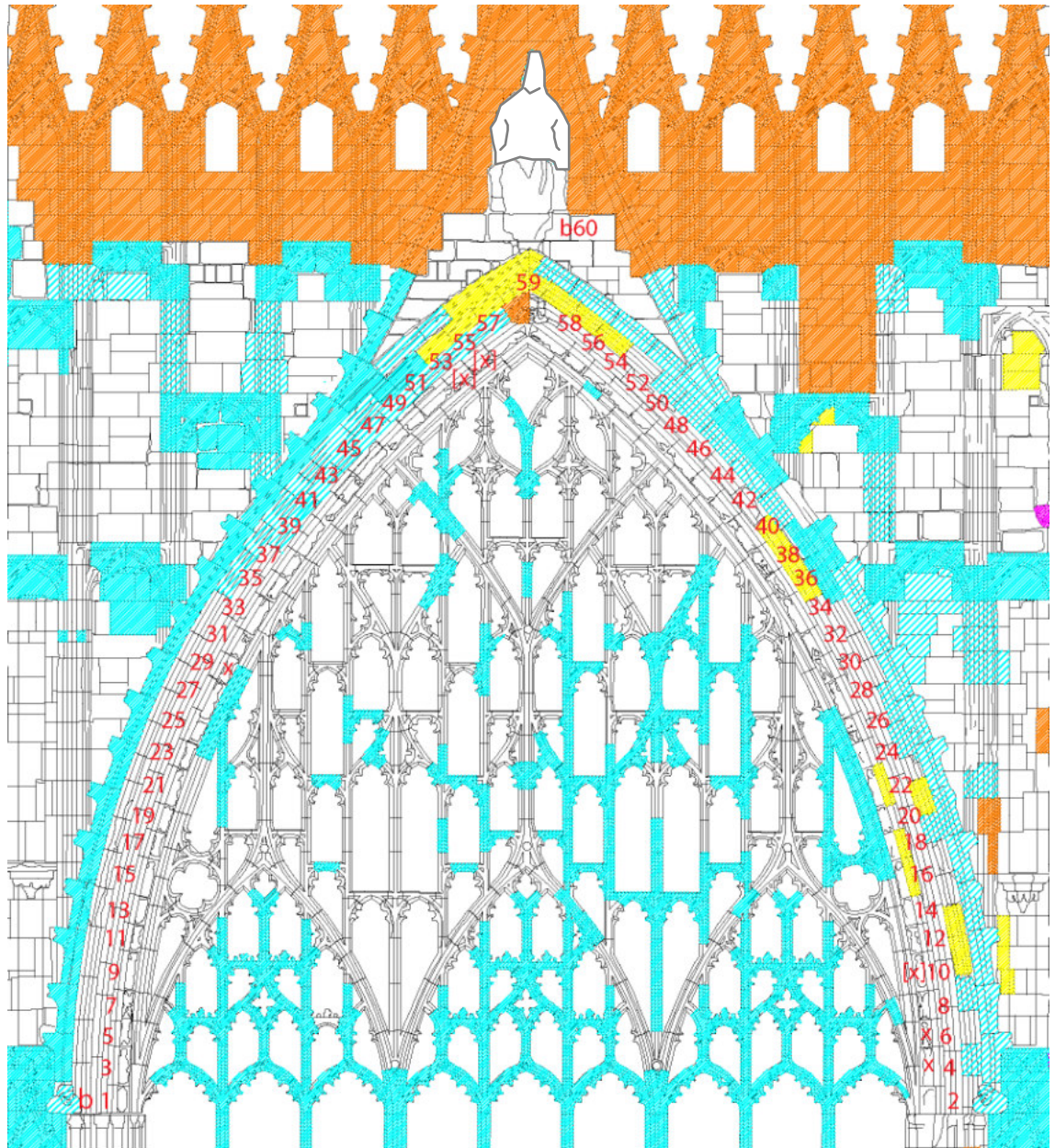


Figure 343: East Front, exterior carvings below sill of Great East Window, a1-a17



X = 19thC replacement voussoir

[X] = 19thC replacement voussoir - probable

Figure 344: East Front, exterior carvings surrounding Great East Window, b1-b60

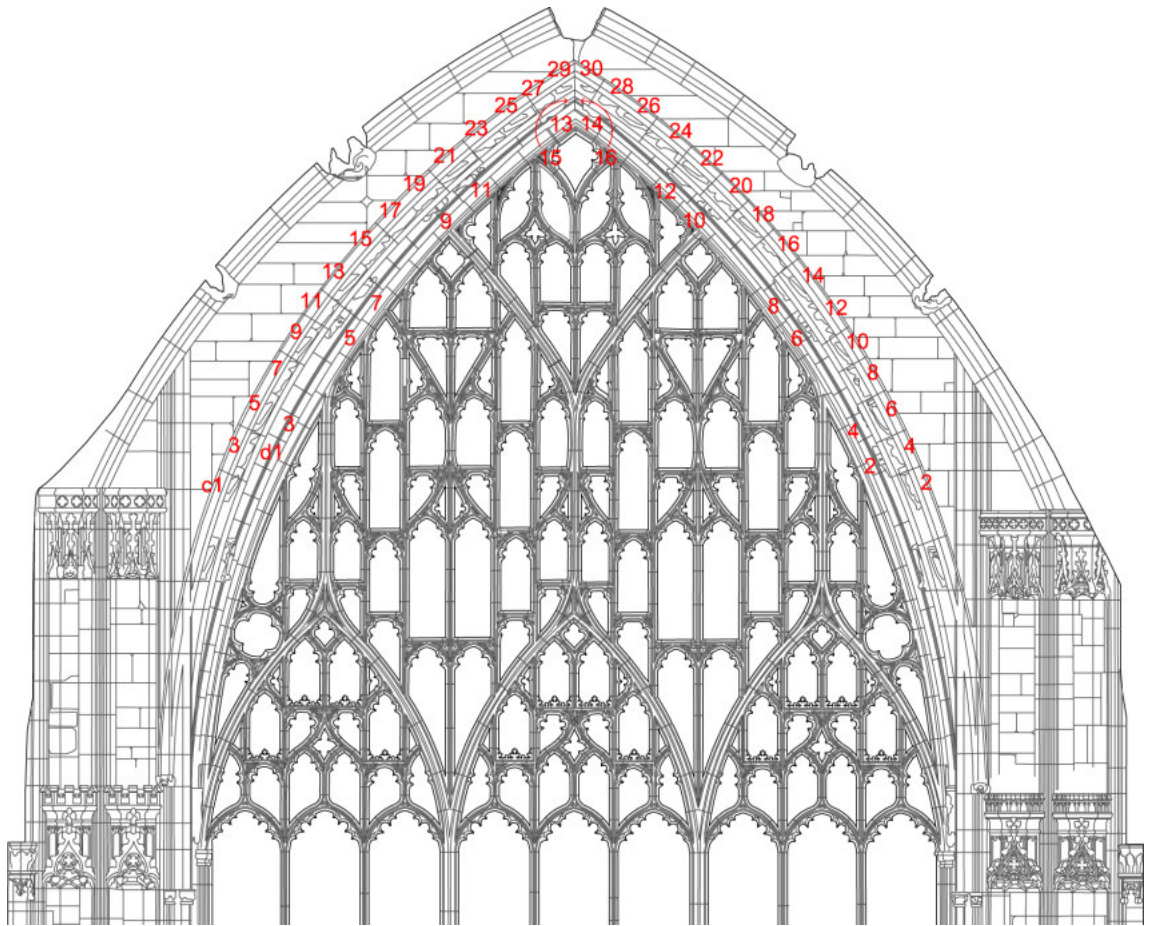


Figure 345: Great East Window interior, arch carvings c1-c30 (angels) and d1-d16 (Kings)



Figure 346: East Front, sill of Great East window with carvings beneath



Figure 347: East Front, carvings beneath sill of Great East Window, a1



Figure 348: East Front, carvings beneath sill of Great East Window, a17



Figure 349: East Front, carved voussoirs within arch of Great East Window



Figure 350: Great East Window, lion voussoir (b37)



Figure 351: Great East Window, king voussoir (b51)



Figure 352: Great East Window, canopy voussoir (b17)



Figure 353: Great East Window, foliage voussoir (b56)



Figure 354: East Front, 'Green Man' keystone (b59) at apex of arch of Great East Window



Figure 355: East Front, seated figure (b60) in apex niche above Great East Window



Figure 356: East Front, apex of Great East Window, Coronation of the Virgin (b57 and b58)



Figure 357: Great East Window, b1 illustrating typical decay patterns

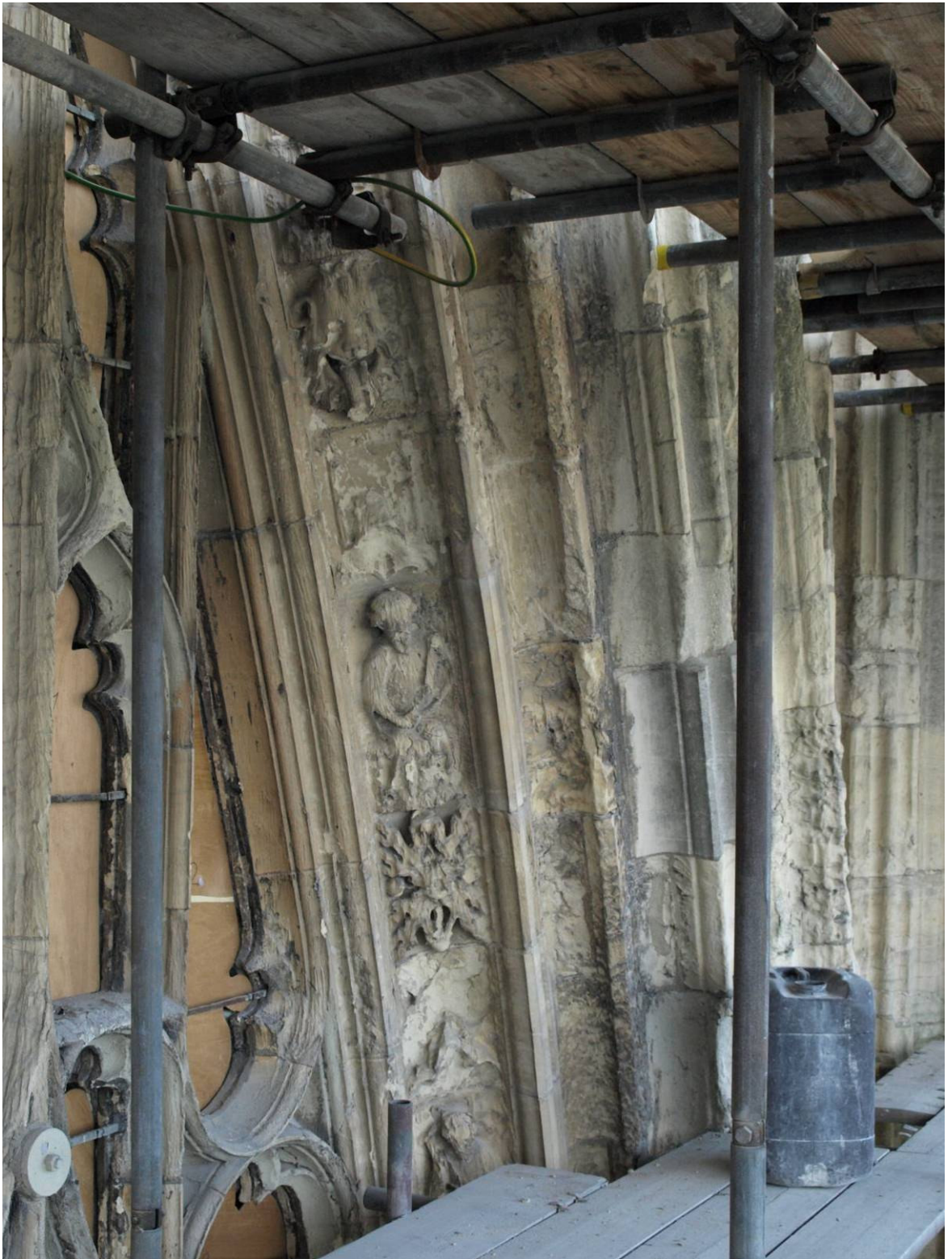


Figure 358: Great East Window, north side of arch showing decayed voussoirs adjacent to zones of substantial replacement of arch stones, indicating previous failure



Figure 359: Voussoir b34, August 2007



Figure 360: Voussoir b34, December 2008



Figure 361: Voussoir b34, April 2009



Figure 362: Voussoir b34, September 2009



Figure 363: Voussoir b4, nineteenth-century replacement ?based on b46 (overleaf)



Figure 364: Voussoir b46, medieval



Figure 365: Voussoir b29, nineteenth-century replacement canopy



Figure 366: Example of replacement canopy showing lack of piercing and nineteenth-century tooling



Figure 367: Voussoir b39, showing typical brown staining indicative of previous treatments with linseed oil



Figure 368: Voussoir b45



Figure 369: Voussoir b4 after cleaning in 1971 (NMR YM/5200) and in September 2009



Figure 370: Great East Window, seated figure within apex niche (b60)



Figure 371: Great East Window, seated figure within apse niche (image cropped to omit scaffold bars)



Figure 372: Seated figure, detail of base stone from south-east



Figure 373: Seated figure, detail of base stone from north-east (note natural bedding of stone)



Figure 374: Seated figure, detail of torso stone, left-hand side showing right hand



Figure 375: Seated figure, detail of torso section from north-east. Note face-bedding of stone

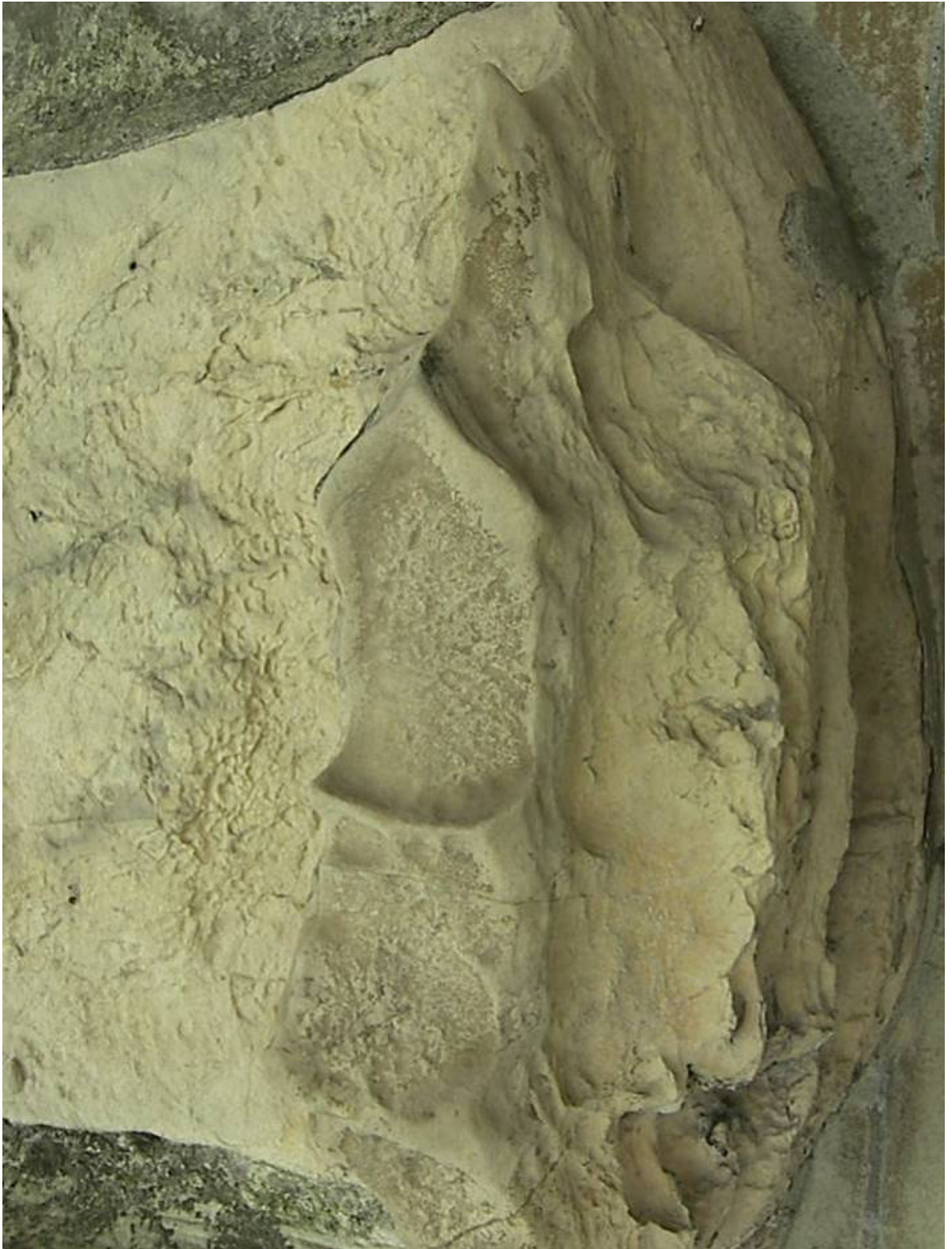


Figure 376: Seated figure, detail of torso stone, right-hand side showing left hand holding a ?building



Figure 377: Seated figure, head section from south-east. Note face-bedding of stone



Figure 378: Seated figure, cement/New Ketton pointing between torso and head section



Figure 379: Seated figure, head section from north-east



Figure 380: Seated figure in 1955 (YML/APYM/A5iii/14) and 2009



Figure 381: Seated figure, right-hand side of base showing exposed armature linking base with parapet



Figure 382: Seated figure, base stone, bottom bed, claw tooling



Figure 383: Seated figure, torso stone, bottom bed, claw tooling

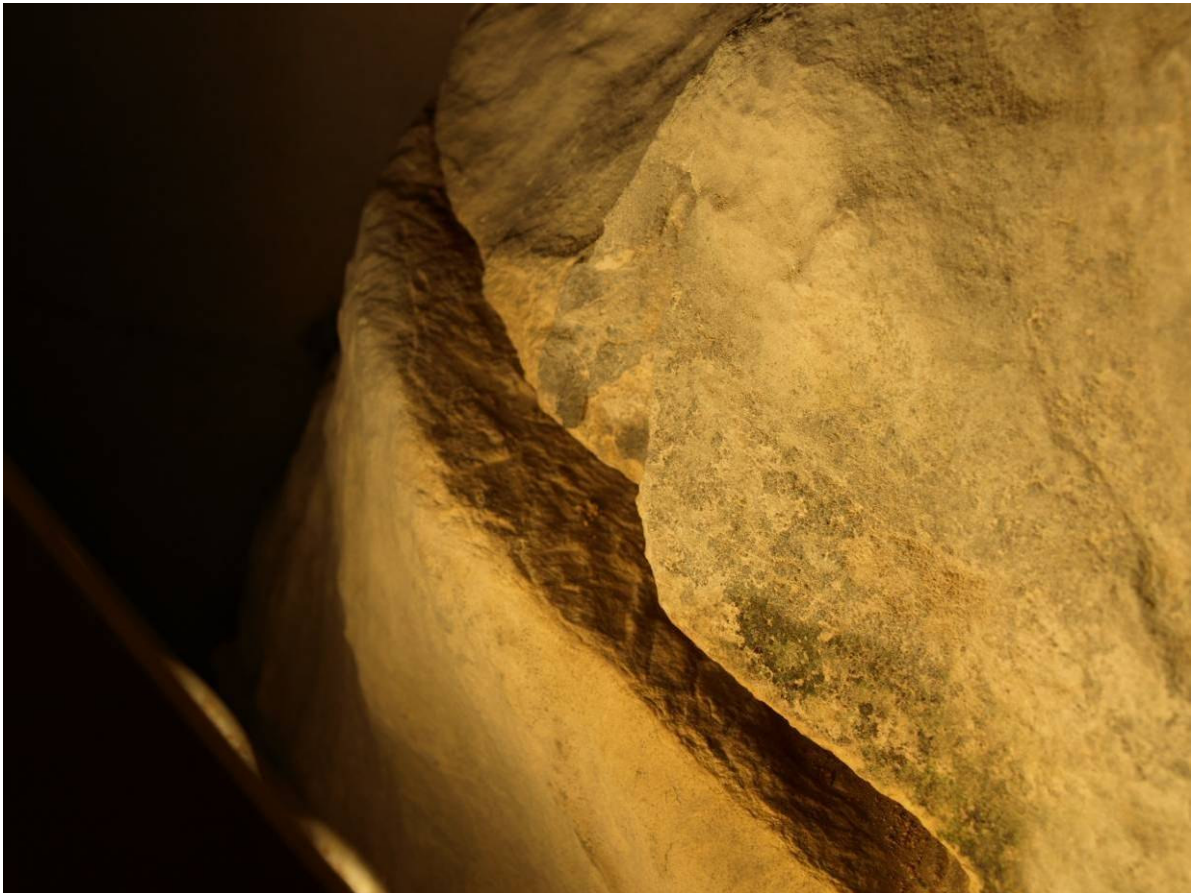


Figure 384: Seated figure, torso stone, upper bed, claw tooling



Figure 385: Seated figure, head and shoulder section, bottom bed, claw tooling



Figure 386: Seated figure, view through rear face of parapet to rear face of base of statue



Figure 387: Seated figure, detail of rear of base showing concave base to left and supporting infill to right, torso stone above

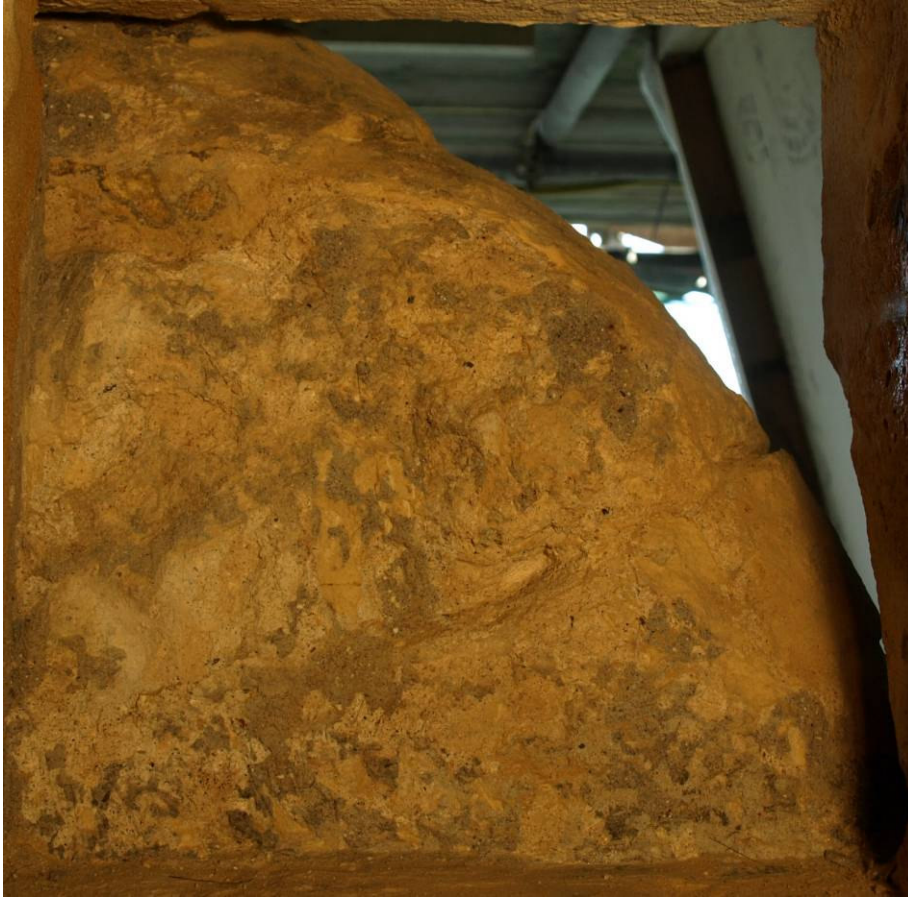


Figure 388: Seated figure, view through rear face of parapet to right-hand shoulder of statue with re-adhered fragments of upper section



Figure 389: Seated figure, view through rear face of parapet to right-hand shoulder of statue with detached fragment removed to reveal calcite fault. Note white repointing mortar over re-fixing mortar



Figure 390: Fragment from rear of upper section showing claw tooling on bottom bed

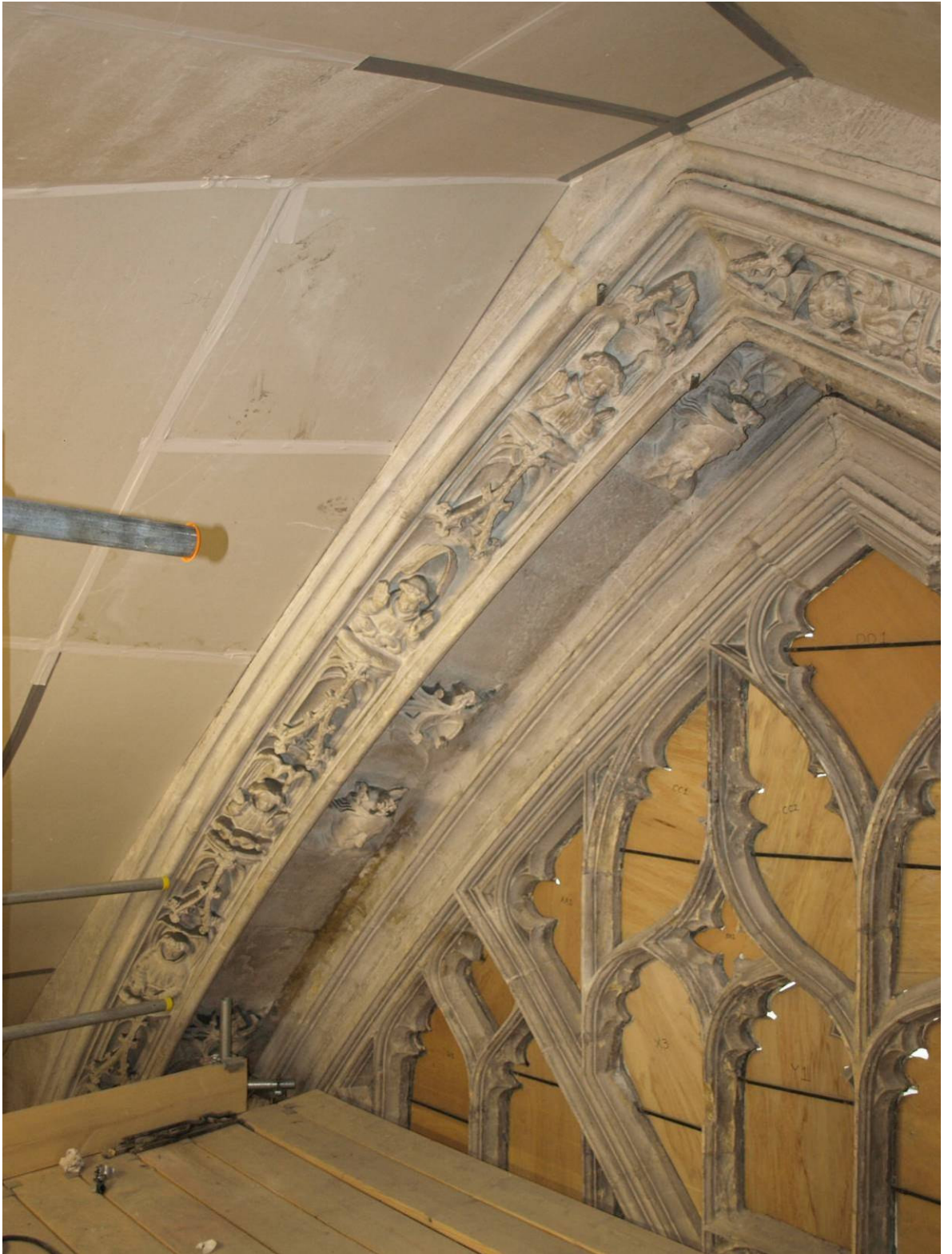


Figure 391: Great East Window interior, apex of arch



Figure 392: Great East Window interior, apex of arch showing truncated carvings



Figure 393: Great East Window interior, angel beneath canopy



Figure 394: Great East Window interior, canopy over angel

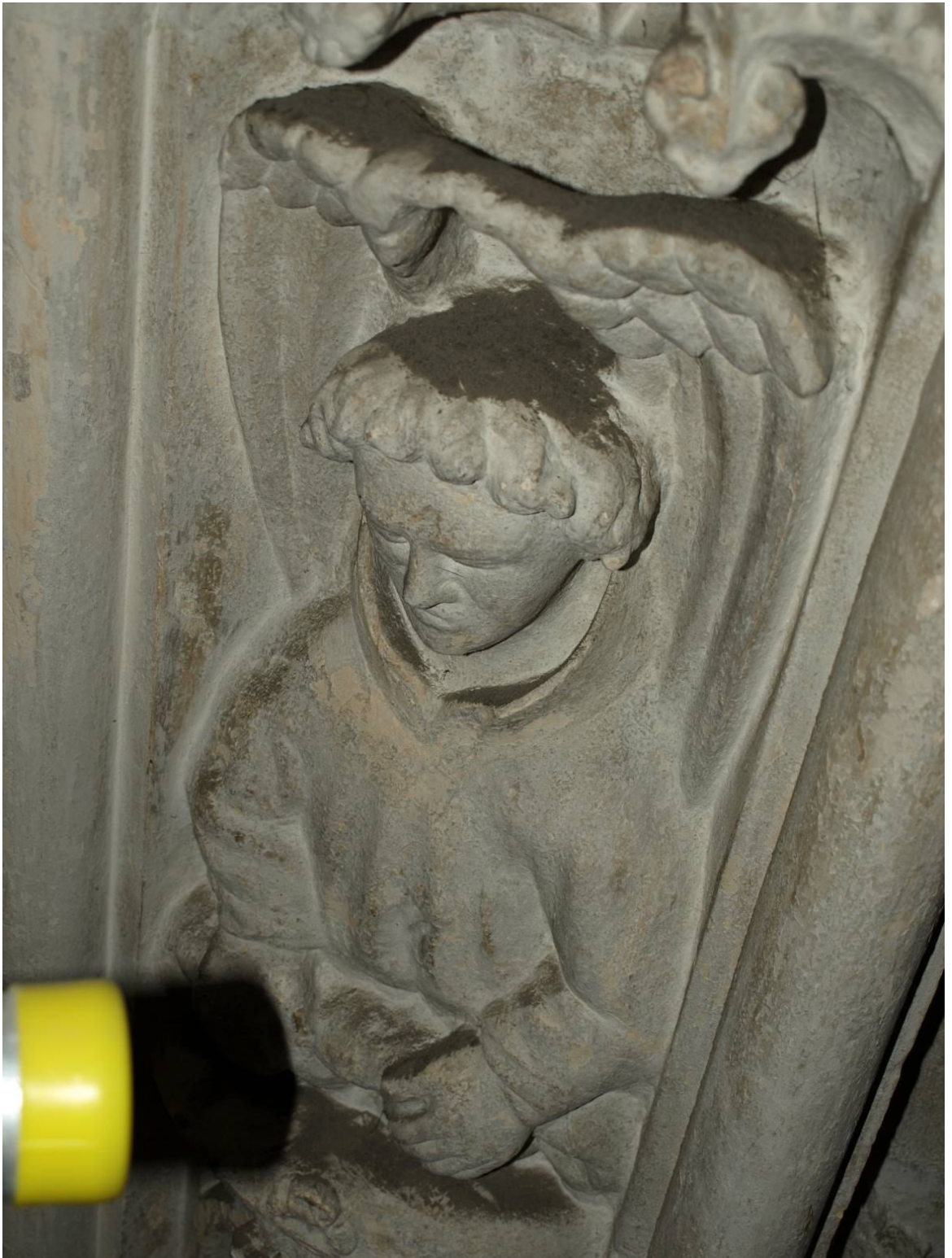


Figure 395: Great East Window interior, angel beneath canopy (c15)



Figure 396: Great East Window interior, crowned bust beneath canopy



Figure 397: Great East Window interior, crowned bust beneath canopy (d9)



Figure 398: Great East Window interior, canopy over crowned bust

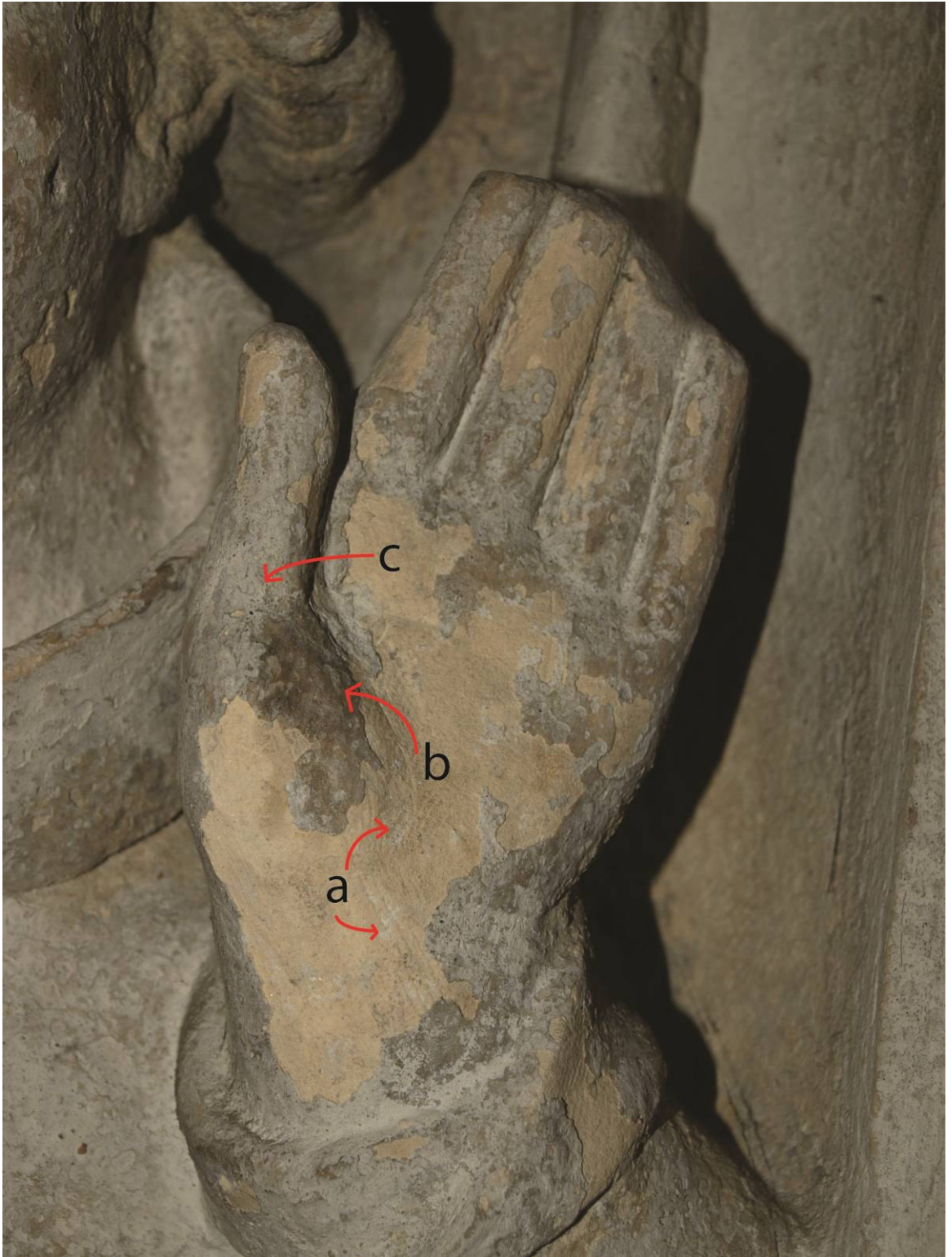


Figure 399: Great East Window interior, historic coatings



Figure 400: Carved boss from Blackfriars, Gloucester (c.1350-1375 (Park 2002, 82, Item, 14)



Figure 401: Christ in Majesty, Psalter of Stephen of Derby, c.1350-1375 (Oxford Bodl. Lib. Rawlinson G. 185 f.97, <http://www.churchtimes.co.uk/content.asp?id=42936>)

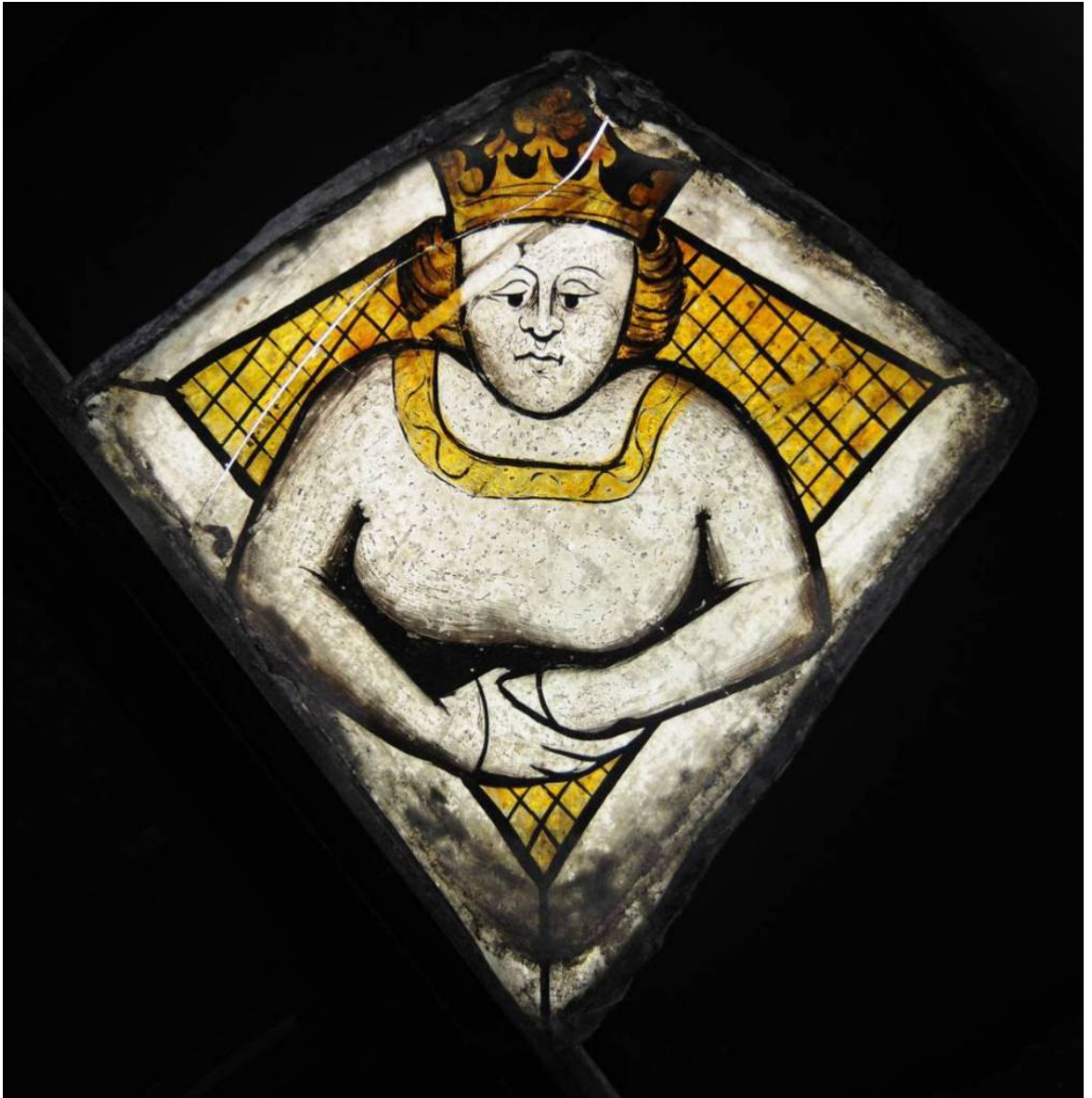


Figure 402: New College Oxford, Panel n5 c.1385 (Ref. n5 A1 007, image courtesy of Nick Teed, York Glaziers Trust)



Figure 403: Angel flanking the tomb of Edward III, Westminster Abbey



Figure 404: Lincoln Cathedral, West Front, Gallery of Kings inserted in the fourteenth century

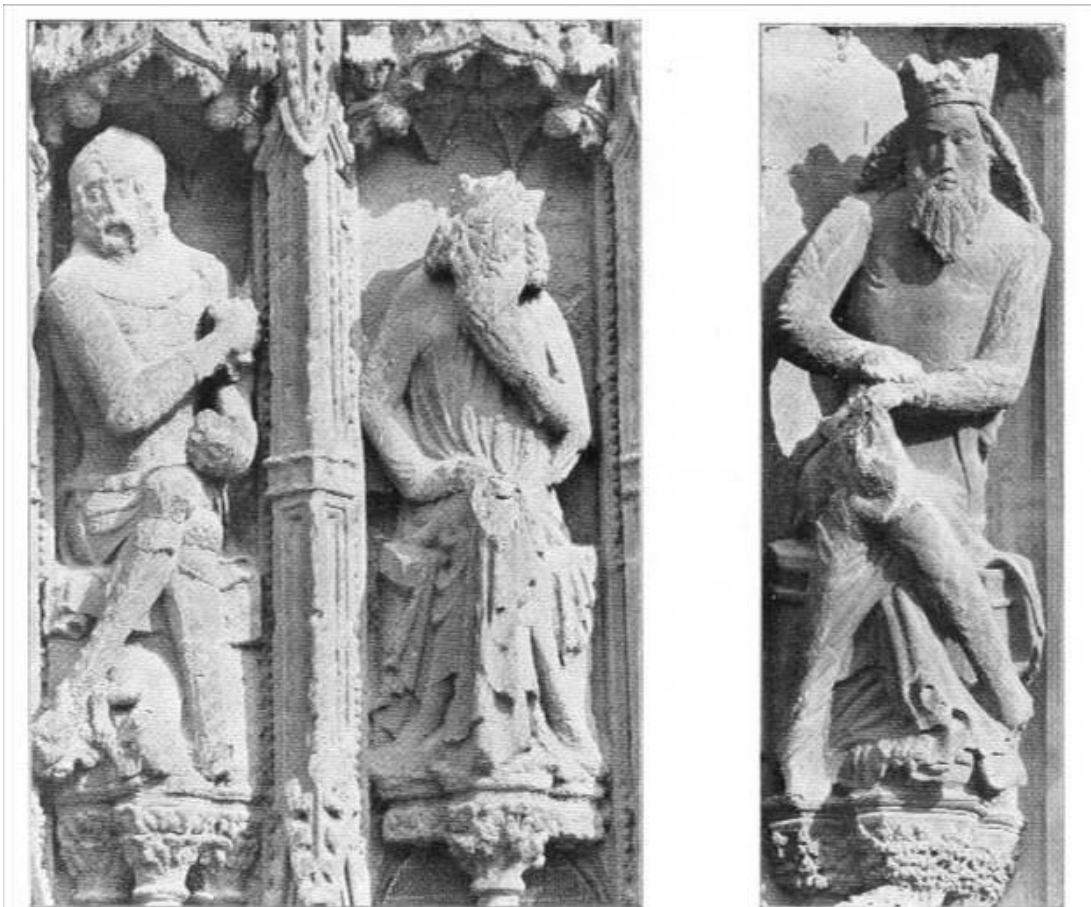


Figure 405: Exeter Cathedral, West Front, fourteenth-century statues of kings (Gardner 1935, 265, Figure 236)



Figure 406: Exeter Cathedral, fourteenth-century roof boss (Cave 1953, 50, Boss 195)



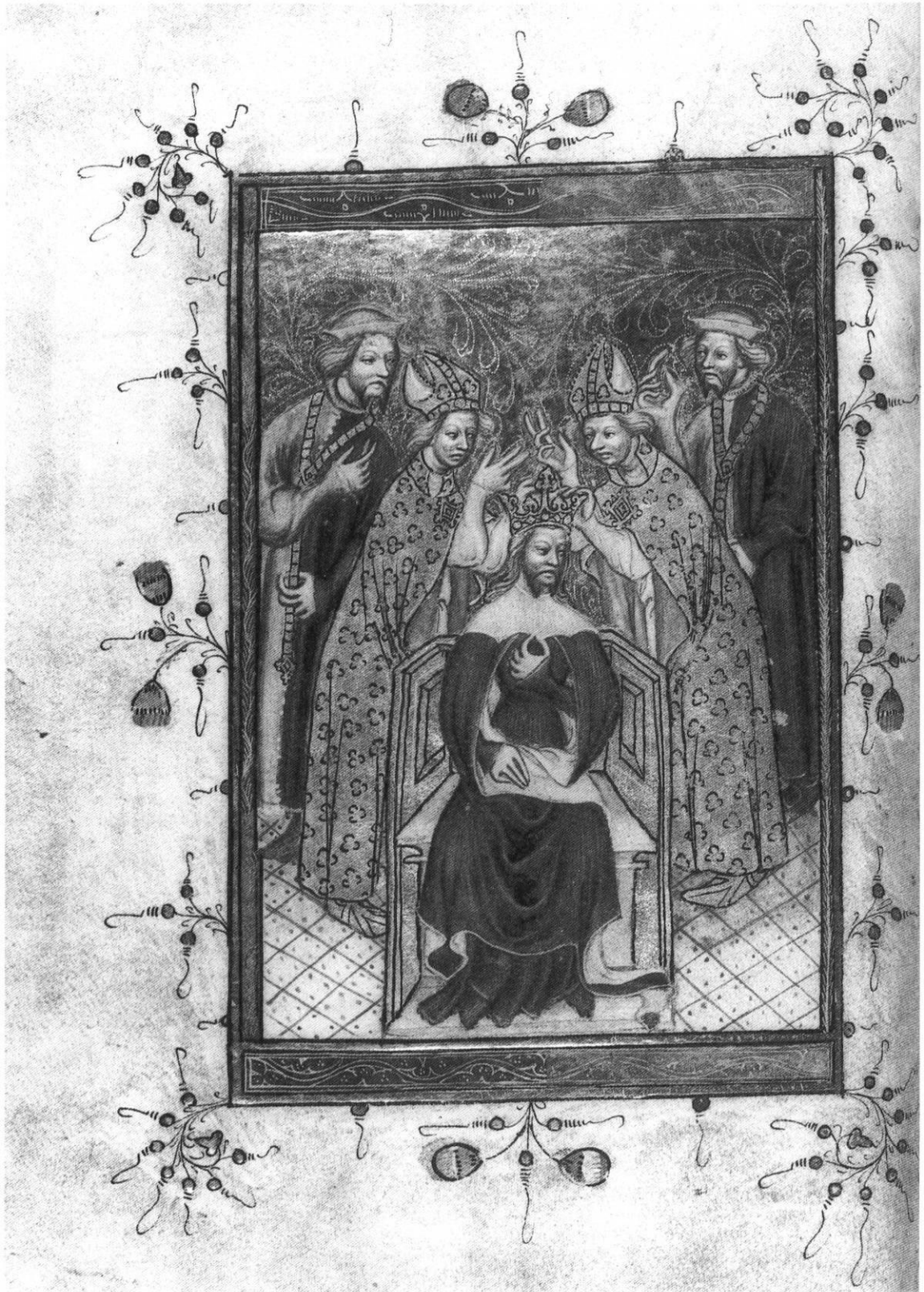
Figure 407: BL Arundel 331 f.22, dated 1392 (British Library Online, <http://www.bl.uk/catalogues/manuscripts/INDEX.asp>)



Figure 408: BL Royal 20 BVI f.2, dated 1395-1396 (British Library Online, <http://www.bl.uk/catalogues/manuscripts/INDEX.asp>)



Figure 409: Coronation of a King and Queen, Liber Regalis c.1390-9(?) London Westminster Abbey MS 38, f.20. (Gordon et al 1997, Plate 18)



139. Coronation of a King. *Liber Regalis*, London, Westminster Abbey, MS 38, f. 1v

Figure 410: Coronation of a King, *Liber Regalis* c.1390-9(?), London Westminster Abbey MS 38, f. 1v (Binski 1997, 232, Figure 139)

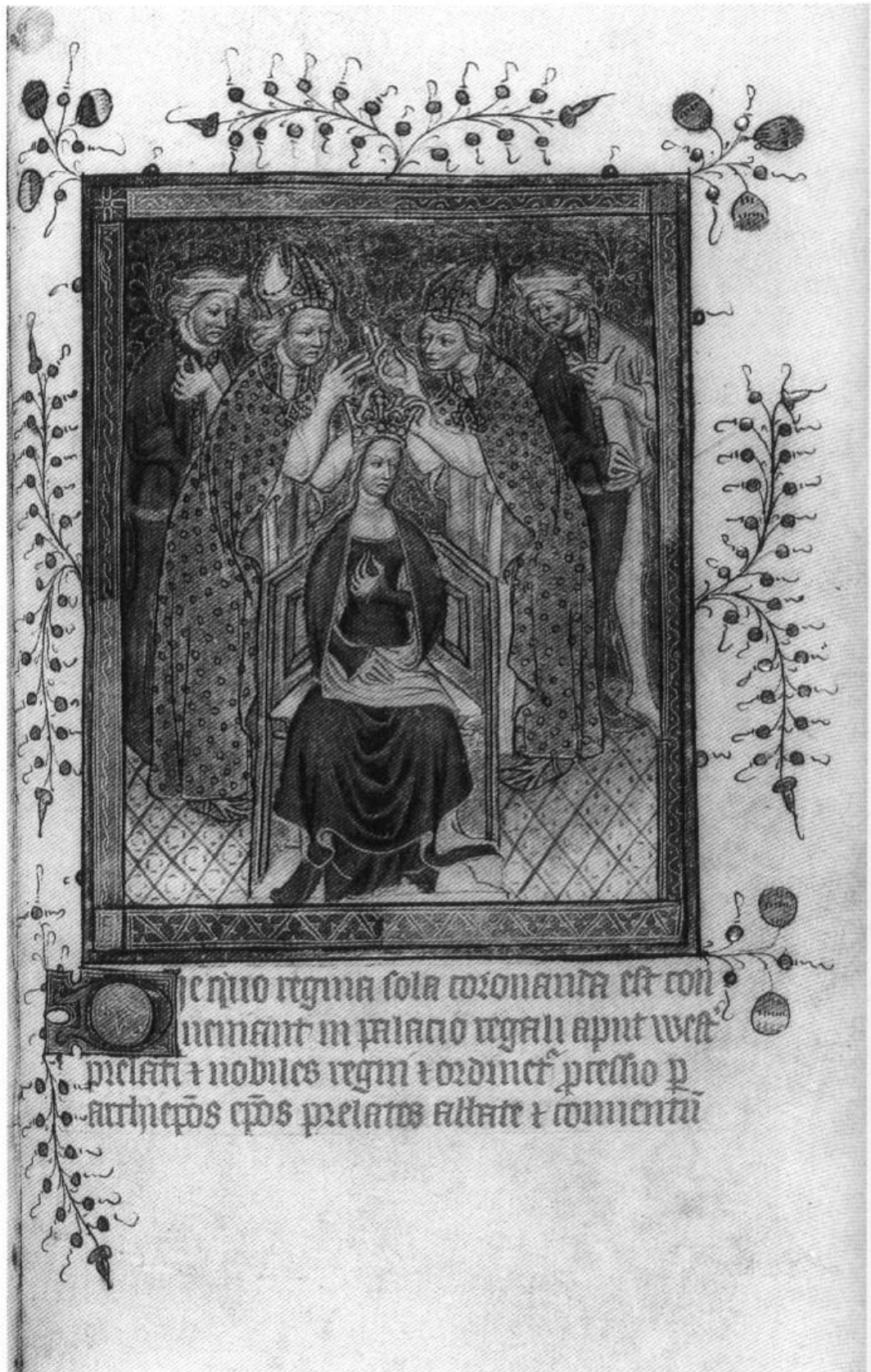


Figure 411: Coronation of a Queen, Liber Regalis c.1390-9(?), London Westminster Abbey MS 38, f. 29 (Binski 1997, 234, Figure 141)



Figure 412: Funeral of a King, Liber Regalis c.1390-9(?), London Westminster Abbey MS 38, f. 33v (Binski 1997, 235, Figure 142)



Figure 413: Coronation of the Virgin, tomb tester of Richard II, Westminster Abbey



Figure 414: Christ in Majesty, tomb tester of Richard II, Westminster Abbey



Figure 415: Carving of a vine, fourteenth century Figure 416: Vine capital, France, fourteenth century (Marc Antoine du Ry, http://www.marcdury.com/catalogues/catalogue2_photos.shtml)



Figure 417: Coronation of the Virgin above east window, Melrose Abbey (Fawcett and Oram 2004, 104, Figure 28)

The Genealogy of the Kings of Ancient Israel and Judah

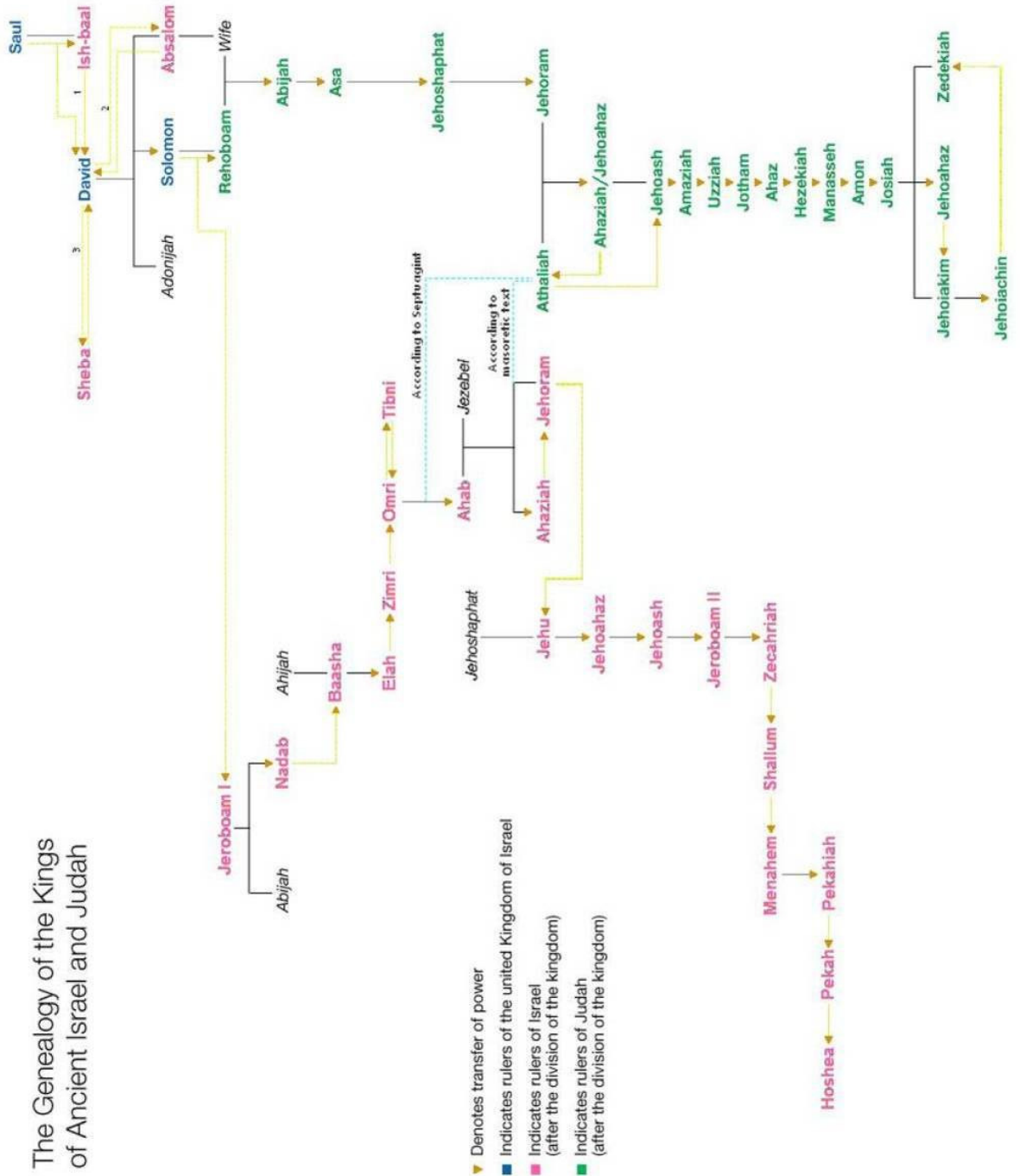


Figure 418: The Genealogy of the Kings of Ancient Israel and Judah (http://commons.wikimedia.org/wiki/File:Genealogy_of_the_kings_of_Israel_and_Judah.png)

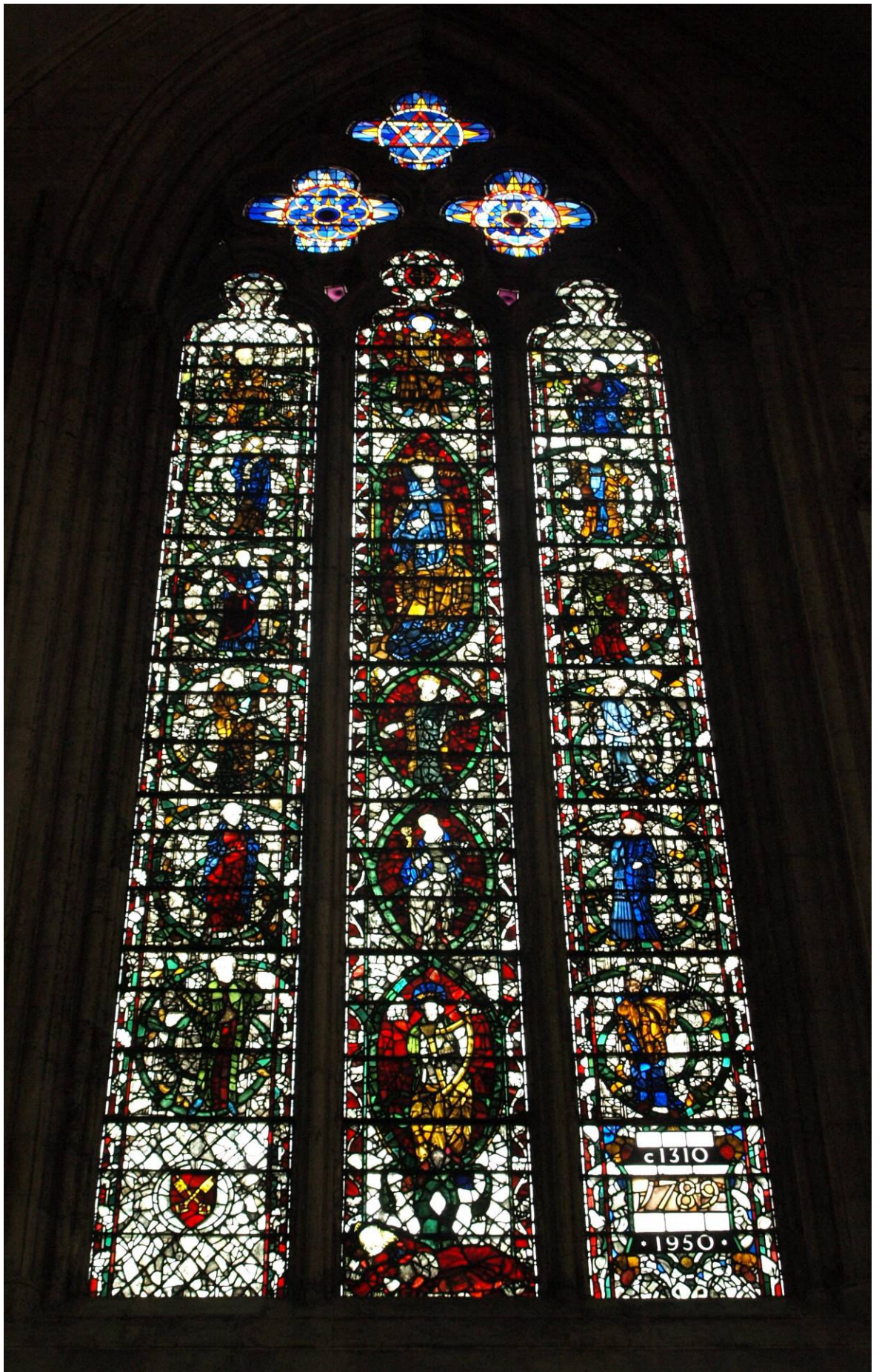


Figure 419: York Minster nave, Tree of Jesse window s33, c.1310-1320

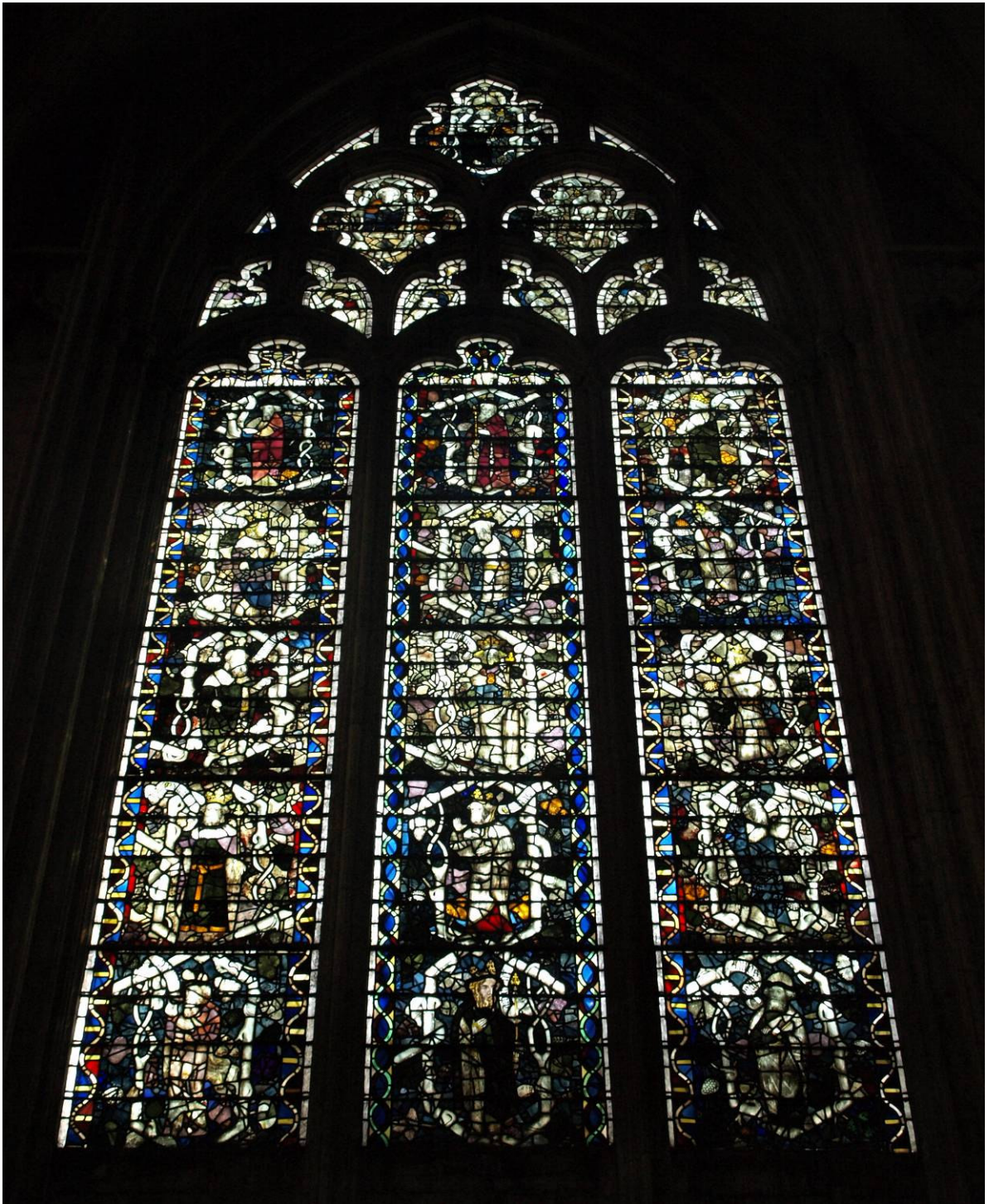


Figure 420: York Minster choir, Tree of Jesse window s8, c.1386

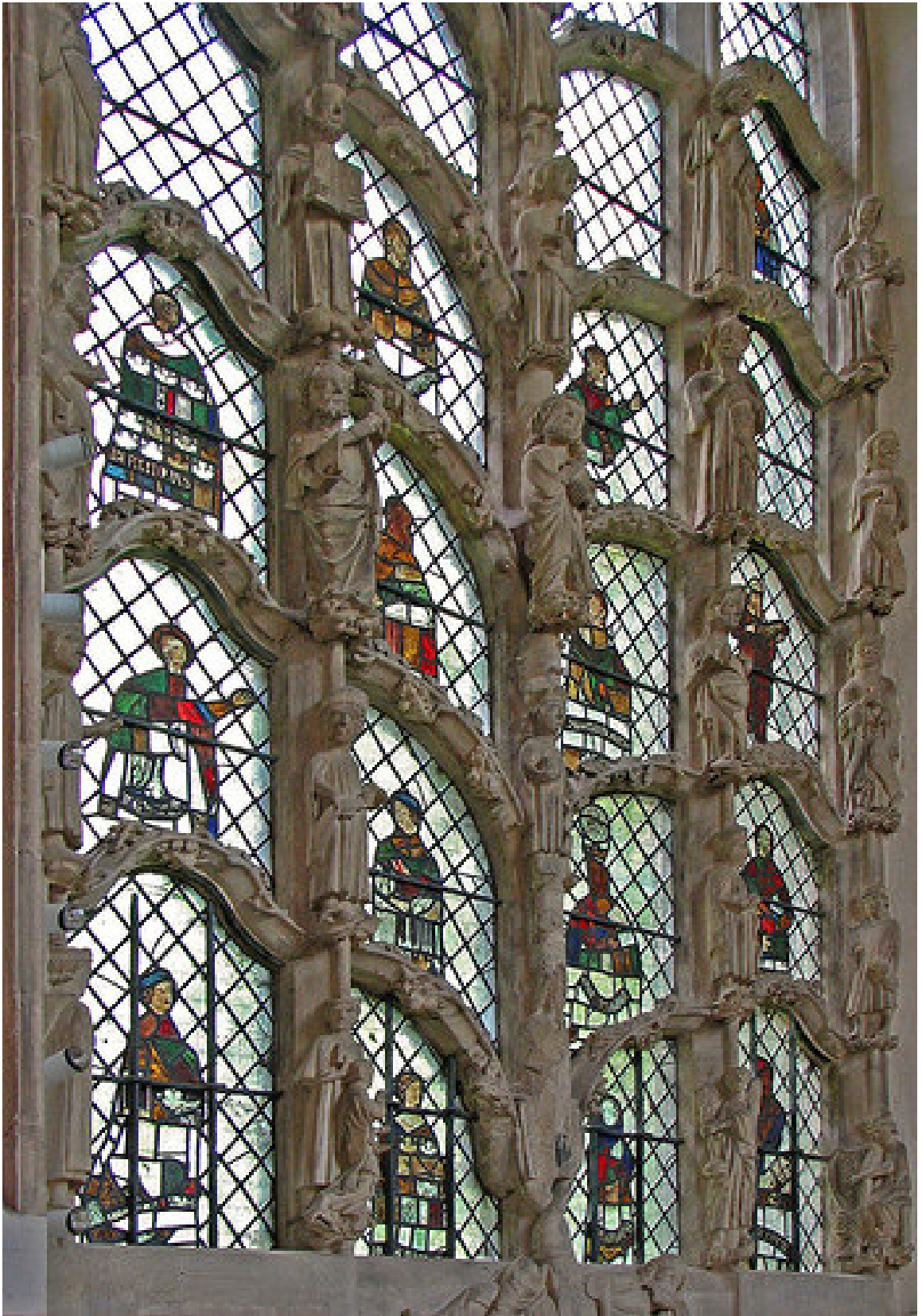


Figure 421: The Jesse Window, Dorchester Abbey, fourteenth century

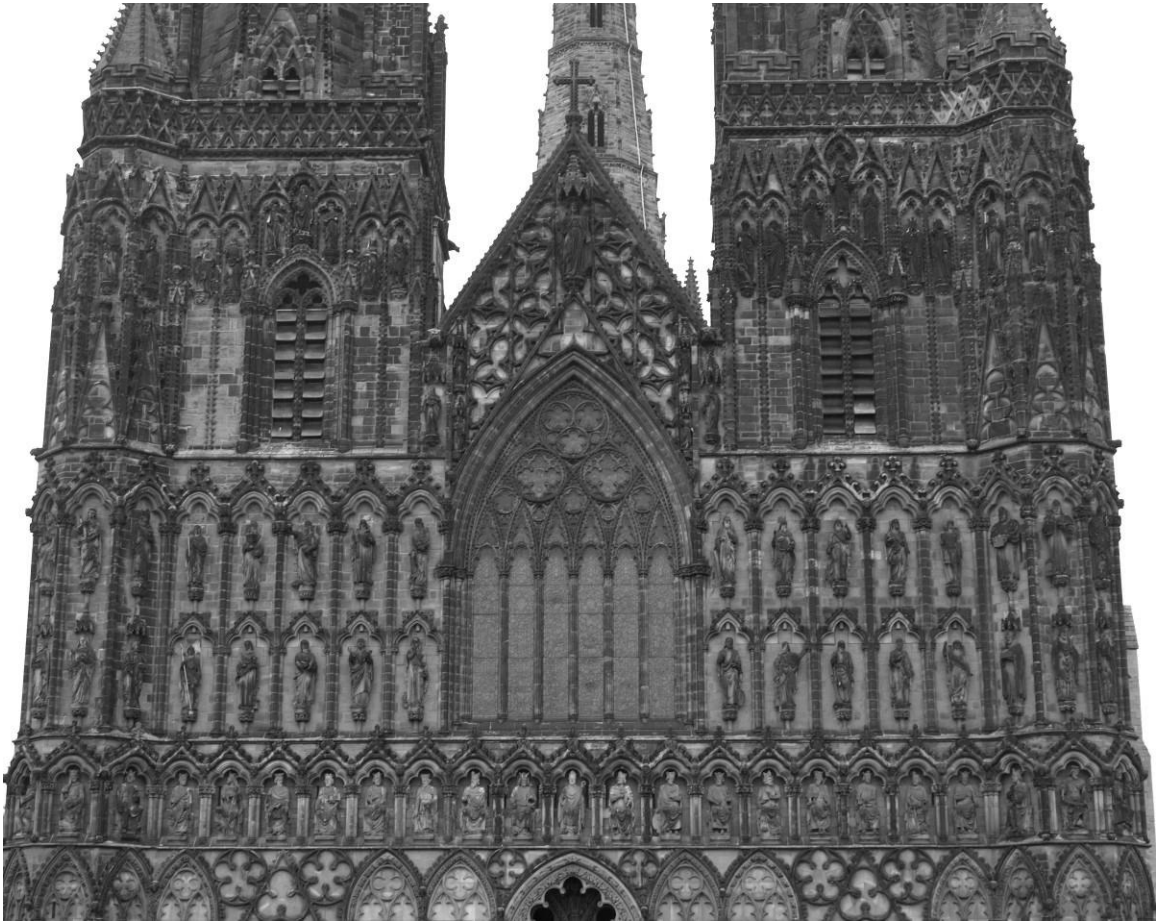


Figure 422: Lichfield Cathedral, West Front, Gallery of Kings of England within first tier



Figure 423: Lichfield Cathedral, detail of Kings of England, West Front



Figure 424: St Peter as Pope, ?France or Luxembourg 1350-1375. Boston Museum of Fine Art, Acc. No. 48.265 (www.mfa.org)



Figure 425: St. Peter as Pope ?France or ?Luxembourg 1350-1375. Boston Museum of Fine Art, Acc. No. 48.265 (www.mfa.org)



Figure 426: York Minster nave, St. Peter in window n25, c.1310-1320

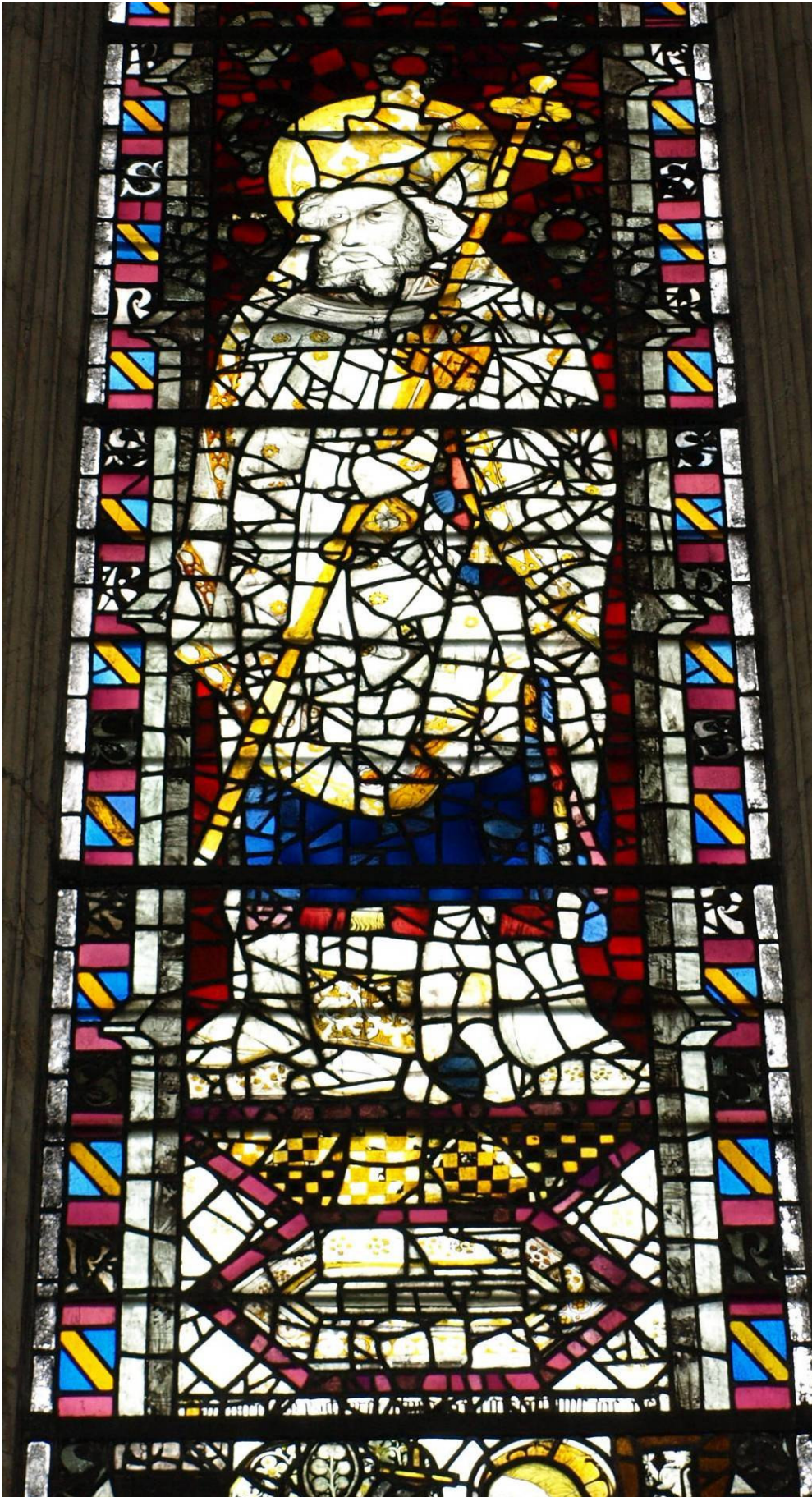


Figure 427: York Minster Thoresby's east end, St. Peter with keys and cross staff in window n6, c.1390



Figure 428: Lichfield Cathedral, Christ in Majesty above western doorway, fourteenth century



Figure 429: Choir, north arcade 6th bay from east, east spandrel shield (2) (YML/2780, 1970)

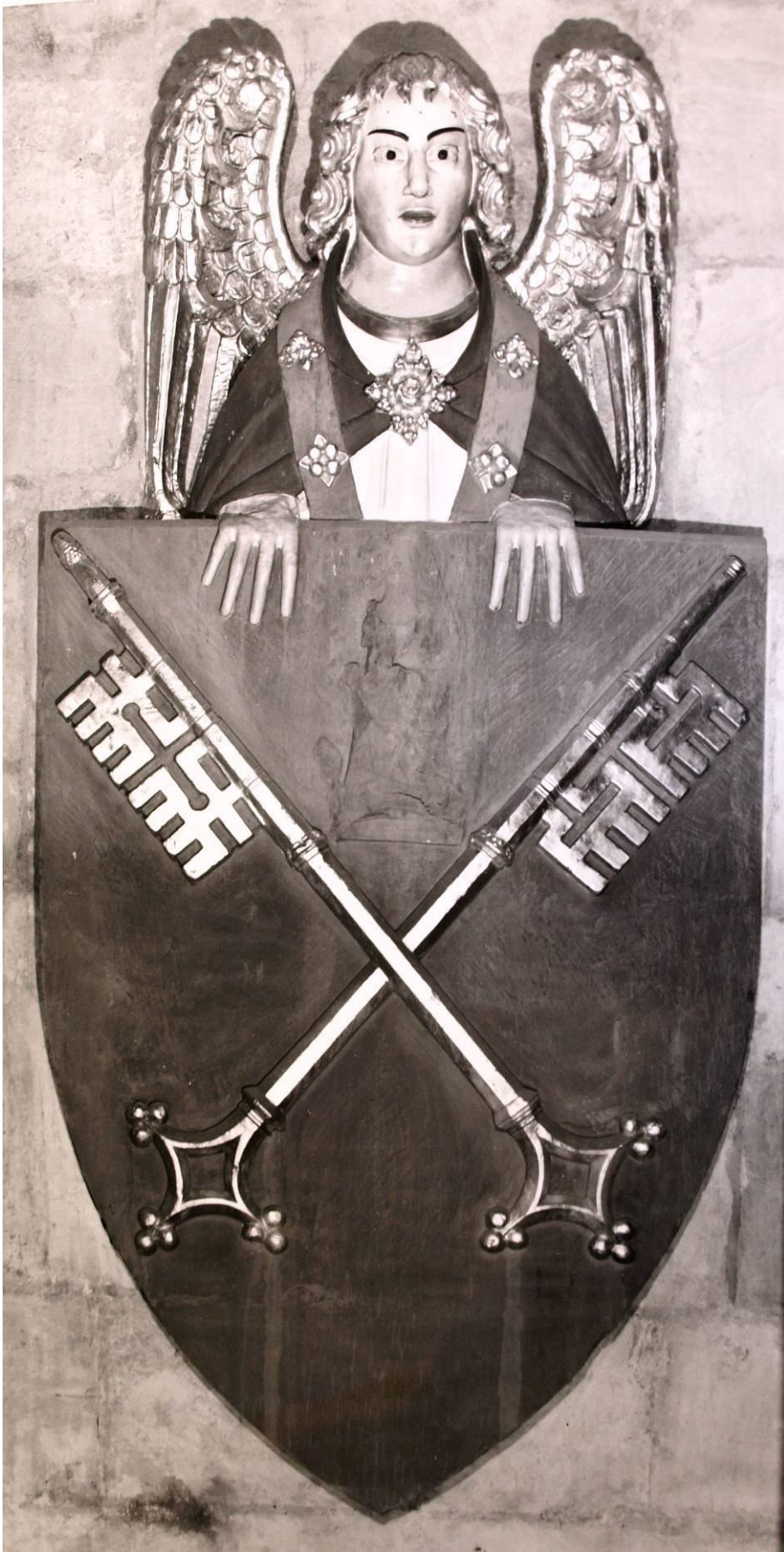


Figure 430: Central Tower, south wall, east shield (YML/2801)



Figure 431: Great East Window, exterior voussoirs, detail of decay



Figure 432: South-clerestory cornice, example of cavitation upon stones previously treated with linseed oil



Figure 433: East Front, example of decay upon underside of canopy, north buttress



Figure 434: East Front, niche-base before cleaning trials



Figure 435: East Front, niche-base after cleaning trials (right-hand side left untreated)



Figure 436: Great East Window exterior, mullions and transom masonry before cleaning trials



Figure 437: Great East Window, exterior mullions and transom masonry after cleaning trials. Note removal of 1960s paint but retention of historic patination



Figure 438: Surface decay of new magnesian limestone indents, Howden Minster Chapter House



Figure 439: Cusworth Hall, South Yorkshire. Detail of salt damage to new magnesian-limestone masonry



Figure 440: Cusworth Hall, detail of surface decay to new magnesian-limestone masonry



Figure 441: East Front, south-buttress canopy before conservation by Lee Godfrey

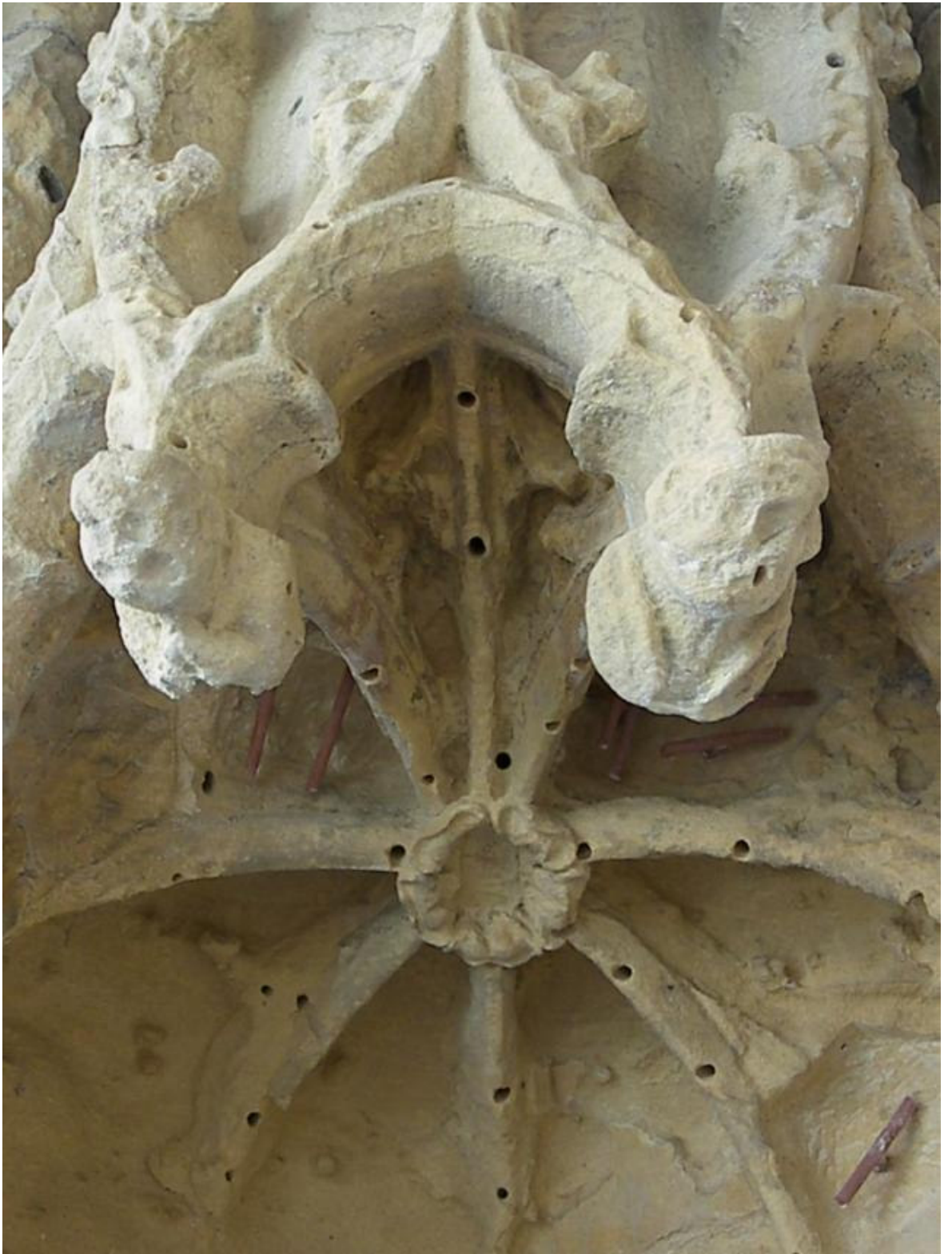


Figure 442: East Front, south-buttress canopy during pinning and anchoring for mortar repairs



Figure 443: East Front, south-buttress canopy during mortar repair



Figure 444: East Front, south-buttress canopy after conservation

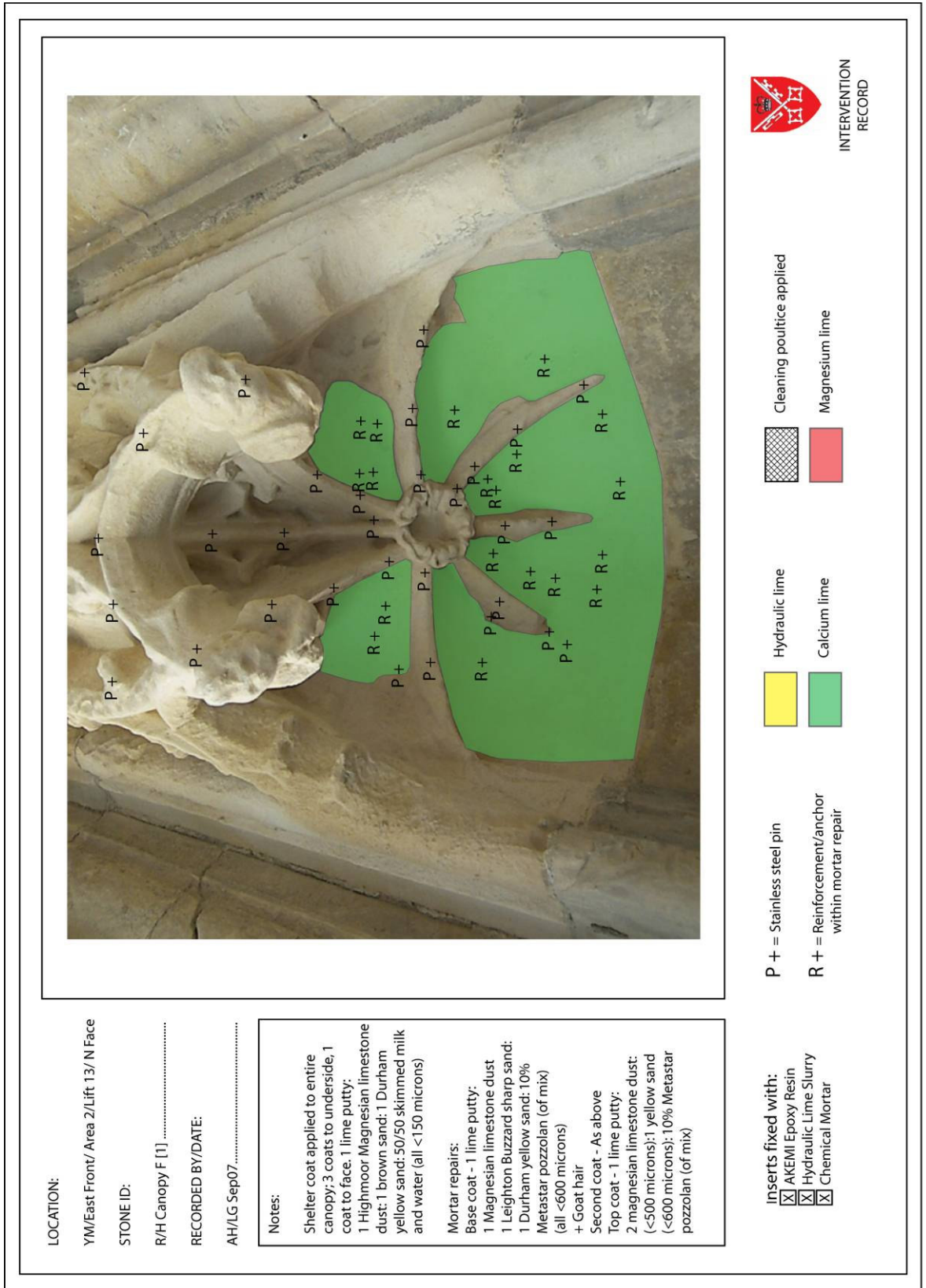


Figure 445: East Front, south-buttrass canopy, intervention record



Figure 446: East Front, central vessel, historic lime-mortar repair



Figure 447: East Front, south buttress, historic lime-mortar repair



Figure 448: Howden Minster Chapter House, arcade panel before conservation trials



Figure 449: Howden Minster Chapter House, arcade panel after conservation, November 2009



Figure 450: Howden Minster Chapter House, detail of trial conservation with coarse lime mortar



Figure 451: Howden Minster Chapter House, enhanced salt development adjacent to magnesium-lime pointing, June 2010



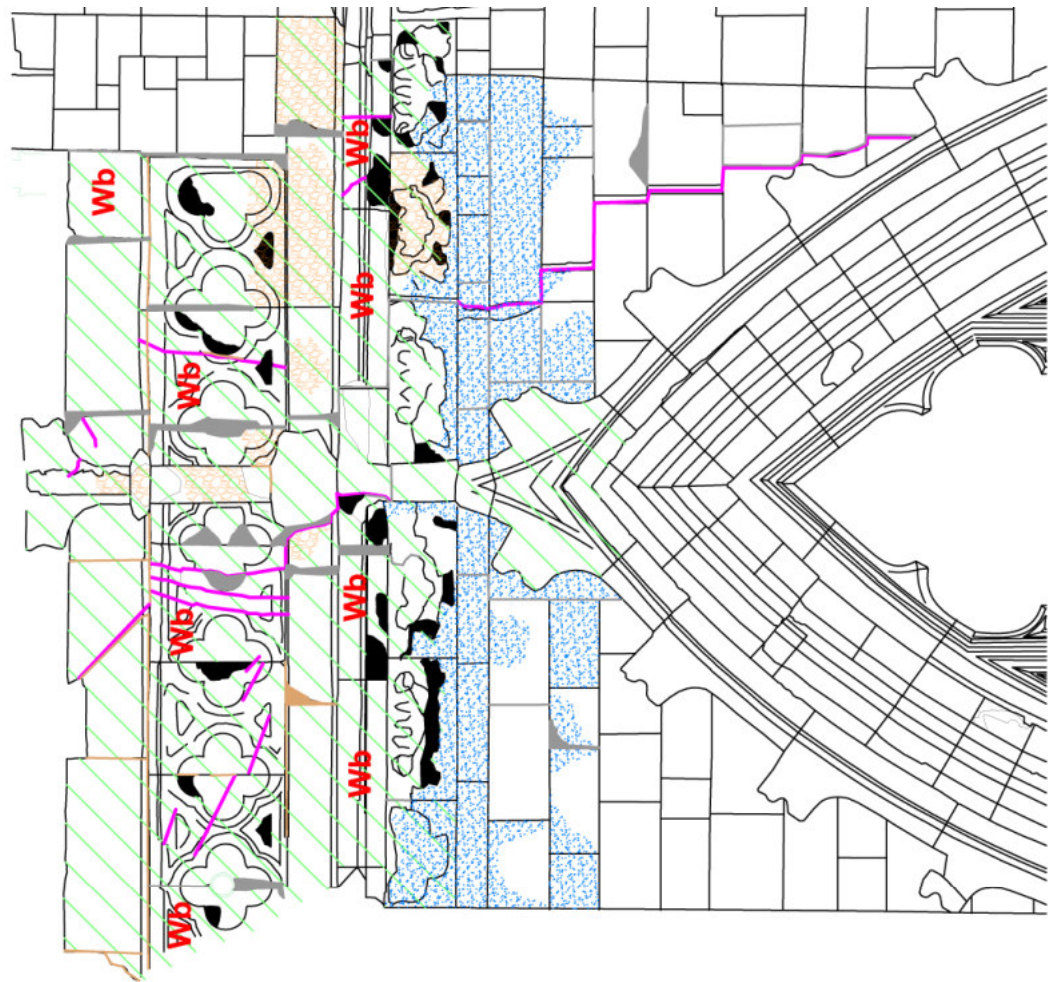
Figure 452: Howden Minster Chapter House, deteriorating NHL2 mortar repairs, June 2010










Figure 453: York Minster, aisle parapet, easternmost bay before surface treatment trials, July 2007



Figure 454: York Minster, south-aisle parapet, easternmost bay after mortar consolidation and application of surface treatments, July 2007



-  Stone harmoniously weathered
-  Stone with cuboidal cracking
-  Stone with symptoms of salt decay
-  Hydrated calcium sulphate (Gypsum)
- Wb** Stone wrongly bedded
-  Structural cracks
-  Ordinary Portland Cement (OPC)
-  Cementitious lime (overlies OPC)

YORK MINSTER
East Front/Lady Chapel
South Aisle, Easternmost Bay Parapet
Condition Survey Jul 07

LG/AH Drwng 01

Figure 455: York Minster, condition of south-aisle parapet before trials, July 2007

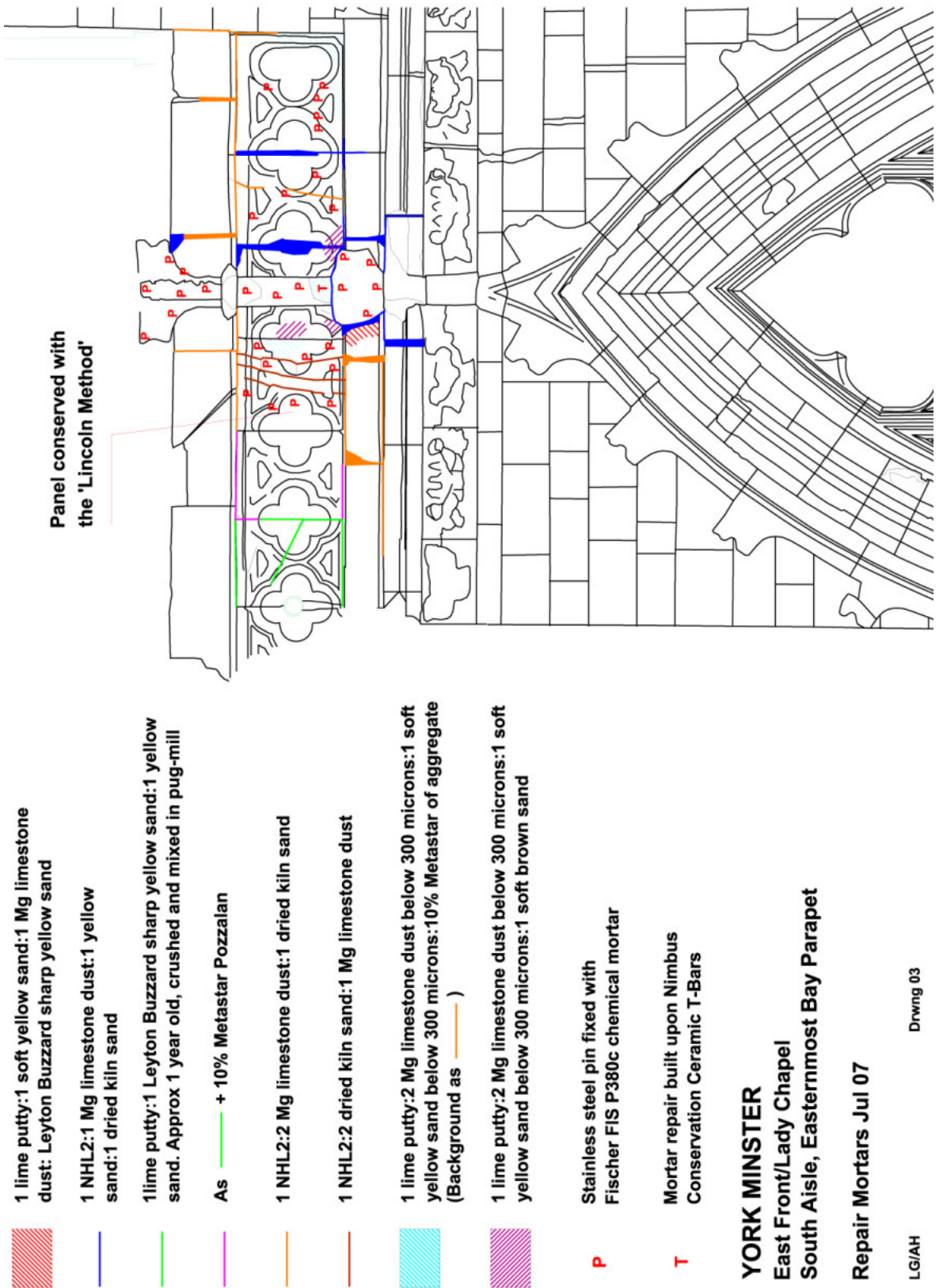


Figure 456: York Minster, south-aisle parapet, lime-mortar pointing and repair record, July 2007

YORK MINSTER
East Front/Lady Chapel
South Aisle, Easternmost Bay Parapet

Protective coating applications
Jul 07

- 1a = lime putty:egg white:yellow ochre
50:50:25%
- 1b = 1a
- 2a = lime putty:yellow ochre:boiled linseed oil
20:1:1
- 2b = 2a
- 3a = lime putty:yellow ochre: raw linseed oil
20:1:1
- 3b = 3a
- 4 = lime putty:yellow ochre: gum arabic
20:1:1
- 5 = lime putty:yellow ochre:beaten egg
20:1:1
- 6 = lime putty:yellow ochre:egg white
20:1:1
- All with several drops of ethanol
- 7 = quicklime:yellow ochre:tallow
20:1:1
- 8 = lime putty:yellow ochre
20:1
- 9 = beaten egg:ethanol
1:several drops
- 10 = egg white:ethanol
1:several drops
- 11a = boiled linseed oil
- 11b = 11a
- 12a = raw linseed oil
- 12b = 12a
- 13a-e = Seamus Hanna sheller coat
1.5 prt soft sand below 15 microns
0.5 prt brown sand below 15 microns
1 prt Mg limestone dust below 15 microns
1 Lime putty sieved thro' muslin
50:50 separated skimmed milk:water
14a-c = As 13a-e but with skimmed milk
NOT separated
- 15 = quicklime:yellow ochre:skimmed milk:water:ethanol
20:1:50:several drops
- 16a = quicklime:yellow ochre:skimmed milk:water
20:1:50:50
- 16b = 16a
- 17a = quicklime:yellow ochre:skimmed milk:water
20:0.5:50:50
- 17a=17b

LG/AH Drwng 04

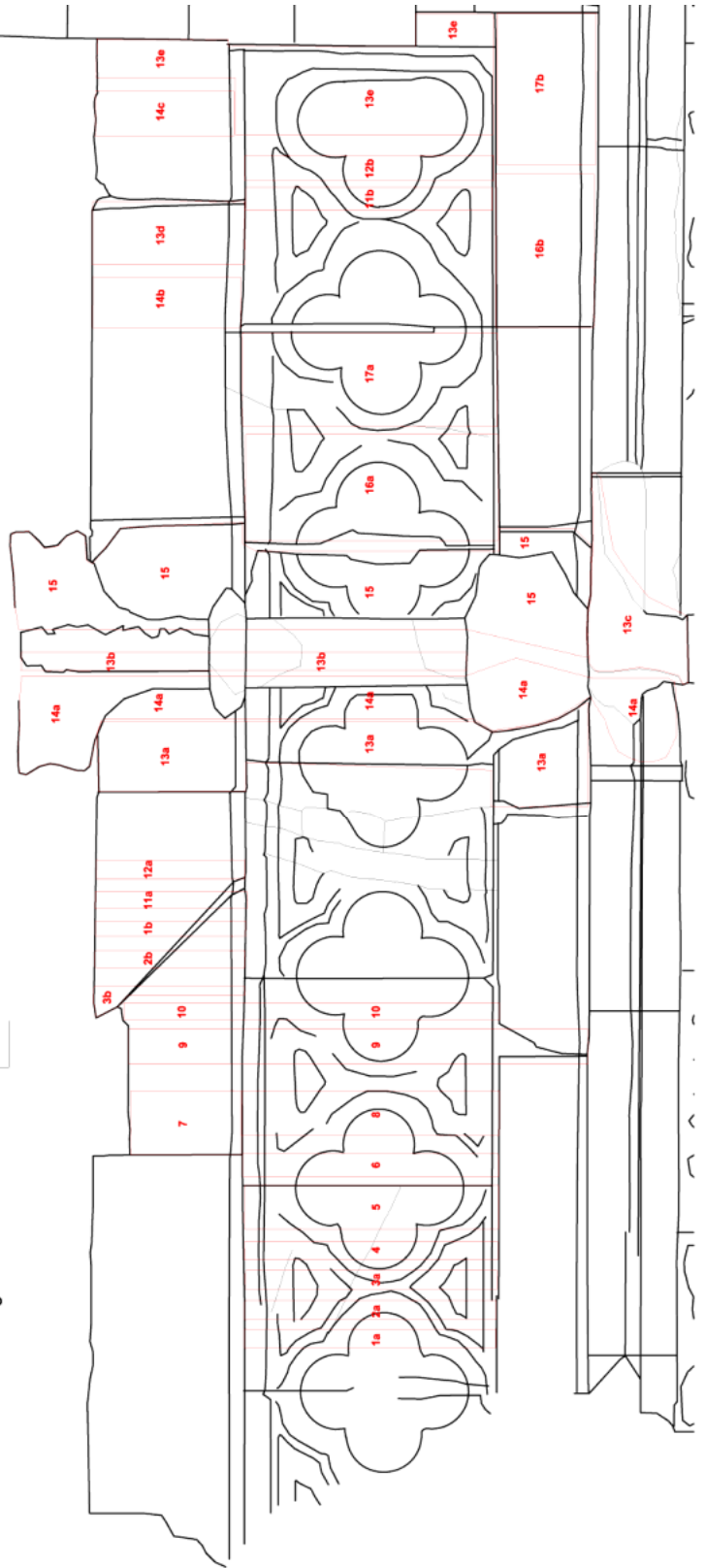


Figure 457: York Minster, south-aisle parapet, record of surface treatment applications, July 2007



Figure 458: Example of effect of linseed oil, south-aisle parapet trial area, January 2008



Figure 459: East Front, Huddleston-stone grotesque on north buttress, c.1970



Figure 460: East Front, north-butress grotesque, detail of decay



Figure 461: South butress, new-niche pedestal carving by Payson Muller



Figure 462: North-clerestory cornice bay 2 before renewal



Figure 463: North-clerestory cornice bay 1 after renewal, comparison of existing and new work



Figure 464: North-clerestory cornice bay 2 after renewal, 2008



Figure 465: East Front, south-buttruss corona carving by Lee Godfrey – King Uzziah



Figure 466: East Front, south-buttress corona carving by Lee Godfrey - The Black Prince

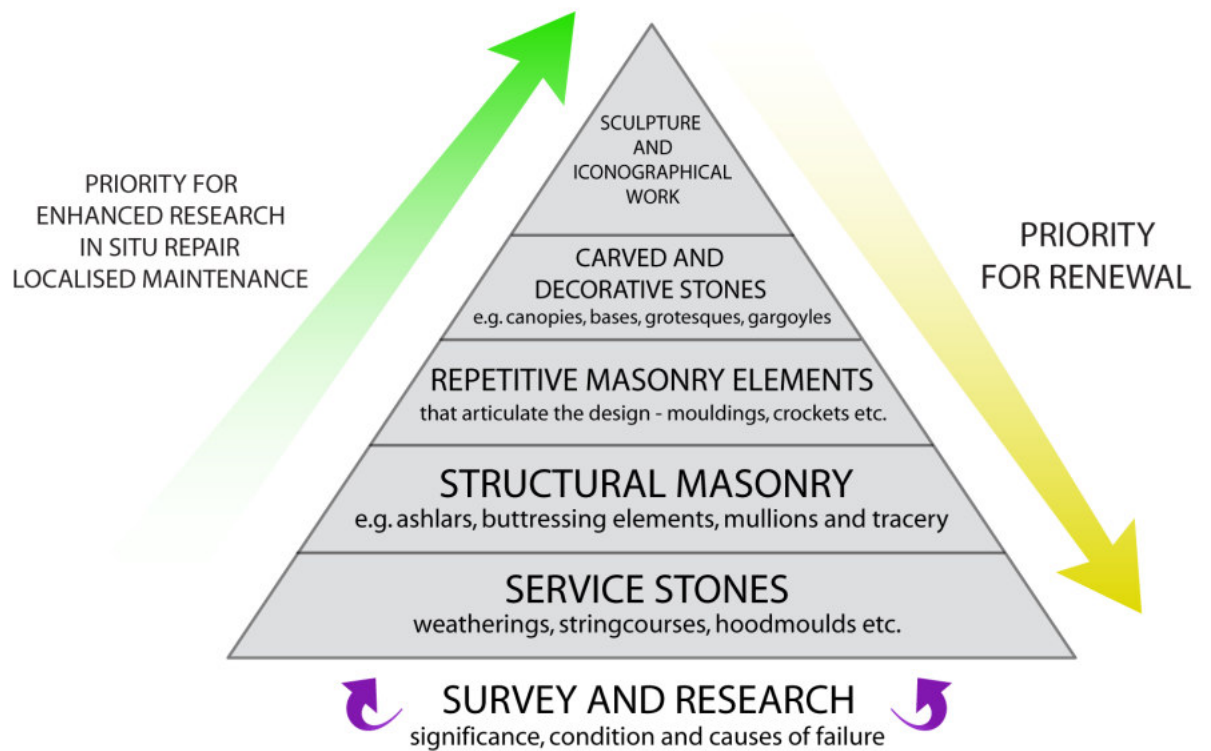


Figure 467: Model for stone conservation



Figure 468: East Front, south butterss, Level G after renewals



Figure 469: Salvaged Great West Doorway voussoirs, York Minster Stoneyard



Figure 470: Great West Doorway voussoirs, York Minster Undercroft

APPENDIX 1 –

Photographic Record of the Exterior Carved Voussoirs

The Coronation of the Virgin and the eighteen seated figures with scrolls
(Photographed with an Olympus 10x megapixel digital SLR, April 2009)

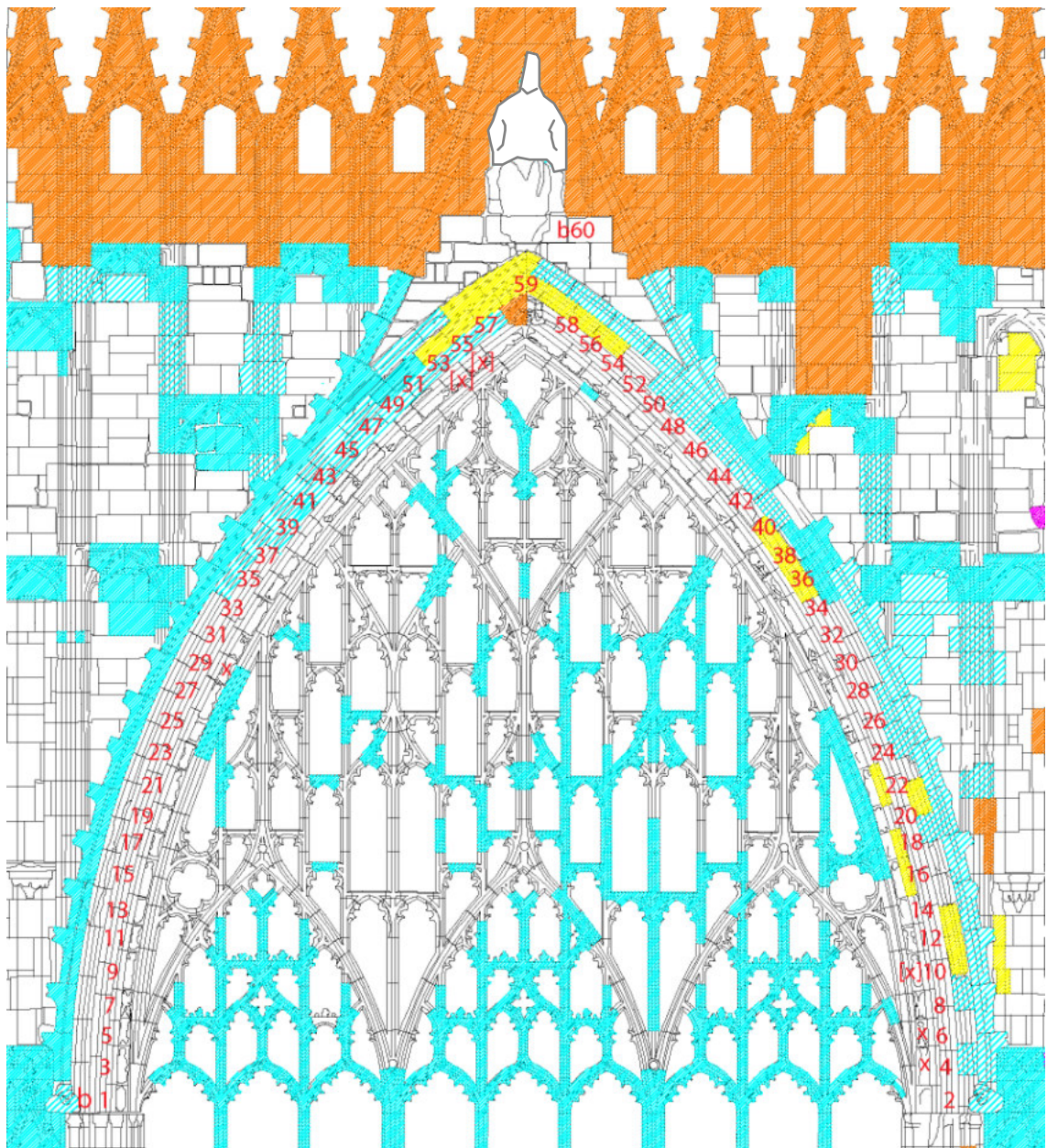


Figure 471: Great East Window, exterior voussoirs numbering scheme



Figure 472: b3



Figure 473: b4



Figure 474: b9



Figure 475: b10



Figure 476: b15



Figure 477: b16



Figure 478: b21



Figure 479: b22



Figure 480: b27



Figure 481: b28



Figure 482: b33



Figure 483: b34



Figure 484: b39



Figure 485: b40



Figure 486: b45



Figure 487: b46



Figure 488: b51



Figure 489: b52



Figure 490: b57



Figure 491: b58

APPENDIX 2 –

Condition Record of the Exterior Carved Voussoirs, Keystone and Seated Figure

May 2009

Notes:

14thC lion mask

Extant sound surfaces harmoniously weathered

Brown staining to surface skins

Note decay debris below mask on East Window capitals



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

●●●● = Epoxy resin repair

Zone of efflorescence

Black crust

Previous cementitious repair

Zone of subflorescence inc. Powdering and Scaling

Cuboidal cracking

Previous OPC repair

Peeling/undercutting/detachment of surface skin

Cementitious coating (if defined)

Previous lime repair

LOCATION : YM/East Front/Area 4/GEW voussoirs

STONE ID: b1.....

RECORDED BY/DATE: AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

14thC lion mask

Extant sound surfaces harmoniously weathered

Brown staining to surface skins



- Fe +** = Ferrous insert
- ~** = Crack/fault
- = Cementitious pointing
- = Epoxy resin repair
- Zone of efflorescence
- Black crust
- Zone of subflorescence inc. Powdering and Scaling
- Cuboidal cracking
- ~** Peeling/undercutting/detachment of surface skin
- Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b2
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

- ▨** Previous cementitious repair
- ▩** Previous OPC repair
- ▧** Previous lime repair



Notes:

14thC crowned, seated figure.

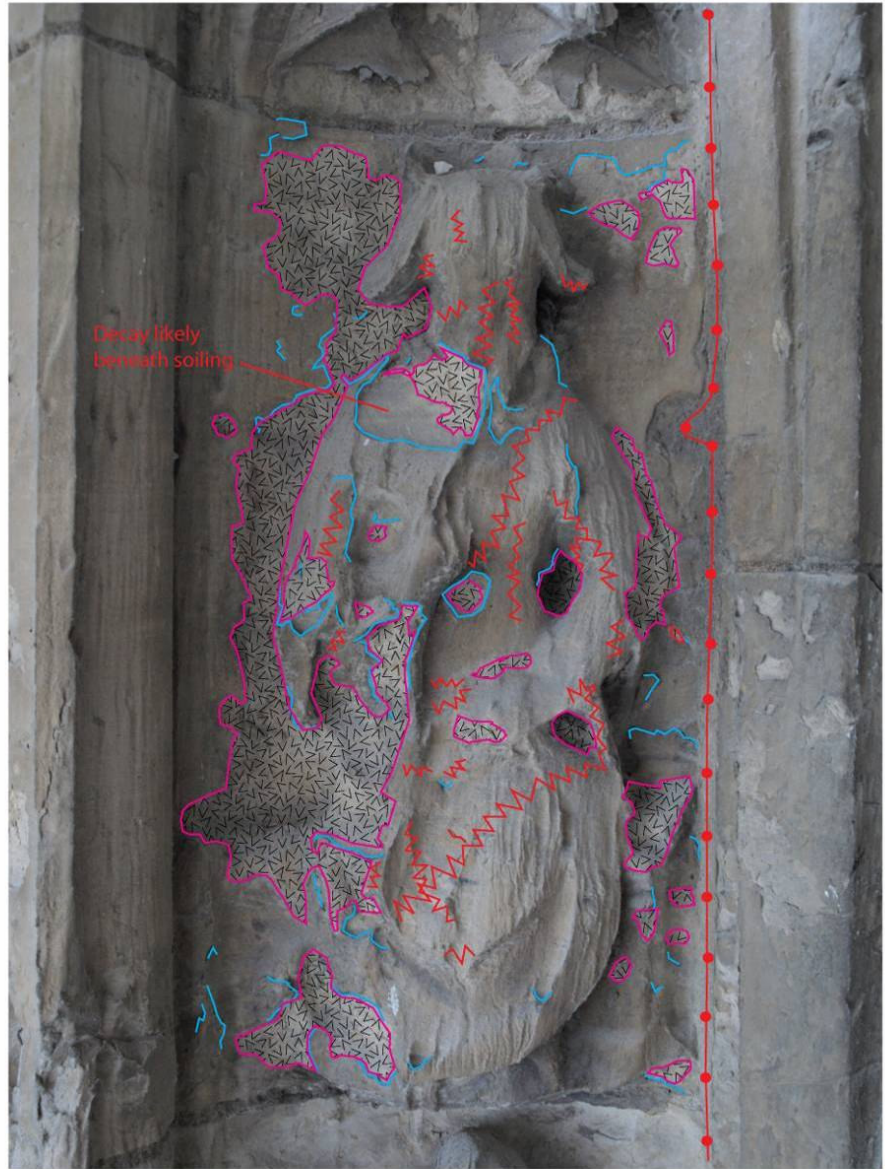
?King Solomon

Trace of a crown and scroll. Figure appears to gesture to itself with its right hand

No significant deterioration noted since first survey by Godfrey (2005)

Extant sound surfaces harmoniously weathered

Brown staining to surface skins



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Previous cementitious repair



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Previous OPC repair



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b3

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

Notes:

19thC crowned, seated, bearded figure

?Originally King David, but 19thC copy taken from b46. Harp held by original figure perhaps interpreted as a scroll by 19thC carvers

Features remain clear, including eyes, nose and mouth. Both feet protrude from robe

Some minor loss of surface skin since first survey by Godfrey (2005) [a, b]

Extant sound surfaces harmoniously weathered

Brown-yellow staining to surface skins

Aggregate residues noted on surface - part of earlier coating application or residue from 'sponging-off' after re-pointing?



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b4

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original foliage

Four leaves, two flowers and stems

intended to represent a vine?

brown staining to sound surfaces

harmonious weathering to sound surfaces, softening of carved details





Fe + = Ferrous insert


⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair


 Zone of efflorescence

 Zone of subflorescence inc. Powdering and Scaling

 Peeling/undercutting/detachment of surface skin

 Black crust

 Cuboidal cracking

 Cementitious coating (if defined)

LOCATION :


YM/East Front/Area 4/GEW voussoirs

STONE ID:

b7

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

 Previous cementitious repair

 Previous OPC repair

 Previous lime repair



CONDITION RECORD

Notes:

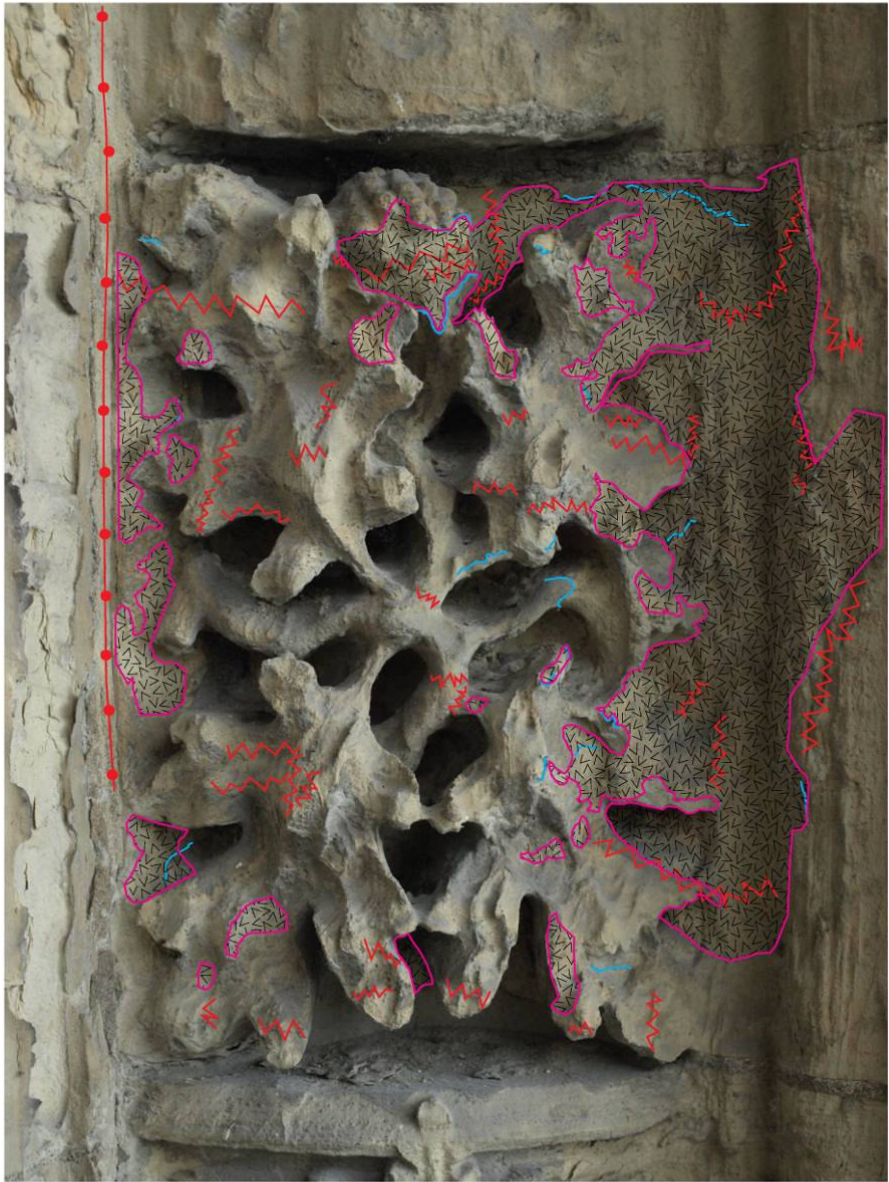
?19thC foliage,
copy of a7

four leaves, two flowers
and stems

considerable
powdering to rear
behind foliage stems

brown-yellow staining
to surface skin

harmonious
weathering to sound
surfaces



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc.
Powdering and Scaling



Peeling/undercutting/
detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating
(if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b8

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION
RECORD

Notes:

14thC original crowned and bearded seated figure

?King Abijah

traces of scroll and left hand

substantial decay, with some significant losses of surfaces and detail since survey by Godfrey (2005). These include the uppermost section of the scroll [a]

voussoirs immediately above and below remain sound; considerable loss of adjacent masonry of EW arch to L/H side

brown staining to surface skin



Fe + = Ferrous insert
 W = Crack/fault

••••• = Cementitious pointing
 ••••• = Epoxy resin repair

••••• Zone of efflorescence
 [Pink outline] Zone of subflorescence inc. Powdering and Scaling
 [Blue wavy line] Peeling/undercutting/detachment of surface skin

[Black stippled] Black crust
 [Yellow stippled] Cuboidal cracking
 [Grey] Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b9
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

[Diagonal lines] Previous cementitious repair
 [Cross-hatch] Previous OPC repair
 [Green stippled] Previous lime repair



Notes:

?19thC insert
(indicated by iron cramp)

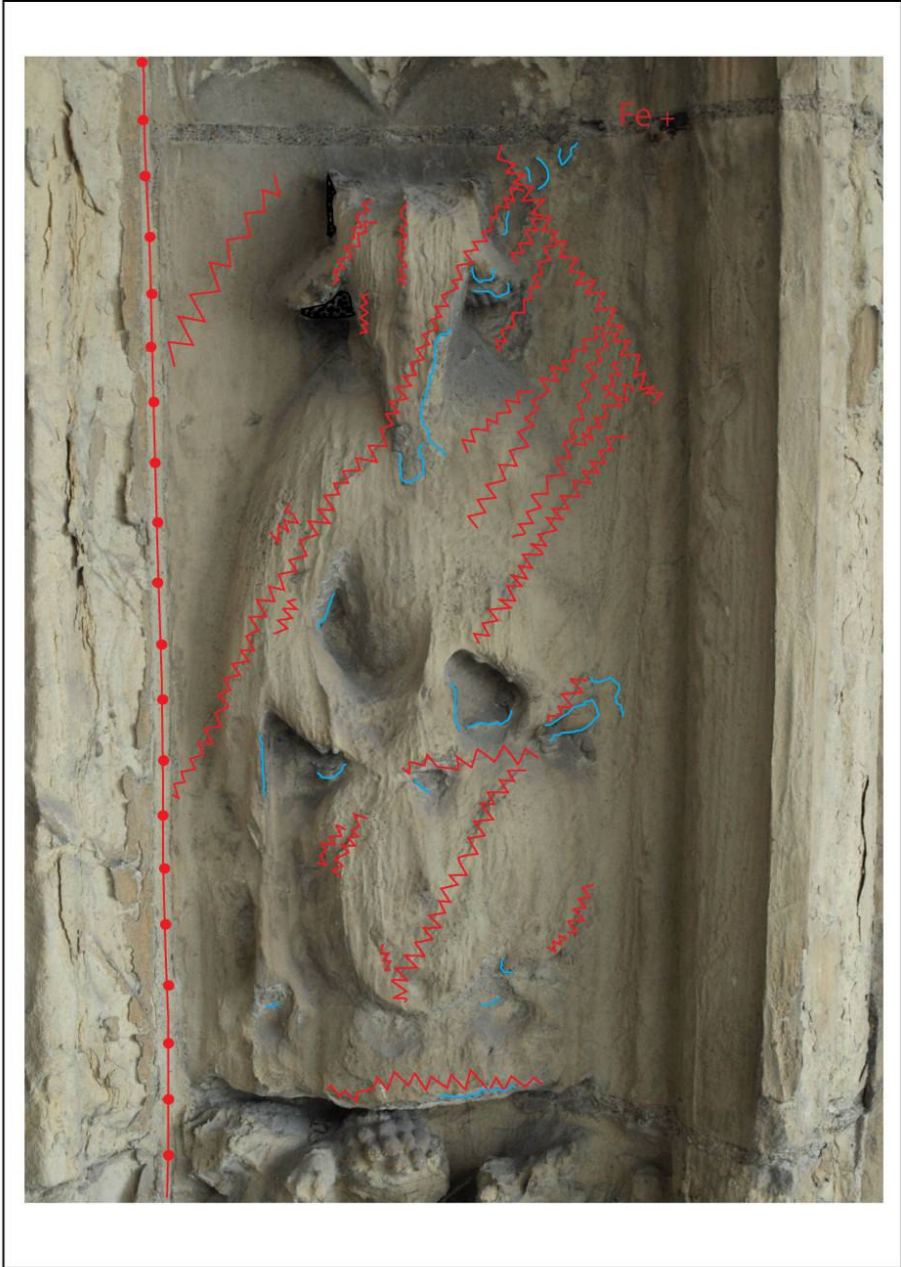
crowned beared and seated figure holding scroll in both hands

trace of nose and mouth, scroll, hands, crown and clothing

?originally represented King Reoboam

harmoniously weathered, sound condition overall

yellow-brown staining to surface



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ○○○○ = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc.
Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/
detachment of surface skin



Cementitious coating
(if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b10
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION
RECORD

Notes:

14thC original canopy

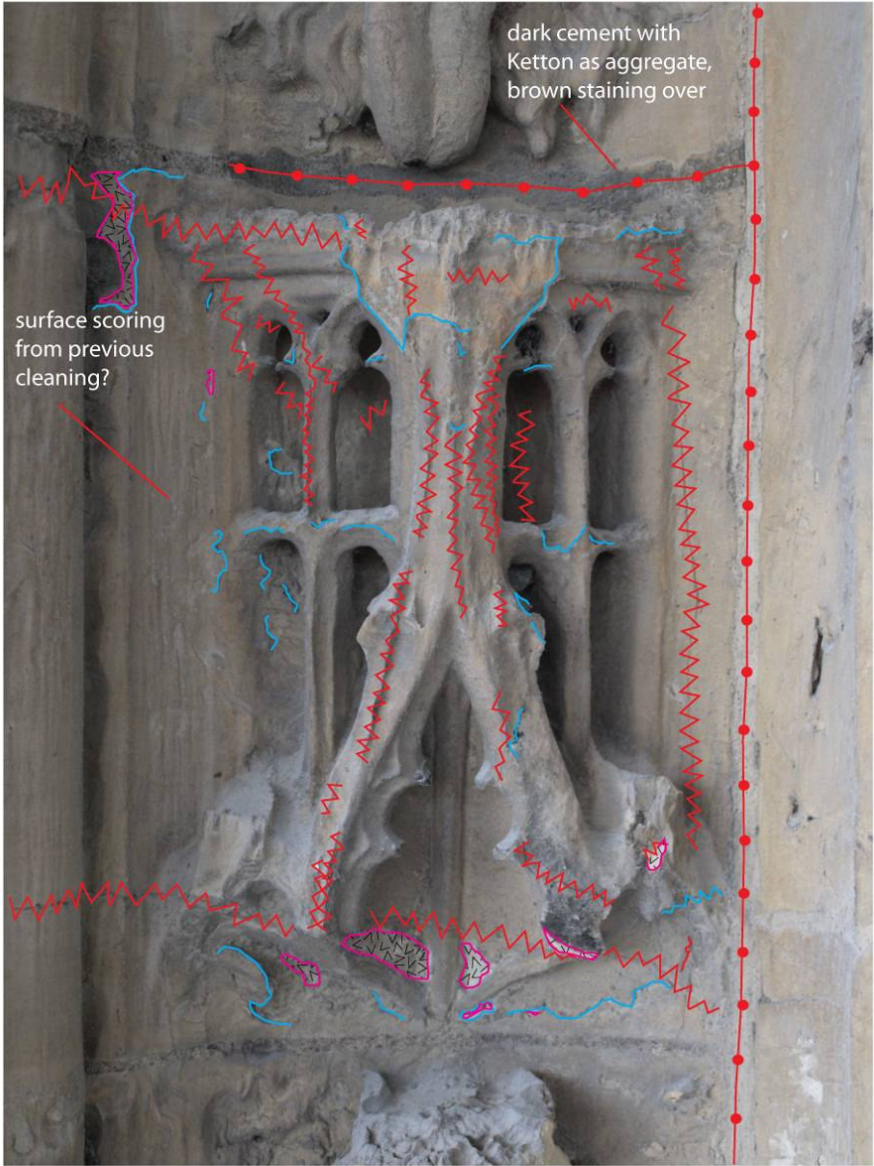
sound surfaces harmoniously weathered

orange-brown staining to sound surfaces

mortar-repaired cavity to adjacent EW arch mouldings

signs of previous decay subsequently consolidated along L/H side

decay to trabecation behind upper section of canopy



Fe + = Ferrous insert

●●●●● = Cementitious pointing

⚡ = Crack/fault

●●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b11

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original

poor condition

brown staining to surface skins

some harmonious weathering to extant sound surfaces

multiple vertical faults running through central section



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b12

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

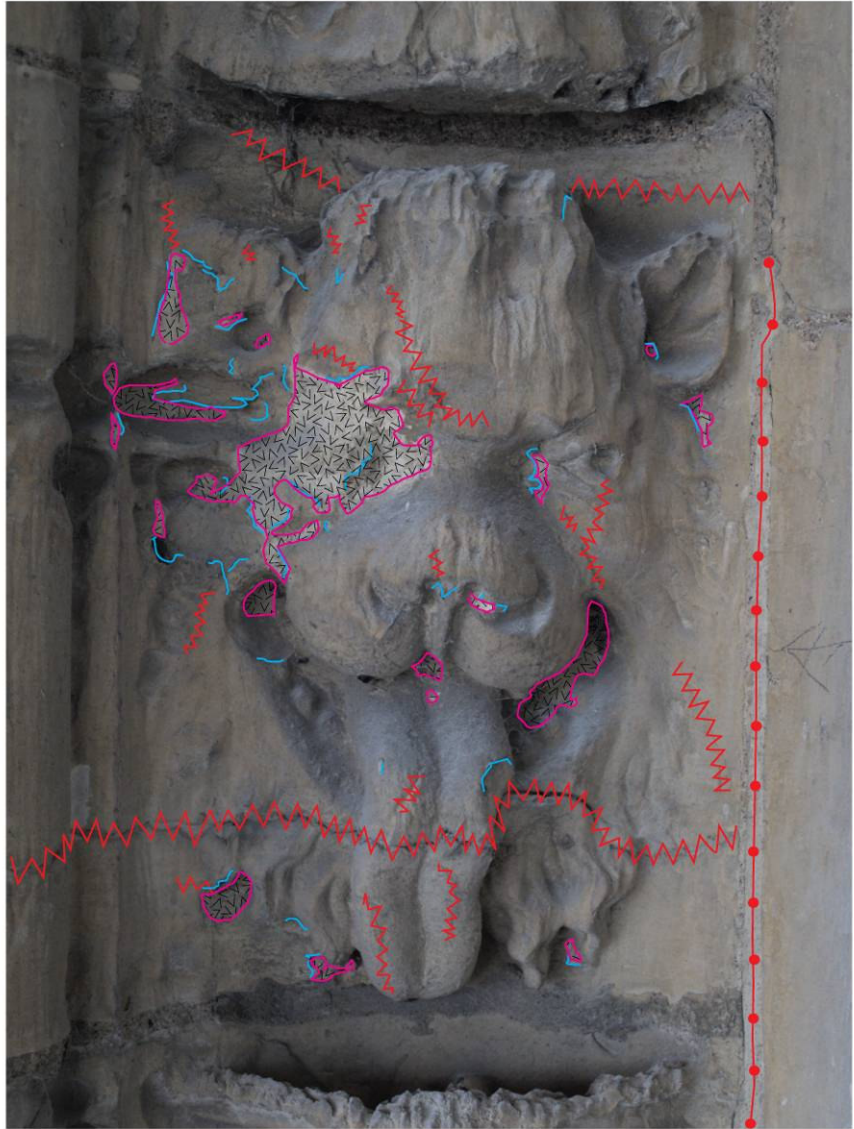
Notes:

14thC original lion mask

brown staining to sound surfaces

evidence of earlier decay on L/H side subsequently consolidated/inhibited

softening of surface details by harmonious weathering



Fe + = Ferrous insert

⚡ = Crack/fault

••••• = Cementitious pointing

••••• = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b13

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:



Fe + = Ferrous insert

⌚ = Crack/fault

●●●● = Cementitious pointing

○●○● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc.
Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/
detachment of surface skin



Cementitious coating
(if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b14

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION
RECORD

Notes:

14thC original canopy

brown staining to surface

pockets of earlier decay subsequently consolidated and inhibited to lower L/H side

outermost details softened by harmonious weathering

zone of micro-blisters behind leftmost upper canopy light



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

○●○● = Epoxy resin repair

Zone of efflorescence

Black crust

Previous cementitious repair

Zone of subflorescence inc. Powdering and Scaling

Cuboidal cracking

Previous OPC repair

Peeling/undercutting/detachment of surface skin

Cementitious coating (if defined)

Previous lime repair

LOCATION : YM/East Front/Area 4/GEW voussoirs

STONE ID: b17.....

RECORDED BY/DATE: AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

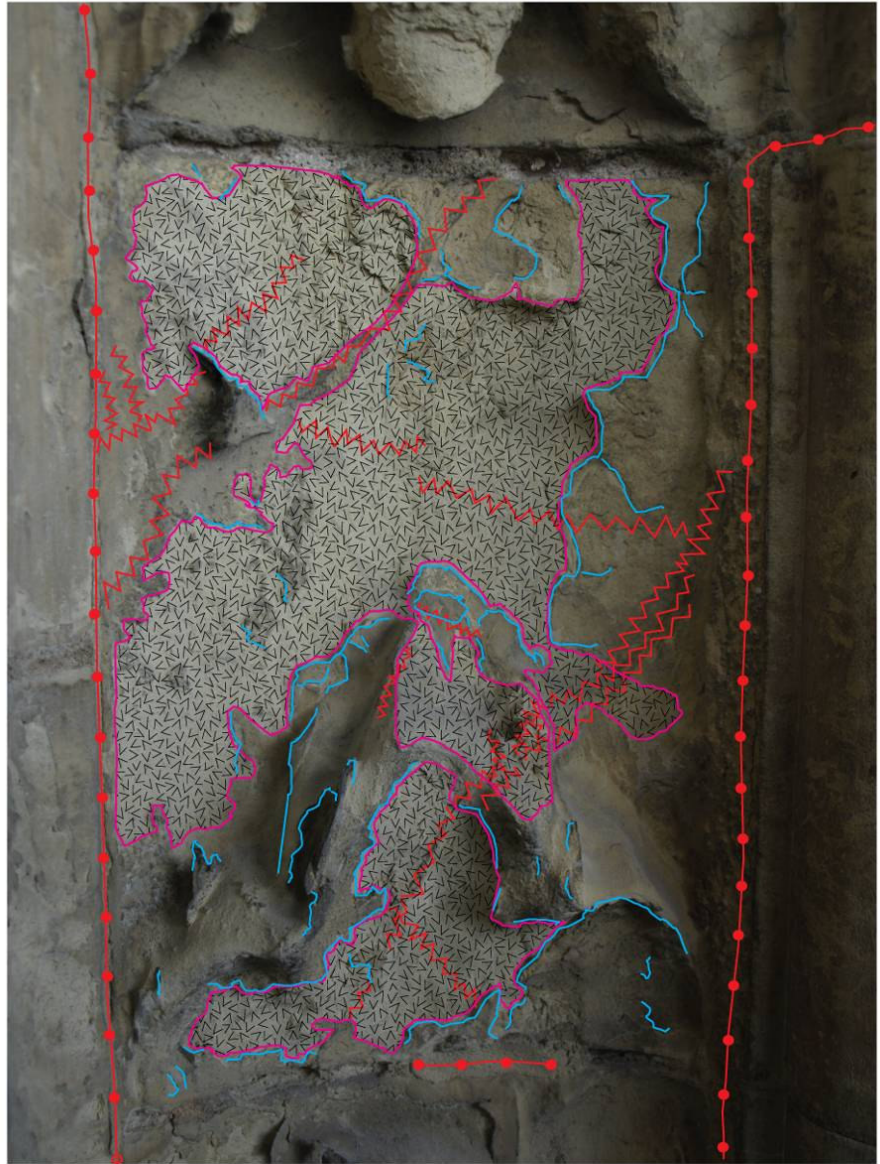
?14thC original canopy

almost all detail now lost

20thC Cadeby indent to R/H moulding

brown staining to extant surface skins

extant surface details softened by weathering




Fe + = Ferrous insert


●●●●● = Cementitious pointing

⌚ = Crack/fault


●●●●● = Epoxy resin repair


 Zone of efflorescence

 Black crust

 Zone of active decay inc. Powdering and Scaling

 Cuboidal cracking

 Peeling/undercutting/detachment of surface skin

 Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b18

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

 Previous cementitious repair

 Previous OPC repair

 Previous lime repair



CONDITION RECORD

Notes:

14thC original foliage
 four main leaves and
 four flowers originally
 brown staining to
 surface skins
 extant surface details
 softened by
 weathering
 claw tooling observed
 on R/H bed where
 mortar has previously
 been removed



Fe + = Ferrous insert

●●●● = Cementitious pointing

∩∩∩ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc.
 Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/
 detachment of surface skin



Cementitious coating
 (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b19

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION
 RECORD

Notes:

14thC original foliage

four leaves, four flowers; R/H flower almost totally lost

brown staining to sound surfaces

extant details softened by weathering

dark sulphation residues behind lower flower

further decay likely to be concealed beneath surface soiling



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc. Powdering and Scaling



Peeling/undercutting/ detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b20

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original seated crowned bearded figure

?King Jehoram

does not appear to hold a scroll; has the unique pose of turning three quarters to look directly into the tracery of the East Window

details of face and clothing survive

very little evidence of continued deterioration since survey by Godfrey (2005)

dark sulphation residues exist upon base of throne

brown staining to extant sound surfaces

details of face and clothing softened by weathering



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair

●●●● Zone of efflorescence
 ■■■■ Zone of subflorescence inc. Powdering and Scaling
 ~~~~~ Peeling/undercutting/detachment of surface skin

■ Black crust  
 ■ Cuboidal cracking  
 ■ Cementitious coating (if defined)

LOCATION :  
 YM/East Front/Area 4/GEW voussoirs .....  
 STONE ID:  
 b21 .....  
 RECORDED BY/DATE:  
 AH Photo Apr 09; Condition Survey AH Apr 09 .....

▨ Previous cementitious repair  
 ▨ Previous OPC repair  
 ▨ Previous lime repair



Notes:

14thC original bearded seated figure

?The Prophet Isaiah

face, right arm and scroll discernable; figure may have originally worn a hat

dark sulphation to underside of hair and ears

1970s indent to R/H moulding

brown staining to surface skins

harmonious weathering to sound surfaces

no noticeable change since survey by Godfrey (2005)



Fe + = Ferrous insert  
 W = Crack/fault

●●●● = Cementitious pointing  
 ●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Previous cementitious repair



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Previous OPC repair



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous lime repair

LOCATION :  
 YM/East Front/Area 4/GEW voussoirs .....  
 STONE ID:  
 b22 .....  
 RECORDED BY/DATE:  
 AH Photo Apr 09; Condition Survey AH Apr 09 .....



CONDITION RECORD

Notes:

14thC original canopy

claw tooling observed in previously exposed R/H joint

canopy lobes originally formed two beasts; heads now missing

brown staining to sound surfaces

details softened by harmonious weathering



Fe + = Ferrous insert

●●●● = Cementitious pointing

⌚ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b23 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original canopy  
 majority of carving  
 now lost  
 brown staining to  
 extant sound surfaces



Fe + = Ferrous insert

⚡ = Crack/fault

●●●●● = Cementitious pointing

●●●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc.  
 Powdering and Scaling



Peeling/undercutting/  
 detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating  
 (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b24 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



CONDITION  
 RECORD

Notes:

14thC original lion mask

claw tooling observed in previously exposed joint

buff-pink hue to original bedding mortar

detail of L/H ear lost, then break subsequently consolidated

Ketton and cement pointing to R/H side exhibits brown staining

brown staining to sound surfaces

softening of details through weathering



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc. Powdering and Scaling



Peeling/undercutting/detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b25 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



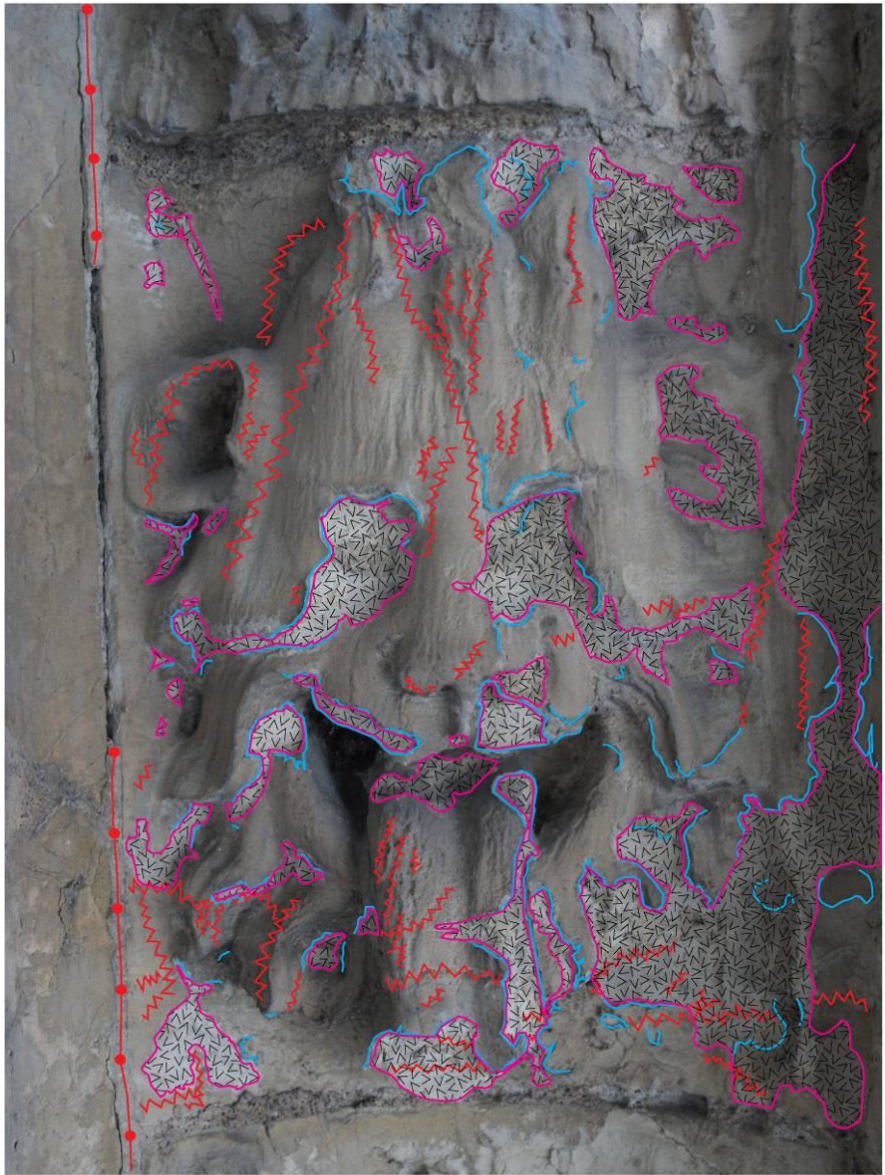
CONDITION RECORD

Notes:

14thC original lion mask

brown staining to sound surfaces

extant sound surfaces harmoniously weathered



Fe + = Ferrous insert

= Cementitious pointing

= Crack/fault

= Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b26 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD



Notes:

19thC indent

Lancets pierced, but not fully; top of canopy closed

bolster tooling observed


brown staining observed on sound surfaces

some softening of detail from weathering




Fe + = Ferrous insert

 = Cementitious pointing


 = Crack/fault

 = Epoxy resin repair

 Zone of efflorescence


 Black crust


 Previous cementitious repair

 Zone of subflorescence inc. Powdering and Scaling

 Cuboidal cracking

 Previous OPC repair

 Peeling/undercutting/detachment of surface skin

 Cementitious coating (if defined)

 Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b29 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



CONDITION  
RECORD

Notes:

14thC original canopy

brown staining to sound surfaces

extant details softened by weathering



Fe + = Ferrous insert

⌚ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b30 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original foliage

four leaves, two flowers and stems

19thC indented moulding to L/H side

details softened by weathering

brown staining to sound surfaces



Fe + = Ferrous insert

W = Crack/fault

••••• = Cementitious pointing

••••• = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b31 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



CONDITION RECORD

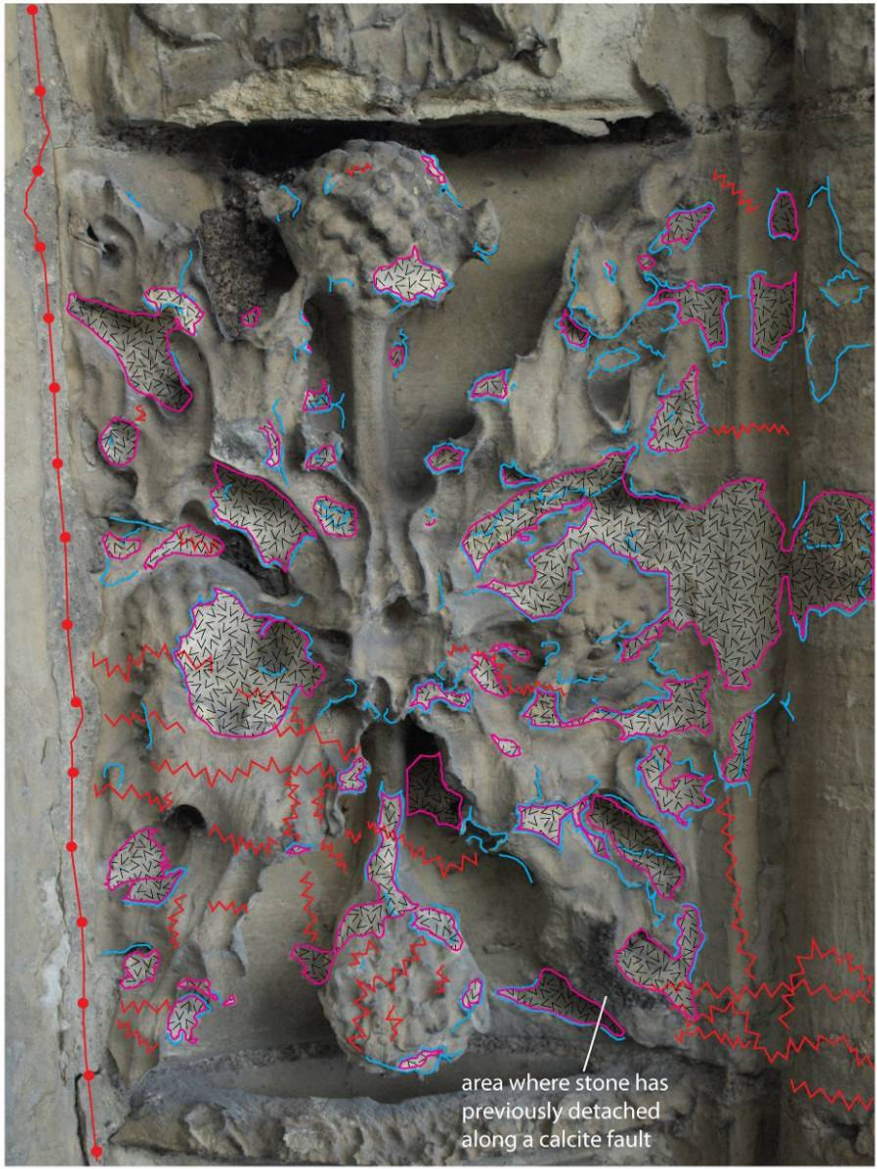
Notes:

14thC original foliage

four leaves, four flowers and stems

details softened by weathering

brown staining to extant sound surfaces



Fe + = Ferrous insert  
 W = Crack/fault

●●●● = Cementitious pointing  
 ○○○○ = Epoxy resin repair

●●●● Zone of efflorescence  
 [Pattern] Zone of subflorescence inc. Powdering and Scaling  
 ~~~~~ Peeling/undercutting/detachment of surface skin

[Pattern] Black crust
 [Pattern] Cuboidal cracking
 [Pattern] Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b32
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

[Pattern] Previous cementitious repair
 [Pattern] Previous OPC repair
 [Pattern] Previous lime repair



Notes:

14thC original bearded seated figure

?St John the Evangelist

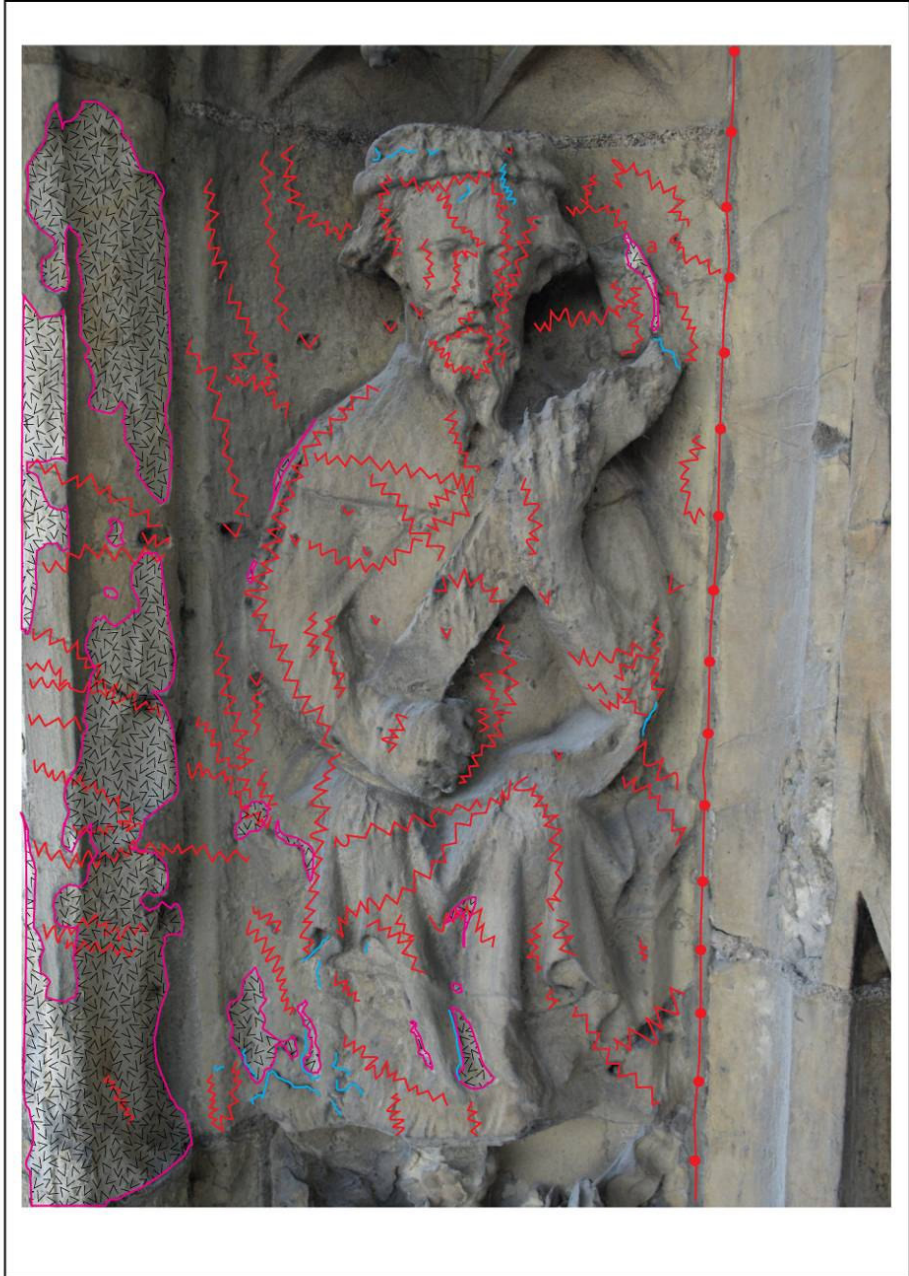
wears a hat, clutches a scroll with both hands

positioned in arch at the point where the EW iconography changes from the Old Testament Patriarchs to the Nine Orders of Angels

details still very clear, some softening by weathering

loss of scroll detail at [a] since survey by Godfrey (2005)

brown staining to surface



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Previous cementitious repair



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Previous OPC repair



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b33

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

14thC original crowned
bearded seated figure

?King Ahaz

uniquely posed with
crossed legs (R over L)

scroll in left hand,
sceptre in right

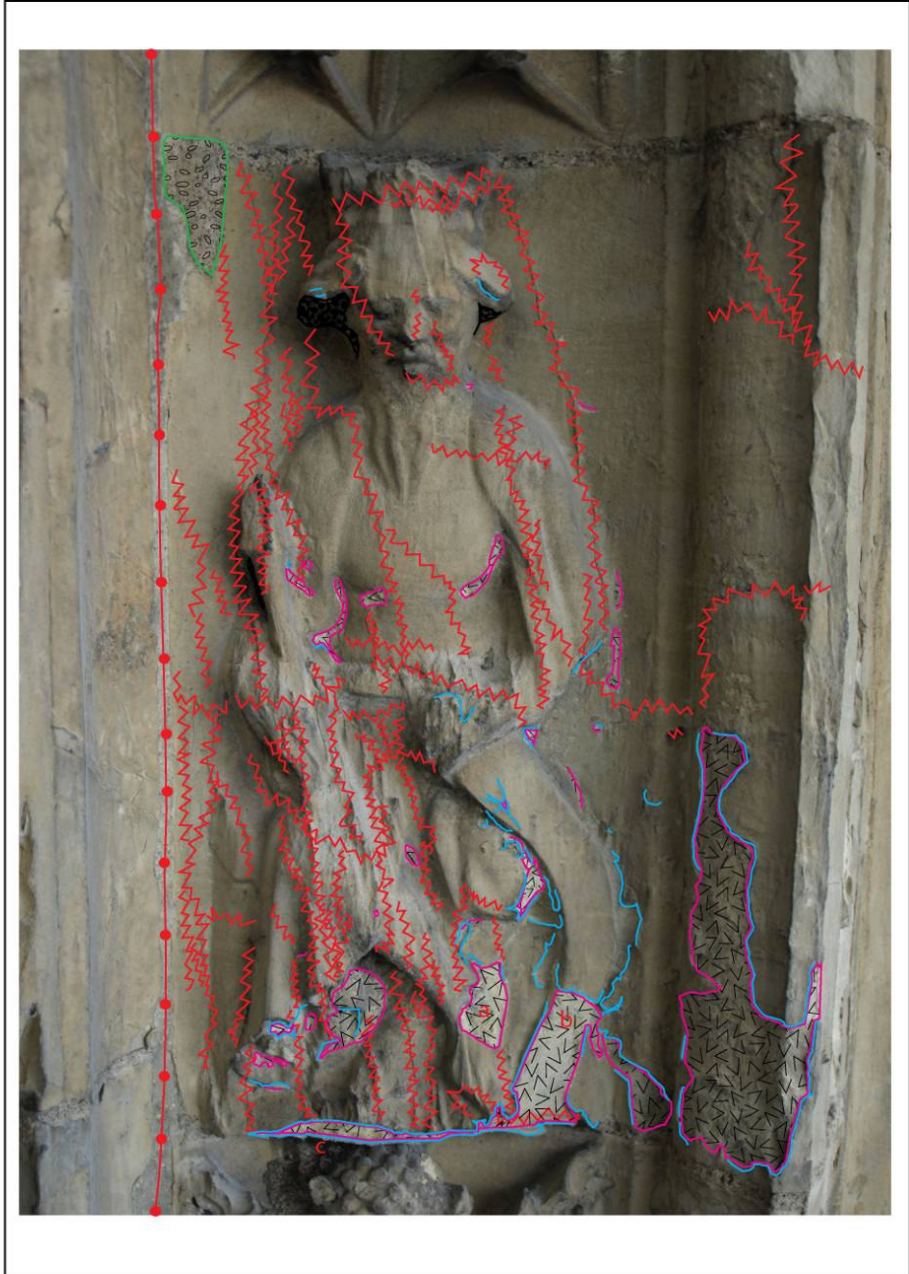
figure wears a belt and
cloak

clothing and facial
elements still clear,
though details
softened generally by
weathering

significant losses of
details since survey by
Godfrey (2005);
right heel detached
Dec 2008 [a]; loss to
base of scroll ongoing
[b]; loss of edge to base
[c]

light brown staining
to extant surface

evidence of previous
dark sulphation



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair

●●●● Zone of efflorescence
 ▨ Zone of subflorescence inc.
Powdery and Scaling
 ~ Peeling/undercutting/
detachment of surface skin

■ Black crust
 ■ Cuboidal cracking
 ■ Cementitious coating
(if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b34
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

▨ Previous cementitious repair
 ▨ Previous OPC repair
 ▨ Previous lime repair



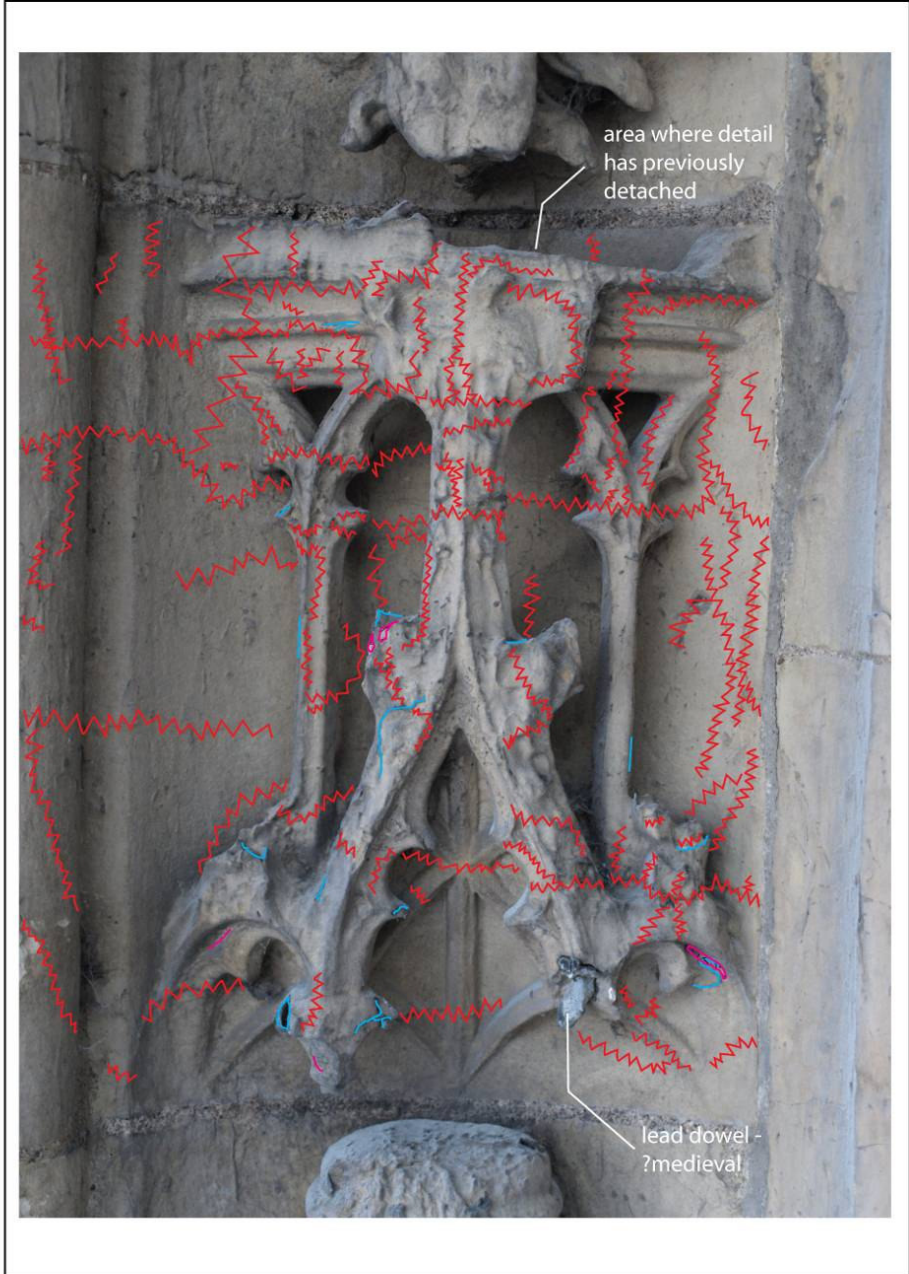
Notes:

14thC original canopy

little in the way of ongoing deterioration visible

softening of details by weathering

brown staining to surface



Fe + = Ferrous insert
 W = Crack/fault

●●● = Cementitious pointing
 ●●● = Epoxy resin repair

●●● Zone of efflorescence
 ■■■ Zone of subflorescence inc. Powdering and Scaling
 ~ Peeling/undercutting/detachment of surface skin

■ Black crust
 ■ Cuboidal cracking
 ■ Cementitious coating (if defined)

LOCATION : YM/East Front/Area 4/GEW voussoirs
 STONE ID: b35
 RECORDED BY/DATE: AH Photo Apr 09; Condition Survey AH Apr 09

▨ Previous cementitious repair
 ▨ Previous OPC repair
 ▨ Previous lime repair



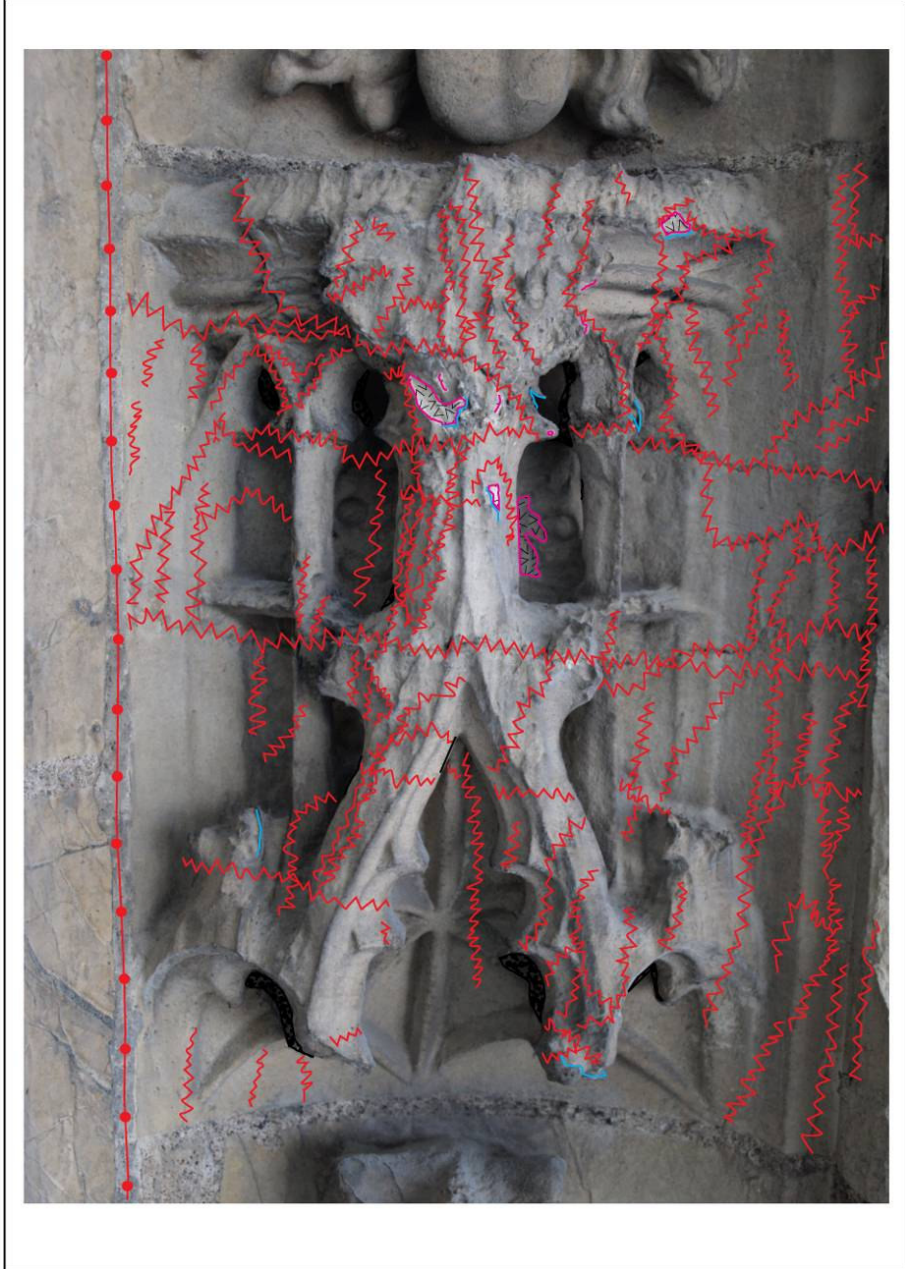
Notes:

14thC original canopy

multiple open cracks in upper section

details softened by weathering

brown staining to surface



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair

◻◻◻◻ Zone of efflorescence
 ◻◻◻◻ Zone of subflorescence inc. Powdering and Scaling
 ~~~~~ Peeling/undercutting/detachment of surface skin

◻◻◻◻ Black crust  
 ◻◻◻◻ Cuboidal cracking  
 ◻◻◻◻ Cementitious coating (if defined)

LOCATION :  
 YM/East Front/Area 4/GEW voussoirs .....  
 STONE ID:  
 b36 .....  
 RECORDED BY/DATE:  
 AH Photo Apr 09; Condition Survey AH Apr 09 .....

◻◻◻◻ Previous cementitious repair  
 ◻◻◻◻ Previous OPC repair  
 ◻◻◻◻ Previous lime repair





Notes:

14thC original lion mask

details softened by weathering

brown staining to surface



Fe + = Ferrous insert  
 W = Crack/fault

●●● = Cementitious pointing  
 ●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc. Powdering and Scaling



Peeling/undercutting/detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating (if defined)

LOCATION :  
 YM/East Front/Area 4/GEW voussoirs .....  
 STONE ID:  
 b37 .....  
 RECORDED BY/DATE:  
 AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original lion mask

softening of details caused by weathering

brown staining to surface



Fe + = Ferrous insert

⌚ = Crack/fault



Zone of efflorescence



Zone of subflorescence inc. Powdering and Scaling



Peeling/undercutting/detachment of surface skin

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Black crust



Cuboidal cracking



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs .....

STONE ID:

b38 .....

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 .....



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original canopy

evidence of previous black sulphation

surface scored by previous wire brushing

details softened by weathering

brown staining to surface



Fe + = Ferrous insert  
 W = Crack/fault

●●●● = Cementitious pointing  
 ●●●● = Epoxy resin repair

●●●● Zone of efflorescence  
 ■■■■ Zone of subflorescence inc. Powdering and Scaling  
 ~~~~~ Peeling/undercutting/detachment of surface skin

■ Black crust
 ■ Cuboidal cracking
 ■ Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b41.....
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

▨ Previous cementitious repair
 ▨ Previous OPC repair
 ▨ Previous lime repair



CONDITION RECORD

Notes:

14thC original canopy
 evidence of previous black sulphation
 surface scored by previous wire brushing
 sound condition, but much detail now lost
 extant details softened by weathering
 brown staining to surface



Fe + = Ferrous insert

∩∩∩ = Crack/fault

●●●●● = Cementitious pointing

●●●●● = Epoxy resin repair



Zone of efflorescence



Zone of subflorescence inc. Powdering and Scaling



Peeling/undercutting/detachment of surface skin



Black crust



Cuboidal cracking



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b42

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

14thC original foliage

four leaves, four flowers and stems

evidence of previous black sulphation

some details previously lost, followed by consolidation

some softening of details caused by weathering

brown staining to surface



Fe + = Ferrous insert

●●●●● = Cementitious pointing

⚡ = Crack/fault

●●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b43

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original foliage

four leaves, four flowers and stems

evidence of previous dark sulphation

some score marking from previous wire brushing

slight softening of details caused by weathering

brown staining to surface



Fe + = Ferrous insert

⌚ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b44

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

14thC original crowned
bearded seated figure

?King Josiah

?hands hold remains of
a scroll

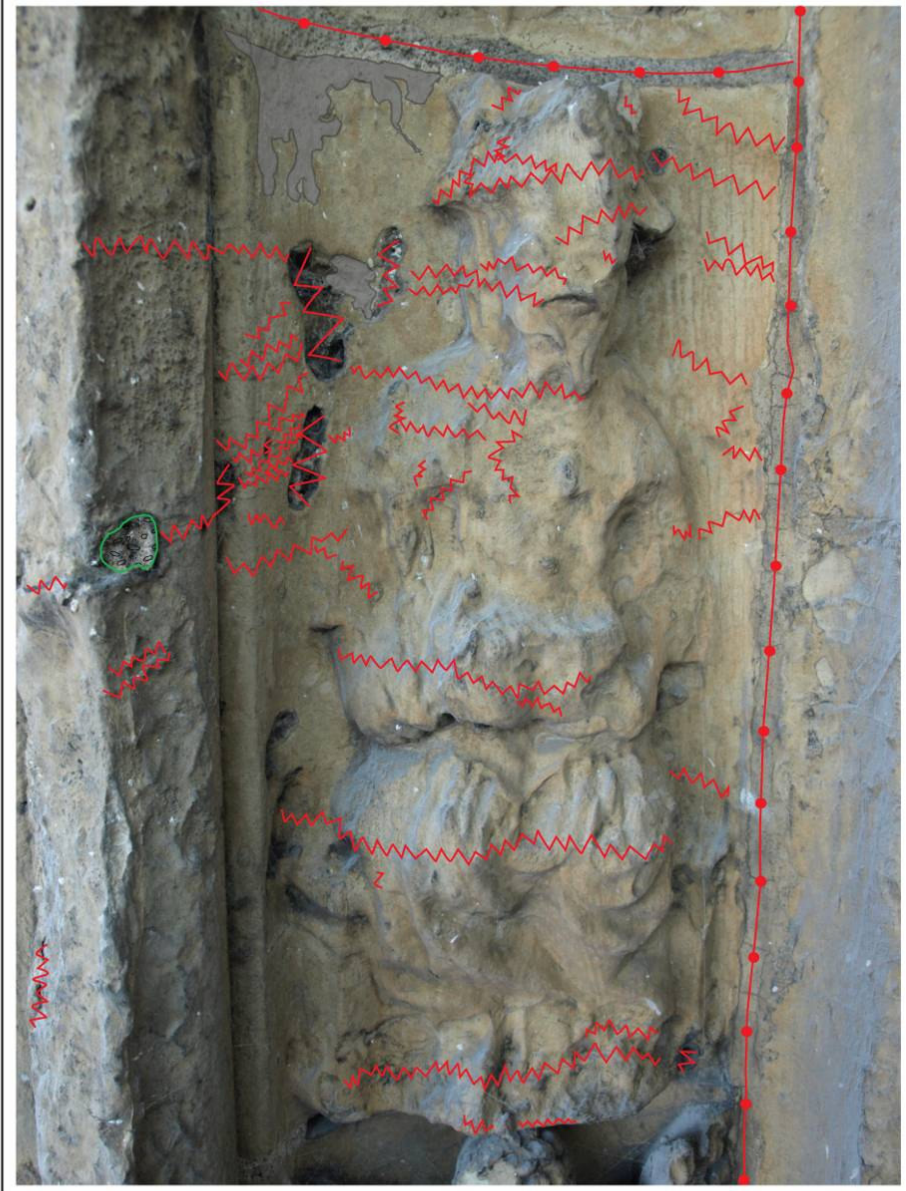
figure very worn but
sound

?previous decay
subsequently
consolidated

scoring/brush marks
left by previous
cleaning/?attempt at
consolidation

evidence of previous
dark sulphation

orange-brown staining
to surface



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair

●●●● Zone of efflorescence
 [] Zone of subflorescence inc.
Powdering and Scaling
 ~ Peeling/undercutting/
detachment of surface skin

Black crust
 Cuboidal cracking
 Cementitious coating
(if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b45
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

[] Previous cementitious repair
 [] Previous OPC repair
 [] Previous lime repair



CONDITION
 RECORD

Notes:

14thC original crowned
bearded seated figure

?King Amon

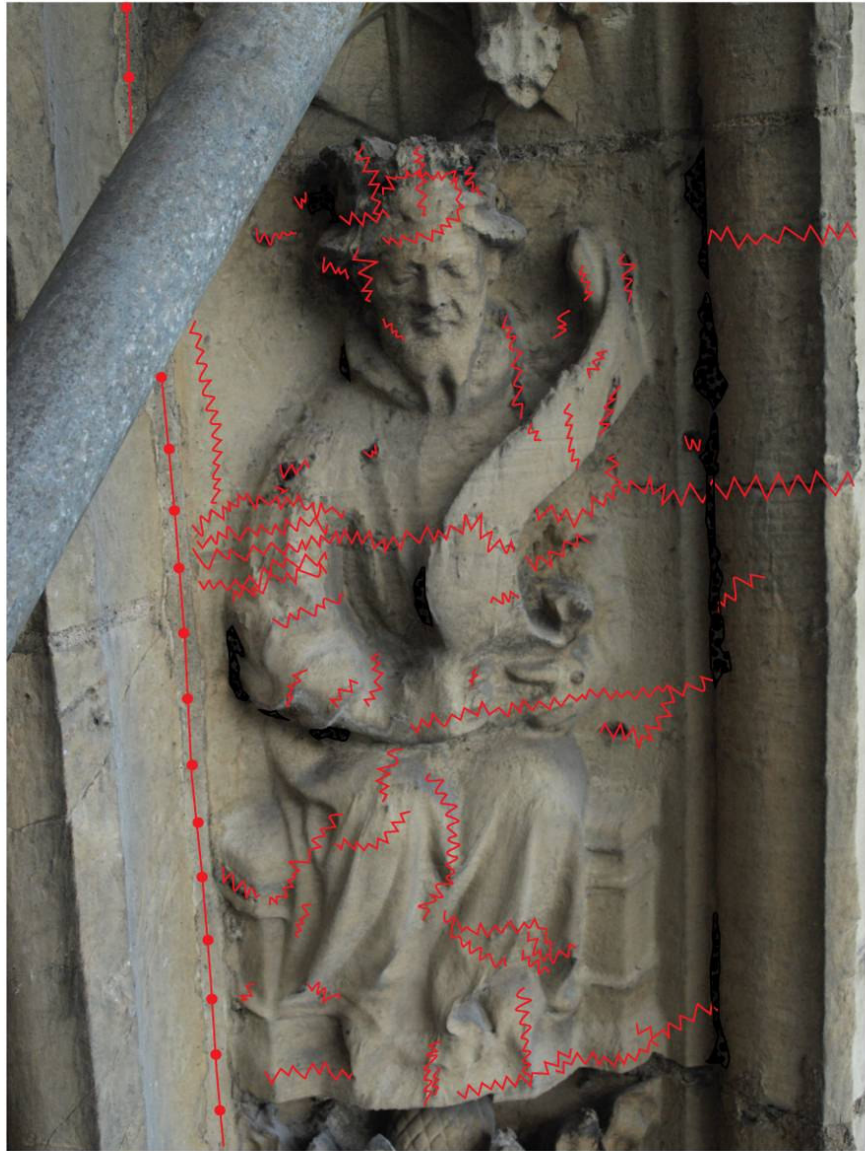
very good condition,
all details still very clear
with limited softening
by weathering

hands hold scroll at its
base, right hand points
to scroll

?used as a reference
for the 19thC
re-carving of b4 below

evidence of previous
dark sulphation in
sheltered zones

brown-grey staining
to surface



Fe + = Ferrous insert

●●●● = Cementitious pointing

⚡ = Crack/fault

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Previous cementitious repair



Zone of subflorescence inc.
Powdering and Scaling



Cuboidal cracking



Previous OPC repair



Peeling/undercutting/
detachment of surface skin



Cementitious coating
(if defined)



Previous lime repair



CONDITION
RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b46

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original canopy
 extant details softened by weathering
 previous decay subsequently consolidated in some areas
 evidence of previous dark sulphation
 some scoring from previous wire brush cleaning
 brown staining to surface



Fe + = Ferrous insert

W = Crack/fault

••••• = Cementitious pointing

••••• = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)

LOCATION :

YM/East Front/Area 4/GEW voussoirs _____

STONE ID:

b47 _____

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09 _____



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

Notes:

14thC original canopy

details softened by weathering

evidence of previous dark sulphation

brown staining to surface



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair

●●●● Zone of efflorescence
 W Zone of subflorescence inc. Powdering and Scaling
 ~ Peeling/undercutting/detachment of surface skin

●●●● Black crust
 ●●●● Cuboidal cracking
 ■ Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b48
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

▨ Previous cementitious repair
 ▨ Previous OPC repair
 ▨ Previous lime repair



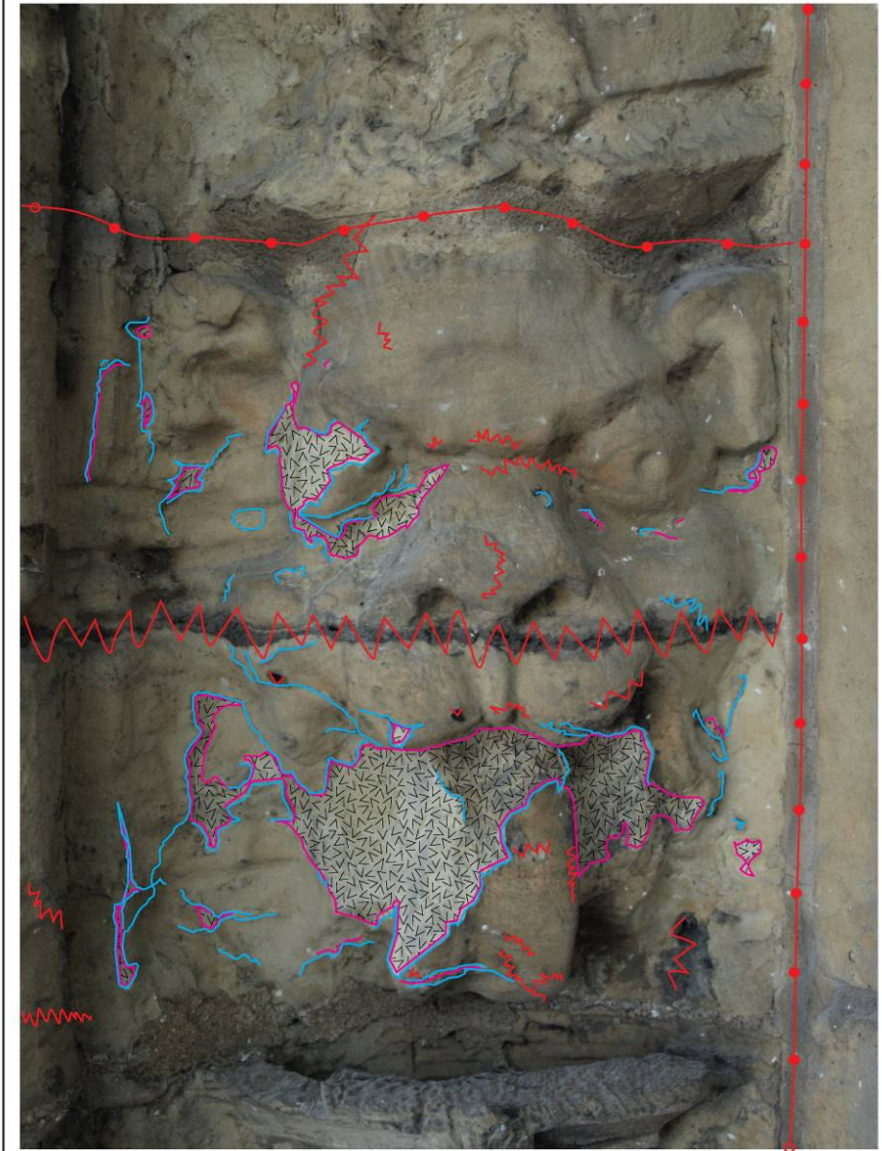
Notes:

14thC original lion mask

previous decay subsequently consolidated on L/H side

softening of details by weathering/cleaning

brown staining to surfaces



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ○○○○ = Epoxy resin repair

●●●● Zone of efflorescence
 [hatched] Zone of subflorescence inc. Powdering and Scaling
 [blue line] Peeling/undercutting/detachment of surface skin

●●●● Black crust
 [hatched] Cuboidal cracking
 [grey] Cementitious coating (if defined)

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b49
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

[diagonal lines] Previous cementitious repair
 [cross-hatch] Previous OPC repair
 [green hatched] Previous lime repair



Notes:

14thC original lion mask

very good condition, very little decay observed

softening of details by weathering

brown staining to surface



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b50
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original crowned
bearded seated figure

?King Jehoiachin/
also known as Jeconiah

mirrors b52 opposite

turns three quarters to
face the viewer

most details in good
condition, although
right hand now lost

left hand raised to
point at raised scroll

pockets of decay on
mouldings previously
consolidated with
coarse lime mortar

some surface loss since
survey by Godfrey
(2005) at [a], [b], [c] and
[d]

softening of details by
weathering

yellow-brown staining
to surface



- | | |
|---|-----------------------------------|
| Fe + = Ferrous insert | = Cementitious pointing |
| = Crack/fault | = Epoxy resin repair |
| Zone of efflorescence | Black crust |
| Zone of subflorescence inc. Powdering and Scaling | Cuboidal cracking |
| Peeling/undercutting/ detachment of surface skin | Cementitious coating (if defined) |

LOCATION :
YM/East Front/Area 4/GEW voussoirs
STONE ID:
b51
RECORDED BY/DATE:
AH Photo Apr 09; Condition Survey AH Apr 09

- | |
|------------------------------|
| Previous cementitious repair |
| Previous OPC repair |
| Previous lime repair |



CONDITION
RECORD

Notes:

14thC original crowned bearded seated figure

?King Jehoiachim

mirrors b51 opposite

turns three-quarters to face the viewer

all details clear; figure points to the top of its scroll with its right hand

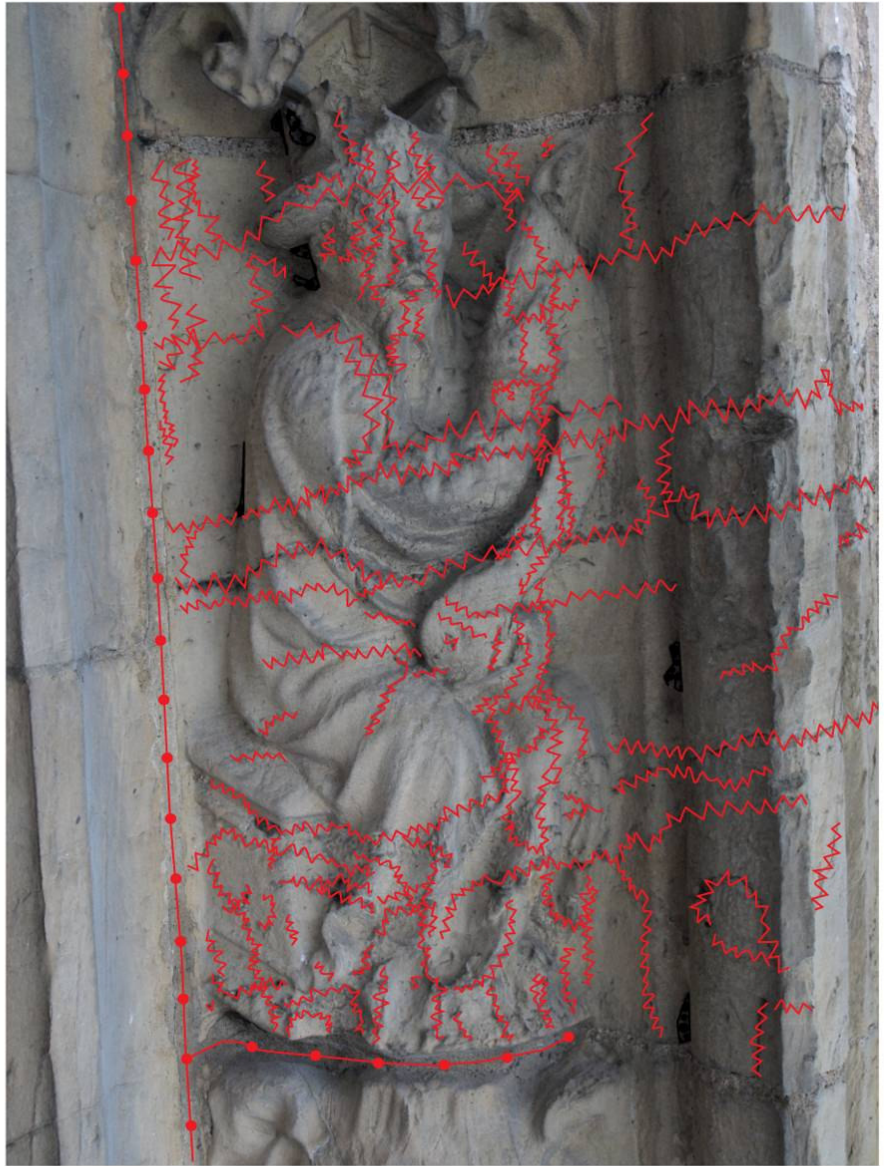
good condition no visible signs of decay

no change since survey by Godfrey (2005)

some softening of details by weathering

evidence of previous dark sulphation

brown staining to surface



Fe + = Ferrous insert

= Cementitious pointing

= Crack/fault

= Epoxy resin repair



Zone of efflorescence



Black crust



Previous cementitious repair



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Previous OPC repair



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b52

RECORDED BY/DATE:

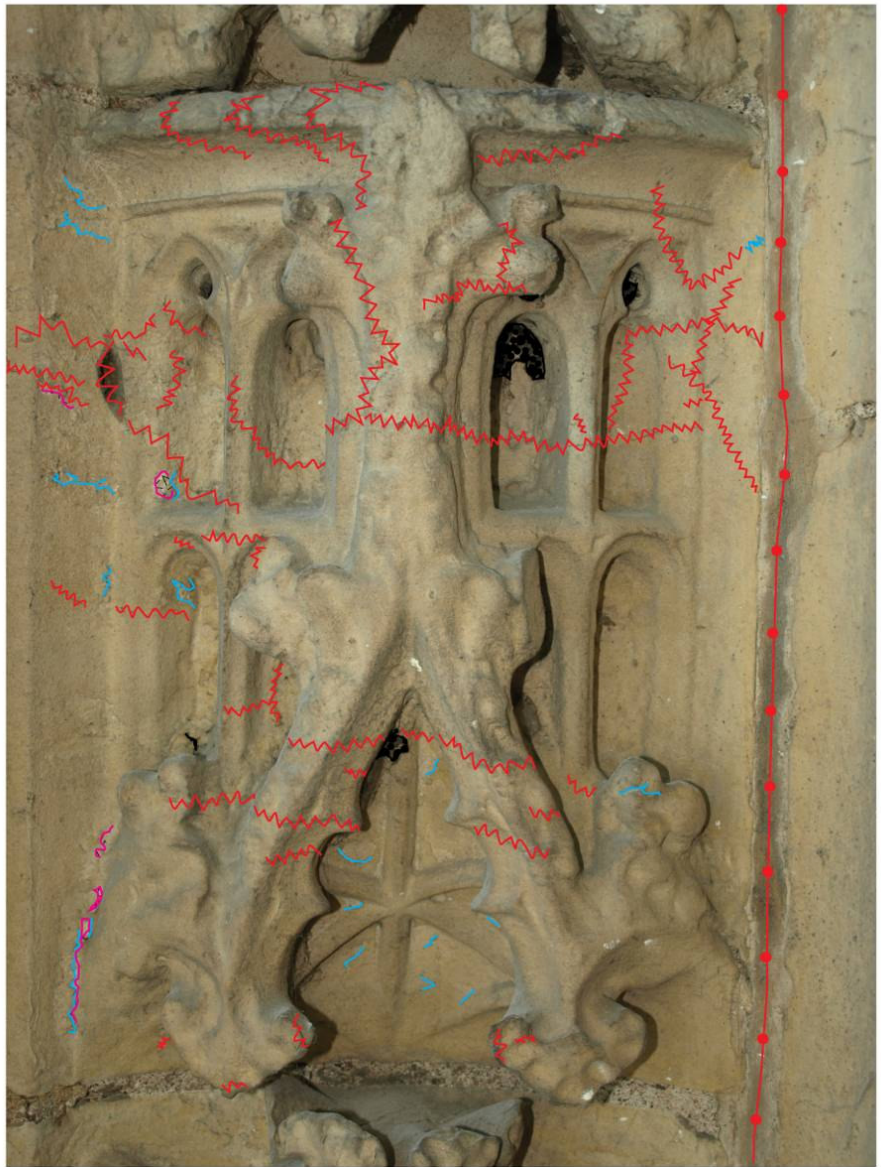
AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

?14thC original canopy
 only partly pierced
 very little evidence of ongoing decay
 softening of details by weathering
 brown staining to surface



Fe + = Ferrous insert

●●●●● = Cementitious pointing

⚡ = Crack/fault

●●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc.
 Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/
 detachment of surface skin



Cementitious coating
 (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION
 RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b53

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original canopy

softening of details by weathering

evidence previous dark sulphation

brown staining to sound surfaces

very little evidence of active decay



Fe + = Ferrous insert

●●●●● = Cementitious pointing

⌚ = Crack/fault

●●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b54

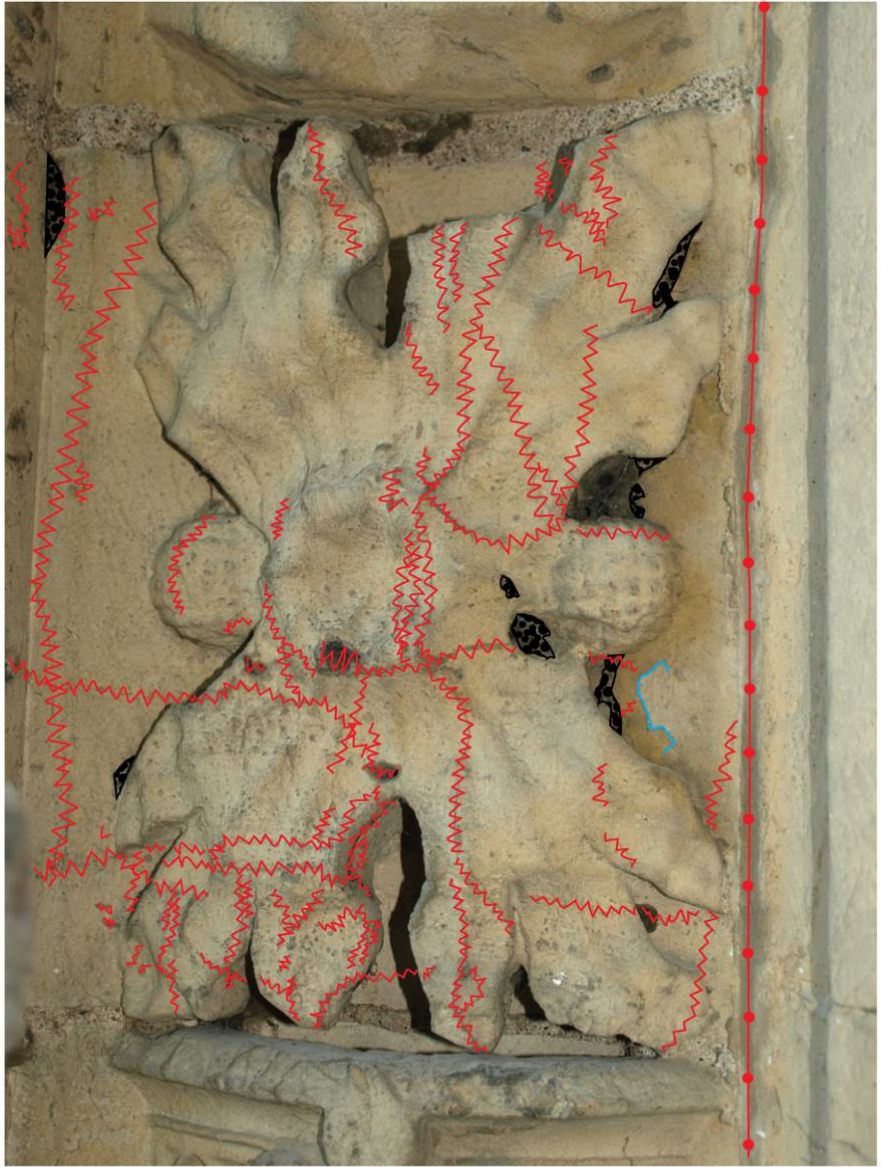
RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09




CONDITION RECORD

Notes:
 ?19thC indent
 very simple form; four bold leaves and two flowers
 evidence of previous dark sulphation
 some softening of detail by weathering
 yellow-brown staining to surface



Fe + = Ferrous insert

 = Cementitious pointing

 = Crack/fault

 = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b55

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

14thC original foliage

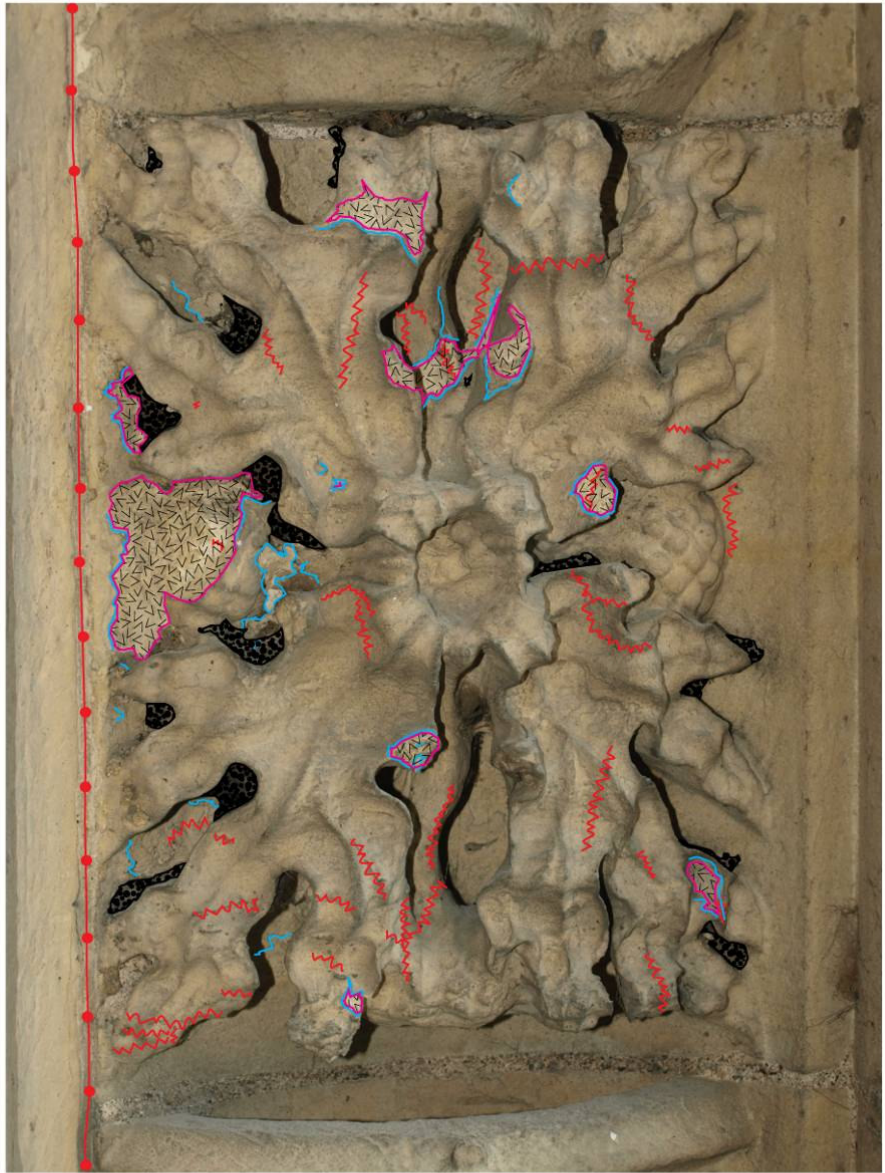
four leaves, four flowers and stems

evidence of previous dark sulphation

softening of details by weathering

claw tooling observed on moulding to R/H side

brown-grey staining to surface



Fe + = Ferrous insert
 W = Crack/fault

●●●● = Cementitious pointing
 ●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :
 YM/East Front/Area 4/GEW voussoirs
 STONE ID:
 b56
 RECORDED BY/DATE:
 AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

?14thC original; set within wide mortar joint; possible bolster tooling on edges of beds, although this may have been created by cutting-out and re-pointing in 20thC

the Virgin Mary of the Coronation of the Virgin scene

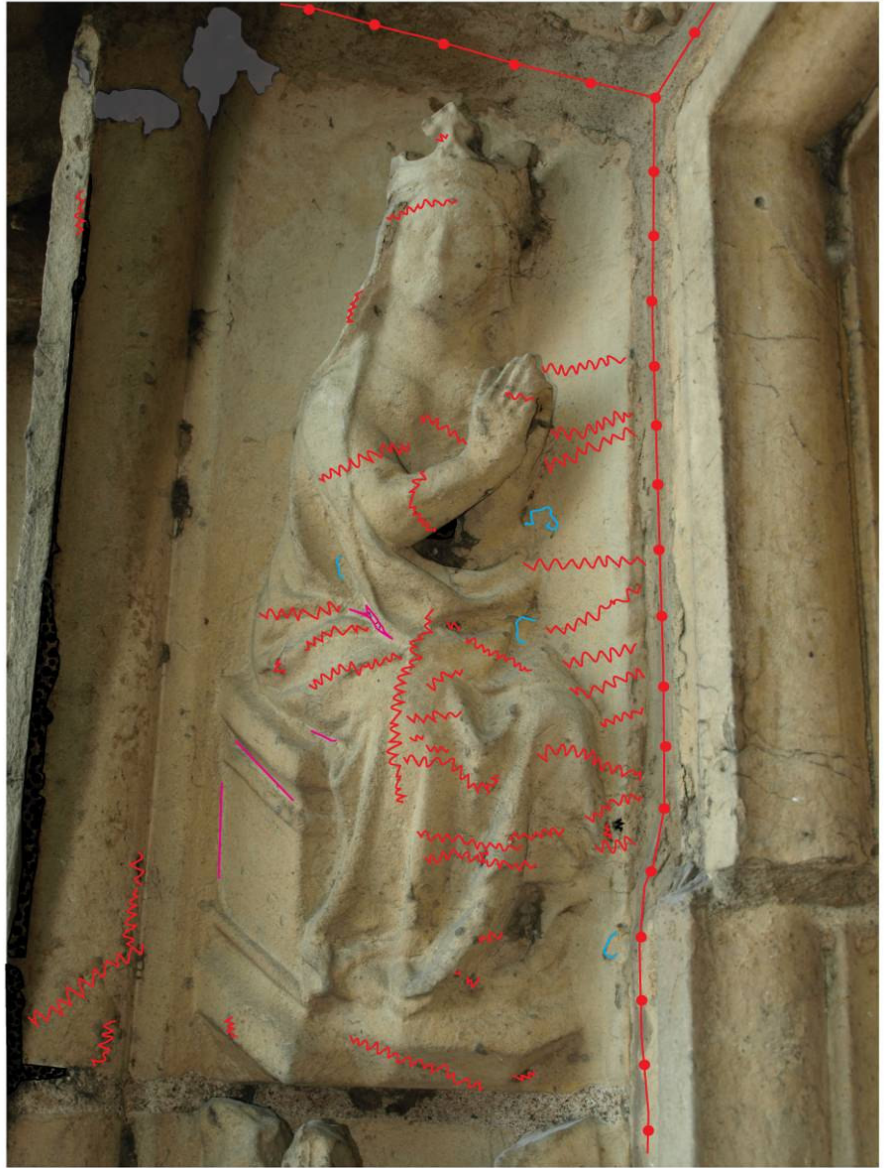
crowned and seated with hands raised in prayer

softening of details by weathering

evidence of previous dark sulphation

no visible change since survey by Godfrey (2005)

yellow-brown staining to surface; possible traces of yellow limewash



Fe + = Ferrous insert

●●●●● = Cementitious pointing

⋈ = Crack/fault

●●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b57

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

?14thC original crowned bearded seated figure

Christ blessing the Virgin Mary in the Coronation of the Virgin scene

right hand raised in blessing; left hand holds the orb

feet protrude from robe; right appears bare with toes visible

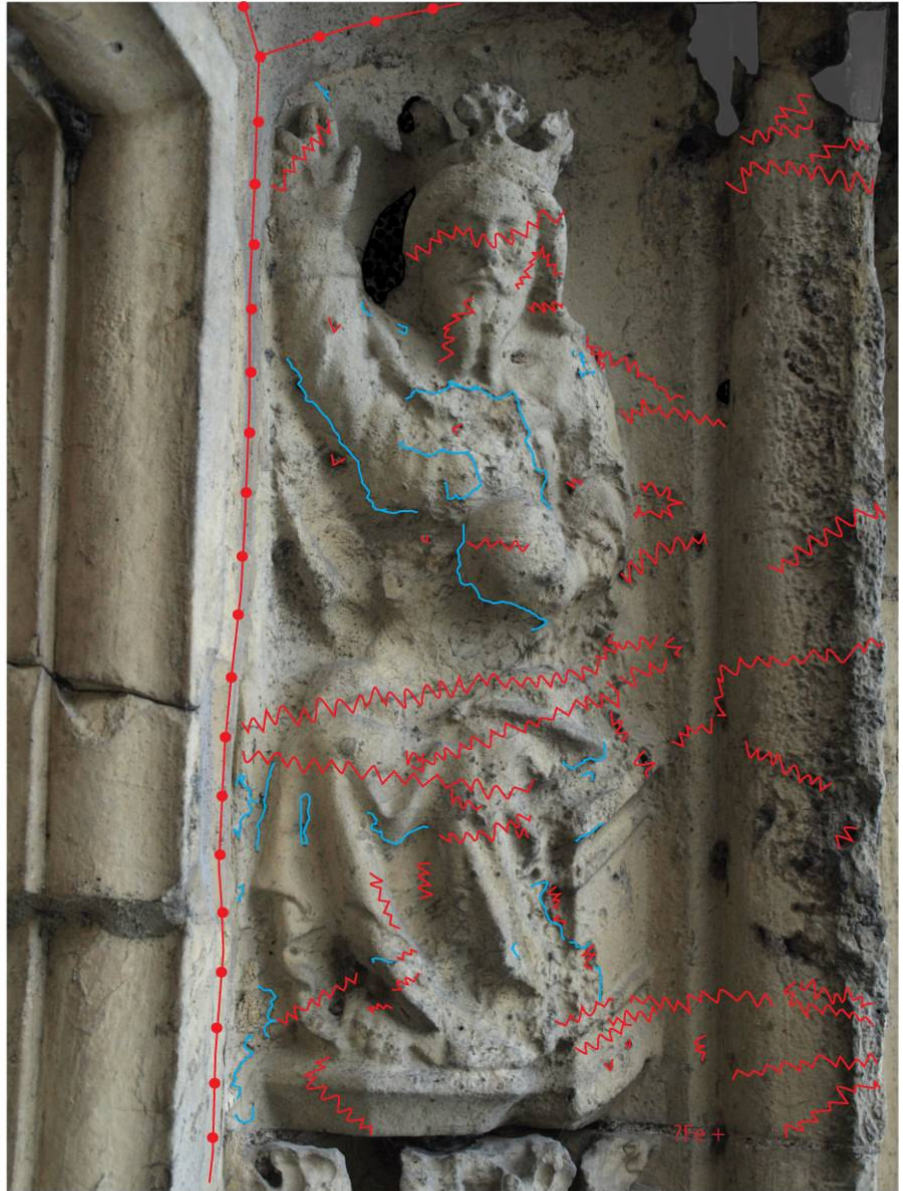
possible traces of yellow limewash on surface

central area shows signs of decay which may have since stabilised

no visible change since survey by Godfrey (2005)

evidence of previous dark sulphation

details softened by weathering



Fe + = Ferrous insert

⚡ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW voussoirs

STONE ID:

b58

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

Notes:

keystone at apex of Great East Window

L/H side renewed in 1915 in Ketton oolitic limestone; carved by Sam Monk. R/H side original 14thC with mortar repair over, also by Monk. repair composed of cement with crushed Ketton as aggregate

head now in the form of a green man

?originally intended to represent the 'bright morning star'; or the holy spirit above the Coronation of the Virgin scene

brown staining to Ketton stone and mortar repair

decay ongoing beneath original stone



Fe + = Ferrous insert

⋈ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair



CONDITION RECORD

LOCATION : YM/East Front/Area 4/GEW keystone at apex

STONE ID: b59 keystone

RECORDED BY/DATE: AH Photo Apr 09; Condition Survey AH Apr 09

Notes:

seated figure viewed from the SE

statue in 3 sections:
base original 14thC naturally bedded;
?middle and head sections restoration of unknown date, face-bedded

claw tooling observed within joints of all three sections

statue weathered; base section vulnerable

biological soiling on base and head sections

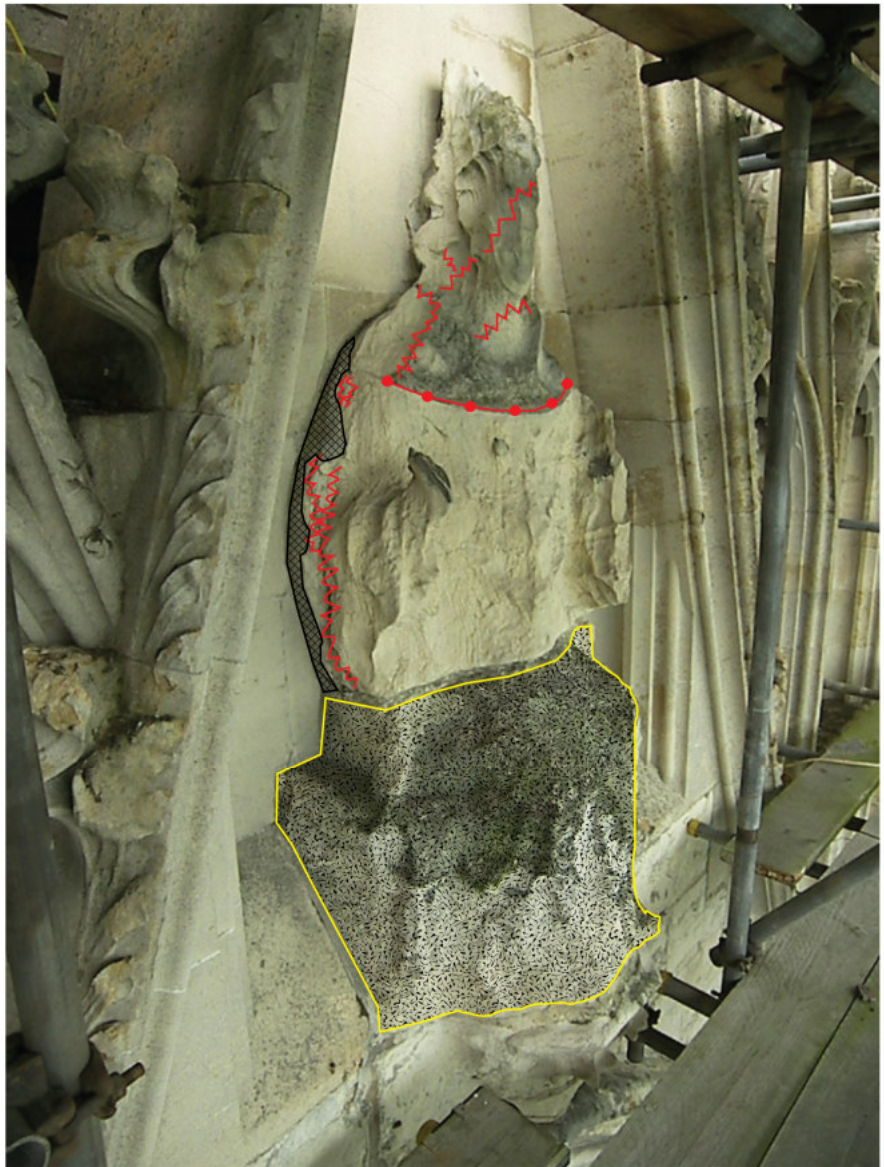
right hand raised ?in blessing; left hand holds a building

?trace of a pallium upon middle section

traces of robe upon base; left foot protudes forward; outline of throne remains; ?socket for additional ornamet next to left leg

statue fixed on lime mortar; re-pointed with lime and cement mortars; faults in head section grouted with cement

intended to represent St Peter; or Archishop Thoresby; or Christ in Majesty?



Fe + = Ferrous insert

~ = Crack/fault

●●●● = Cementitious pointing

●●●● = Epoxy resin repair



Zone of efflorescence



Black crust



Zone of subflorescence inc. Powdering and Scaling



Cuboidal cracking



Peeling/undercutting/detachment of surface skin



Cementitious coating (if defined)



Previous cementitious repair



Previous OPC repair



Previous lime repair

LOCATION :

YM/East Front/Area 4/GEW seated figure at apex .

STONE ID:

b60 seated figure

RECORDED BY/DATE:

AH Photo Apr 09; Condition Survey AH Apr 09



CONDITION RECORD

APPENDIX 3 –

Conservation Records of *in situ* limework undertaken on the south buttress of the East Front (Area 2)

LOCATION:
 YM/East Front/Area 2/Lift 5/S Face
 STONE ID:
 L/H Capital A

RECORDED BY/DATE:
 AH Jul08

Notes:
 Stone not shelter coated at point of survey
 [a] Portion of moulding detached during pin drilling. Re-fixed with Singleton Birch NHL 3.5 slurry + pins
 Mortar repair built in 5 layers
 Base coat: 1 Singleton Birch NHL 3.5; 1.5 Leyton Buzzard; 1.5 North Cave.
 Intermediate coats: 1 Singleton Birch NHL 3.5; 2.5 Magnesian limestone dust (<300 microns)
 :0.5 Durham yellow sand; Goat hair
 Top coat: 1 St. Astier NHL 2; 2.5 Magnesian limestone dust (<150 microns); 0.5 Durham yellow sand
 Lime render built in 3 layers
 1 Singleton Birch NHL 3.5; 2.5 Magnesian limestone dust (<300 microns); 0.5 Durham yellow sand
 Mix also used for cappings, apart from [b]: 1 Singleton Birch NHL 3.5 : 2 Magnesian limestone dust: 1 Durham yellow sand
 Joints pointed with 1 Singleton Birch NHL 3.5; 1 Leyton Buzzard; 1 Nosterfield washed river sand; 1 North Cave; 2% stone chippings; 0.5% ash
 Cleaning poultice - 'Monumentique'



INTERVENTION RECORD

-  Hydraulic lime
-  Calcium lime
-  Cleaning poultice applied
-  Magnesium lime
- P + = Stainless steel pin
- R + = Reinforcement/anchor within mortar repair

- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar



LOCATION:
 YM/East Front/Area 2/Lift 5/S Face

STONE ID:

R/H Capital B

RECORDED BY/DATE:
 AH Jul08

Notes:
 Stone not shelter coated at point
 of survey
 Cleaning poultice -
 'Monumentique'



INTERVENTION
 RECORD

- Stainless steel pin
- Reinforcement/anchor within mortar repair
- Hydraulic lime
- Calcium lime
- Cleaning poultice applied
- Magnesium lime

Inserts fixed with:
 AKEMI Epoxy Resin
 Hydraulic Lime Slurry
 Chemical Mortar

LOCATION:

YM/East Front/Area 2/Lift 5/East Face

STONE ID:

L/H Capital C

RECORDED BY/DATE:

AH Jul08

Notes:

Stone not shelter coated at point of survey



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin
 R + = Reinforcement/anchor within mortar repair

Hydraulic lime
 Calcium lime

Cleaning poultice applied
 Magnesium lime



INTERVENTION RECORD

LOCATION:

YM/East Front/Area 2/Lift. 5/East Face

STONE ID:

R/H Capital ID

RECORDED BY/DATE:

AH Jul08

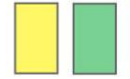
Notes:

Stone not shelter coated at point of survey
Cleaning poultice - 'Monumentique'

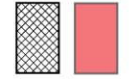


- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin
R + = Reinforcement/anchor within mortar repair



Hydraulic lime
Calcium lime



Cleaning poultice applied
Magnesium lime



INTERVENTION RECORD

Notes:

Stone not shelter coated at point of survey.

Mortar repair:

Built in 3 layers

Base: 1 Singleton Birch

NHL 3.5: 2 Magnesian

limestone dust (<300

microns): 1 Durham

yellow sand (<300

microns).

Second coat =

as above

Top Coat = as above

Mix also used for pointing to decorative surfaces, but putty substituted for NHL.



P + = Stainless steel pin



Hydraulic lime



Cleaning poultice applied

R + = Reinforcement/anchor within mortar repair



Calcium lime



Magnesium lime

Inserts fixed with:

- AKEMI Epoxy Resin
- Hydraulic Lime Slurry
- Chemical Mortar

LOCATION :

YM/East Front/Area 2/Lift 7/N Face

STONE ID:

L/H Canopy E

RECORDED BY/DATE:

AH Oct08



INTERVENTION
RECORD

Notes:

Stones not shelter coated at point of survey.

Mortar repairs:

A)

Base Coat: 1 Singleton
Birch 3.5:



P + = Stainless steel pin



Hydraulic lime



Cleaning poultice applied

R + = Reinforcement/anchor
within mortar repair



Calcium lime



Magnesium lime

Inserts fixed with:

- AKEMI Epoxy Resin
- Hydraulic Lime Slurry
- Chemical Mortar

LOCATION :

YM/East Front/Area 2/Lift 7/N Face

STONE ID:

L/H Canopy F

RECORDED BY/DATE:

AH Oct08

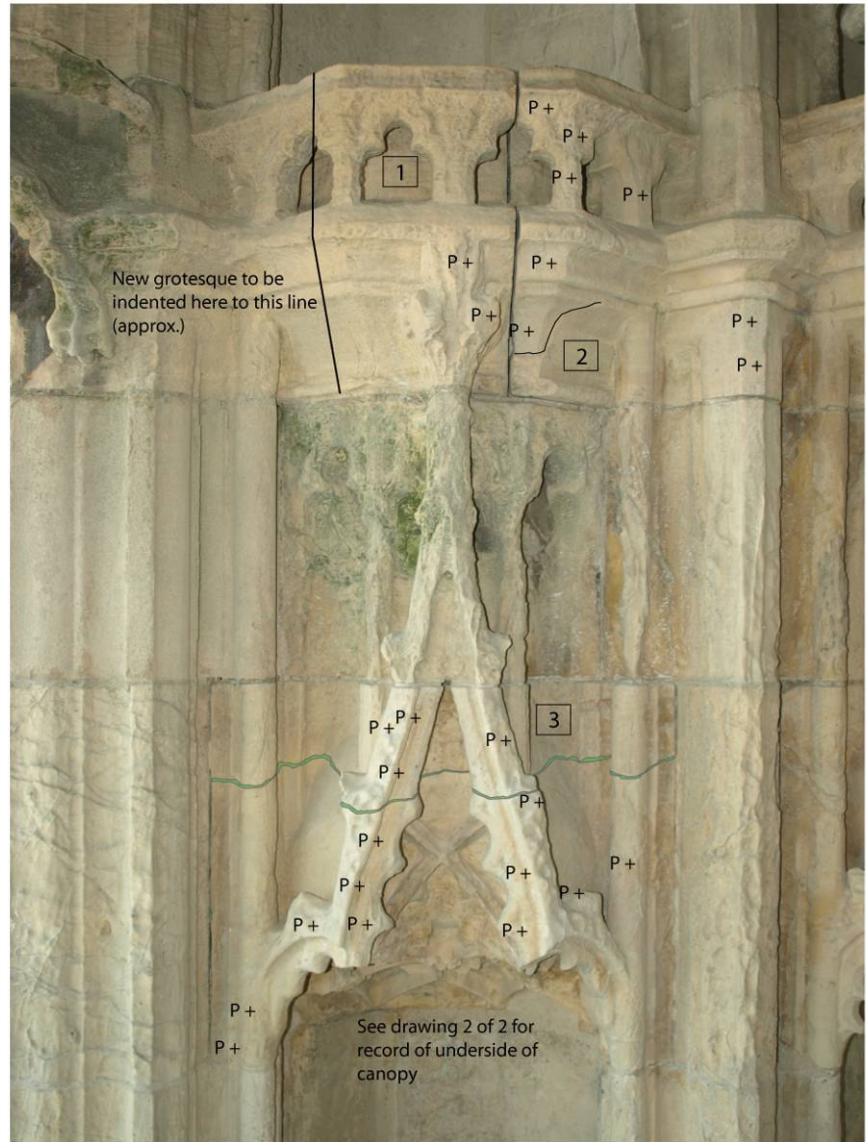


INTERVENTION
RECORD

Notes:


Drawing 1 of 2

Stones not shelter coated at time of recording. Pointing incomplete awaiting fixing of new grotesque to left.



P + = Stainless steel pin

 Hydraulic lime

 Cleaning poultice applied

R + = Reinforcement/anchor within mortar repair

 Calcium lime

 Magnesium lime

Inserts fixed with:

- AKEMI Epoxy Resin
- Hydraulic Lime Slurry
- Chemical Mortar

LOCATION :

YM/East Front/Area 2/Lift 10/N Face

STONE ID:

L/H Canopy E (stones 1, 2, 3 shown above)

RECORDED BY/DATE:

AH Jul08



INTERVENTION RECORD





LOCATION:
 YM/East Front/Area 2/Lift 10/N Face
 STONE ID:
 L/H Canopy E
 RECORDED BY/DATE:
 AH Jul08

Notes:
 Drawing 2 of 2
 Stone not shelter coated at point of recording.
 Mortar repairs built in 2 layers
 Base: 1 Singleton Birch NHL 3.5;
 2 Durham yellow sand: 1
 Magnesian limestone dust (all sieved <300 microns)
 Top coat: As above but sieved to <150 microns
 Cleaning poultice - 'Monumentique'



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin
 R + = Reinforcement/anchor within mortar repair

| | | | |
|---|----------------|---|---------------------------|
|  | Hydraulic lime |  | Cleaning poultice applied |
|  | Calcium lime |  | Magnesium lime |

LOCATION:

YM/East Front/Area 2/Lift 10/N Face

STONE ID:

R/H Canopy F

RECORDED BY/DATE:

AH Jul08

Notes:

Drawing 2 of 2

Stone not shelter coated at point of recording

Mortar repairs [a] built in 2 layers

Base: 1 Singleton Birch NHL 3.5;

2 Durham yellow sand; 1

Magnesian limestone dust

(all sieved <300 microns)

Top coat: As above but sieved to

<150 microns

Mortar repairs [b] built in 2 layers

Base: 1 Singleton Birch NHL 3.5;

2 Magnesian limestone dust;

1 Durham yellow sand

(all sieved <300 microns)

Top coat: As above but sieved to

<150 microns



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin

R + = Reinforcement/anchor within mortar repair



Hydraulic lime



Calcium lime



Cleaning poultice applied



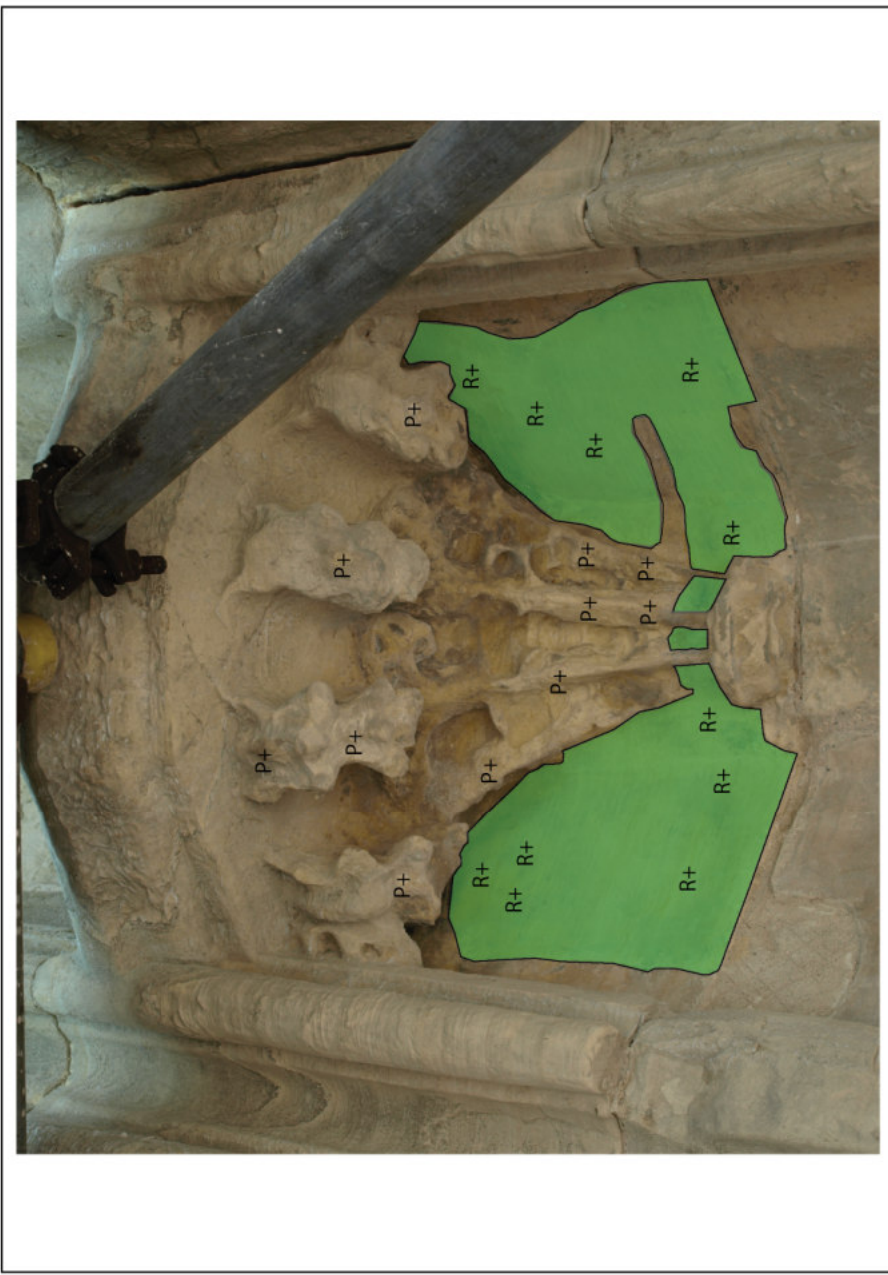
Magnesium lime



INTERVENTION RECORD

LOCATION:
 YM/East Front/Area 2/Lift 11/S Face
 STONE ID:
 R/H Pedestal B
 RECORDED BY/DATE:
 AH Jul08

Notes:
 Stone not shelter coated at point of survey
 Mortar repairs:
 Base Coat: 1 lime putty; 2 Magnesian limestone dust <500 microns; 1 Yellow sand <500 microns
 Top coats: 1 lime putty; 1 Magnesian limestone dust <300 microns; 1 Yellow sand <300 microns; 1 Soft Brown sand <300 microns
 Pigment finish to mortar repairs



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin
 R + = Reinforcement/anchor within mortar repair

Hydraulic lime
 Calcium lime

Cleaning poultice applied
 Magnesium lime

LOCATION:
 YM/East Front/Area 2/Lift 117/N Face
 STONE ID:
 L/H Pedestal E



RECORDED BY/DATE:
 AH May08

Notes:
 An original 14thC pedestal
 Shelter coat applied to entire
 stone: 1 lime putty sieved thro'
 muslin: 1.25 Magnesian
 limestone dust: 0.5 brown sand;
 1.25 Durham yellow sand;
 50/50 skimmed milk and water
 (all <150 microns)
 Mortar repair/filling/capping
 to rear face and carving: 1 lime
 putty; 1.5 Magnesian limestone
 dust: 1 Durham yellow sand: 0.5
 Brown sand (all below <300
 microns) Mortar repair to R/H
 moulding: 1 lime putty: 1 Durham
 yellow sand: 2 Magnesian
 limestone dust (all <300 microns)
 Pointing at base: 1 lime putty: 1
 sieved Nosterfield washed river
 sand: 1 Leyton Buzzard: 1 North
 Cave fine: 2% stone chippings:
 0.5% ash



INTERVENTION
 RECORD

 Cleaning poultice applied
 Magnesium lime

 Hydraulic lime
 Calcium lime

P + = Stainless steel pin
 R + = Reinforcement/anchor
 within mortar repair

Inserts fixed with:
 AKEMI Epoxy Resin
 Hydraulic Lime Slurry
 Chemical Mortar

LOCATION:

YM/East Front/Area 2/Lift 11/N Face

STONE ID:

R/H Pedestal F

RECORDED BY/DATE:

AH Jun08



Notes:

Entire stone shelter coated: 1 lime putty sieved thro' muslin: 1 Magnesian limestone dust: 0.5 brown sand: 1.5 Durham yellow sand: 50/50 skimmed milk and water (all < 150 microns)



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

- P + = Stainless steel pin
- R + = Reinforcement/anchor within mortar repair

-  Hydraulic lime
-  Calcium lime

-  Cleaning poultice applied
-  Magnesium lime



INTERVENTION RECORD

LOCATION:

YM/East Front/Area 2/Lift 13/S Face

STONE ID:

L/H Canopy A

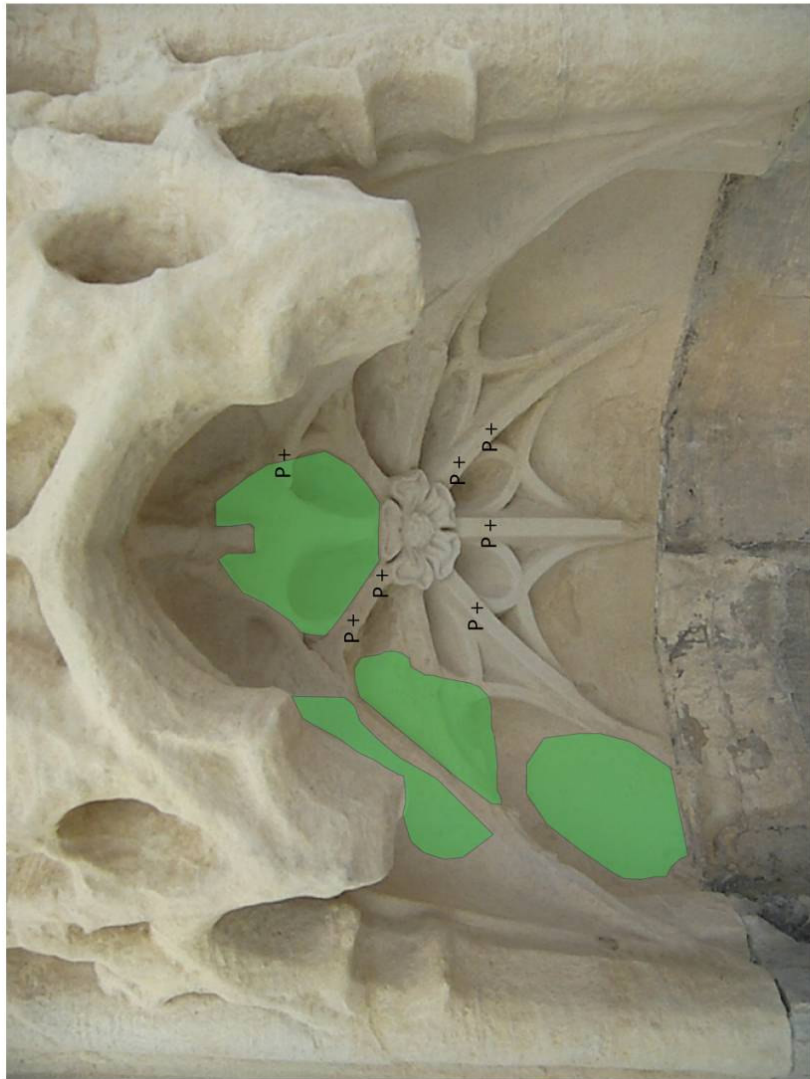
RECORDED BY/DATE:

AH/LG Aug07

Notes:

Shelter coat applied to entire canopy. 1 lime putty.
 1 Magnesian limestone dust:
 0.5 brown sand: 1.5 yellow sand:
 50/50 skimmed milk and water
 <150 microns

Mortar repair: 1 lime putty:
 2 Magnesian limestone dust
 <500 microns: 1 yellow sand
 <500 microns: 10% Metastar
 pozzolan (of mix)



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin

R + = Reinforcement/anchor within mortar repair



Hydraulic lime



Calcium lime



Cleaning poultice applied



Magnesium lime

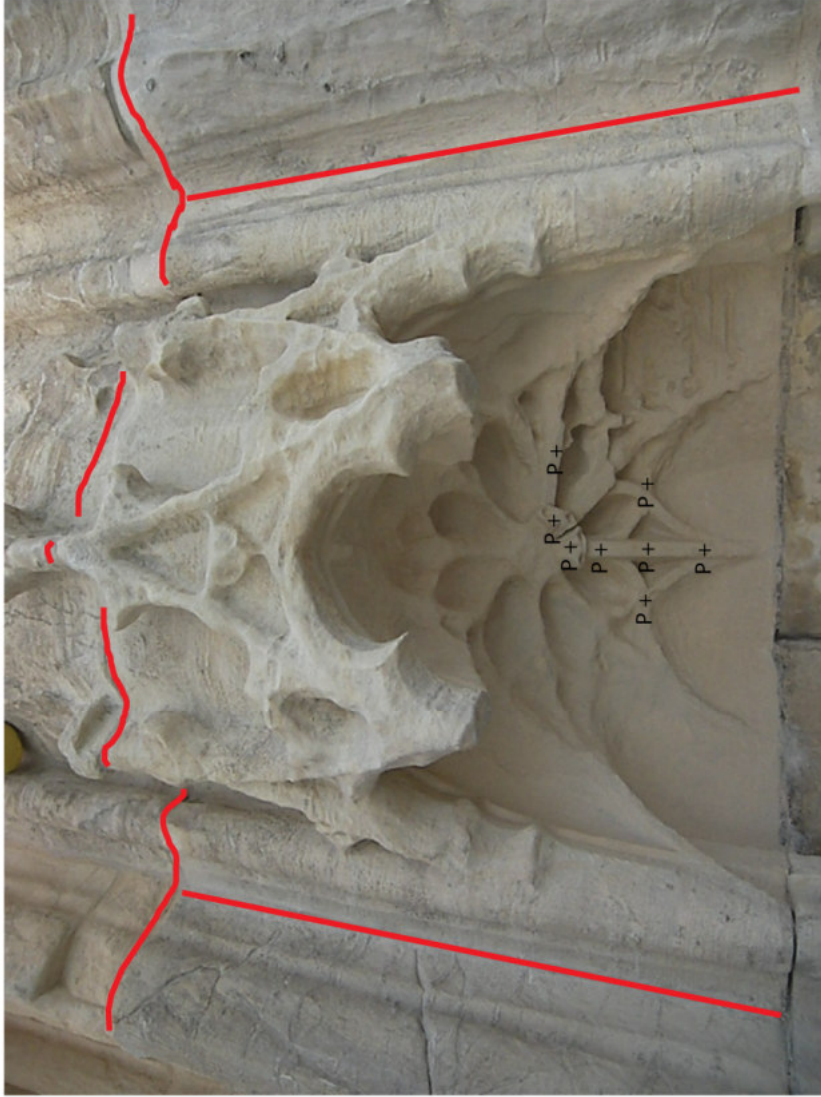


INTERVENTION RECORD

LOCATION:
 YM/East Front/Area 2/Lift 13/S Face
 STONE ID:
 R/H Canopy B

RECORDED BY/DATE:
 AH/LG Aug07

Notes:
 Shelter coat applied to underside of canopy only: 1 lime putty:
 1 Magnesian limestone dust:
 0.5 brown sand:1.5 yellow sand:
 50/50 skimmed milk and water
 (all <150 microns)



- Inserts fixed with:
- AKEMI Epoxy Resin
 - Hydraulic Lime Slurry
 - Chemical Mortar

P + = Stainless steel pin
 R + = Reinforcement/anchor within mortar repair

Hydraulic lime
 Calcium lime

Cleaning poultice applied
 Magnesium lime



INTERVENTION
 RECORD

LOCATION:
 YM/East Front/ Area 2/Lift 13/N Face

STONE ID:
 R/H Canopy F [1]

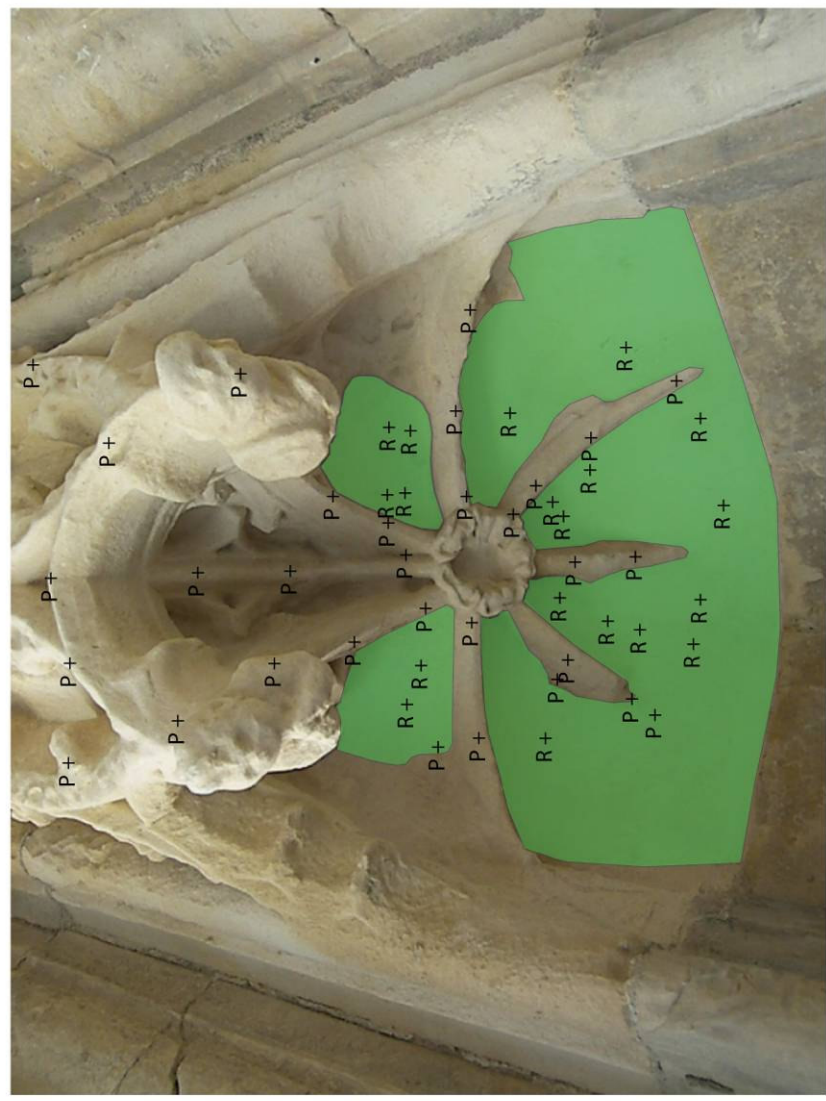
RECORDED BY/DATE:
 AH/LG Sep07.....

Notes:

Shelter coat applied to entire canopy; 3 coats to underside, 1 coat to face. 1 lime putty:
 1 Highmoor Magnesian limestone dust: 1 brown sand: 1 Durham yellow sand: 50/50 skimmed milk and water (all <150 microns)

Mortar repairs:
 Base coat - 1 lime putty:
 1 Magnesian limestone dust
 1 Leighton Buzzard sharp sand:
 1 Durham yellow sand: 10% Metastar pozzolan (of mix) + Goat hair

Second coat - As above
 Top coat - 1 lime putty:
 2 magnesian limestone dust: (<500 microns): 1 yellow sand (<600 microns): 10% Metastar pozzolan (of mix)



- Inserts fixed with:
 AKEMI Epoxy Resin
 Hydraulic Lime Slurry
 Chemical Mortar
- P + = Stainless steel pin
 R + = Reinforcement/anchor within mortar repair
- Hydraulic lime
 Calcium lime
- Cleaning poultice applied
 Magnesium lime

APPENDIX 4 –

Great East Window Conservation Strategy

YORK MINSTER

Great East Window Conservation Trials

Outline of procedure

October 2008

Alexander Holton and Lee Godfrey

OVERVIEW

This document summarises the proposed strategy for the cleaning and *in situ* conservation of the stonework of the Great East Window of York Minster.

The term ‘stonework’ refers to the interior and exterior decorative voussoirs of the window, as well as the jambs, mullions and tracery elements which have **not** been considered for renewal.

STAGE 1 – UNDERSTANDING AND DEFINING SIGNIFICANCE

- 1.0 The conservation treatment of the stonework of the Great East Window must be informed by an understanding of its artistic, historical and associated cultural significance in accordance with guidance outlined by the Venice and Burra Charters (1966; 1999), and English Heritage’s *Conservation Principles* (2008). Therefore, Stage 1 of the procedure is concerned with gaining a sufficient level of understanding through research that will guide and underpin the practical conservation process.
- 2.0 Stage 1 comprises art historical, archaeological and condition survey, which will seek to shed light on the iconography of the carved voussoirs of the arch and the history and impact of previous interventions. This will include the recording of previous aesthetic and/or protective coating applications to the stonework, along with detailed condition and photographic surveys. A survey by terrestrial laser-scanning is also envisaged in order to accurately capture the condition and appearance of the carved elements in 3D. This will provide a high-resolution visualisation of the carvings with

an accuracy of below 1mm. The laser-scan data will be archived and made available as a valuable reference tool for future generations.

- 3.0 A *statement of significance* will conclude this section which will act as a central point of reference when considering the impact of current intervention proposals.

STAGE 2 – IDENTIFYING AND SPECIFYING THE NEED FOR INTERVENTION

- 1.0 Stage 2 will use the condition survey to identify the specific needs and levels of intervention. These interventions will seek to reinstate the structural, and in some cases aesthetic integrity of the stonework, without detriment to the perceived significance and values as established in Stage 1.
- 2.0 For the exterior and interior faces of the mullions and tracery and the exterior voussoir carvings, preliminary discussions with the Surveyor to the Fabric have identified the desirability for an initial phase of cleaning to remove atmospheric soiling and previous coating applications. This has been proposed as the soiling and/or coatings may be concealing further instances of decay or cracking that will need to be added to the condition survey, and therefore the overall conservation design.
- 3.0 In the case of the interior voussoirs, a programme of cleaning and coating removal is also being considered by the Surveyor to improve the aesthetic value of the carvings. The results of preliminary observations indicate that much of the original crispness of the carvings is consumed by successive layers of coatings, which may (or may not) be seen as detrimental to their visual impact.
- 4.0 A further consideration will be to devise a suitable scheme to visually unify the stonework of the window that will draw together plastic repairs, indents and full-depth stone renewals.
- 5.0 In respect to the exterior voussoirs, initial condition surveys have recognised that intervention beyond cleaning will be required, with the possible indenting of some carved stones. For *in situ* repair, a series of trials will be established to explore the range of consolidating techniques currently available.

STAGE 3 – TRIALS

- 1.0 Once the cases for intervention have been clarified, a specification for trials can be compiled which will explore a range of practical cleaning and consolidating techniques.
- 2.0 Specific locations for trials on the window stonework will be decided in direct consultation with the Surveyor. Should certain techniques or media for cleaning and/or consolidation be considered inappropriate for direct application to the

window stonework (such as irreversible silane-based products), then suitable ruquette stones from the East Front will be selected for this purpose.

- 3.0 Observations before, during and after the trialling processes will be documented by photography, CAD drawings and notation. In the case of any silane trials, the possibility for laboratory analysis of penetration depths could also be explored.
- 4.0 The following techniques and products might be considered for trialling, with further suggestions welcomed. These options may be considered alone, or in some cases in conjunction with others:

For cleaning:

- Vacuuming
- Dry brushing with soft bristle brushes
- Controlled scraping using fine blades (specifically for coating removals)
- Water-based cleaning, either with soft brushes and sponges
- or
- with the Stoneyard's TORC system (with or without micro-abrasives)
- Dry micro-abrasive cleaning using the TORC system
- Natural latex-based peel-away methods (such as CleanFilm™ or ArteMundit™)
- Monumentique™ (Synthetic latex peel-away method)
- Complexon™ (Gel application removed by sponging)
- Laser cleaning

For consolidating

- Plastic repair using the 'lime method'. Both putty and hydraulic lime varieties should be considered. The lime method includes -
- Shelter-coating (incorporating knowledge gained from on going protective coating trials begun in July 2007). This may also be considered as a means to unify the stonework post-repair
- Consider organic consolidation using a silane, most probably Wacker OH. Wacker OH is not hydrophobic and so a degree of breathability is

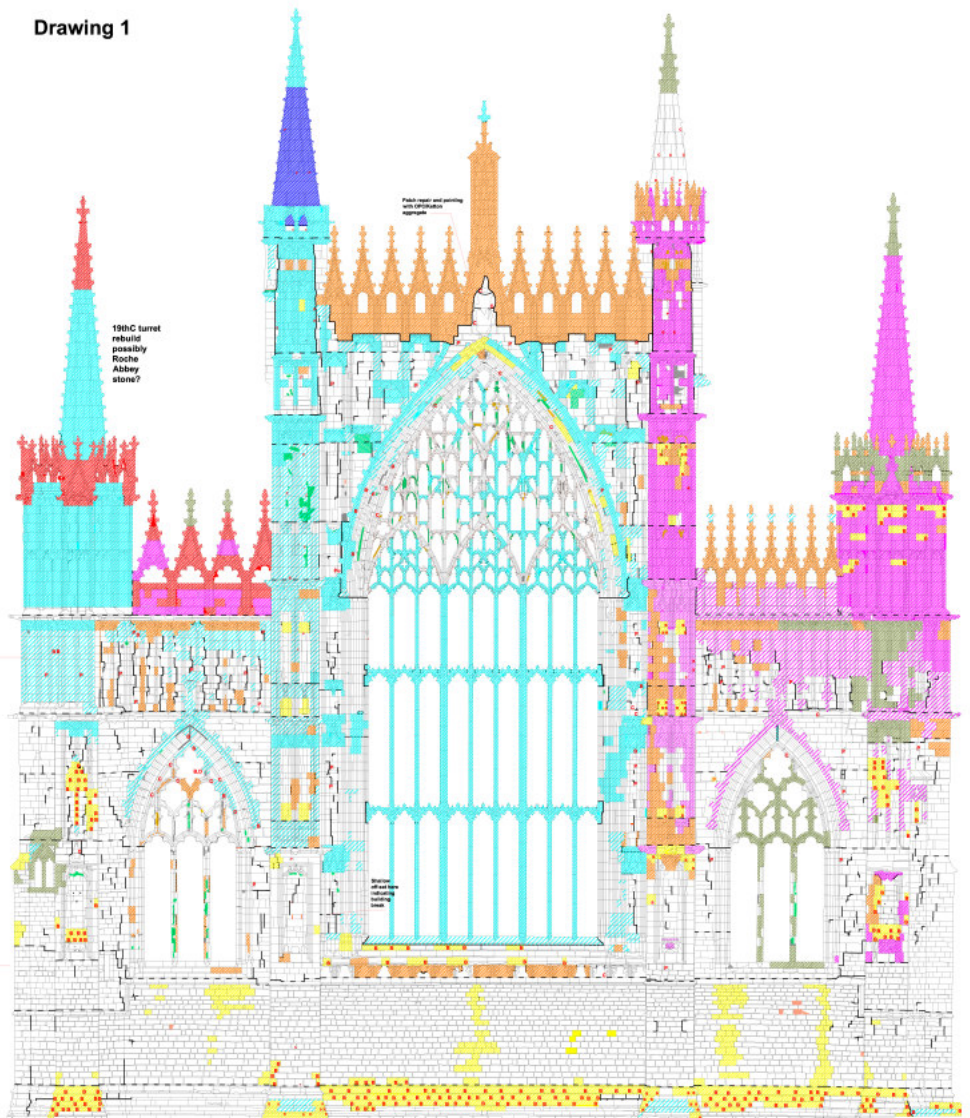
maintained after application. Wacker OH can stabilise decaying, laminating and granulating stone prior to secondary consolidation and protection with the lime method

- 5.0 After trialling, the results will be reviewed with the Surveyor and the appropriate methods will be selected. A detailed timetable and specification for conservation should be devised at this stage.

- 6.0 On completion of the conservation work, a final photographic record will be made of all of the stonework and all documentation will be deposited at the York Minster Archive and the National Monument Record, Swindon.

* * * *

Drawing 1



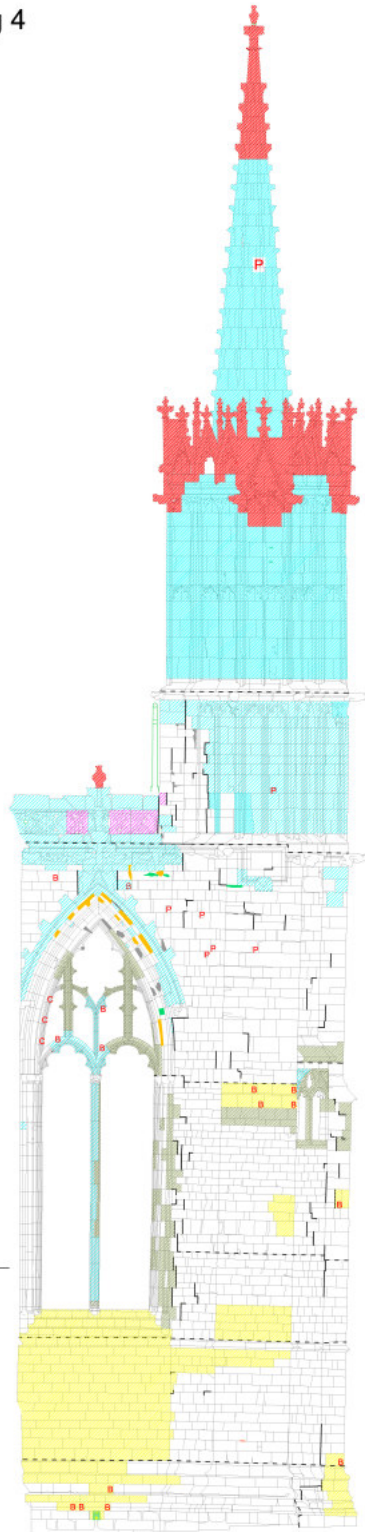
Tight joints here within reconstructed area

NB No boarding out of scaffold below this level as at July 2009

- | | | |
|---|--|---|
| 1700s (magnesian limestone, ?Huddleston) | 1960s Calcium Silicate Paint | Construction break/re-assembly break/mis-course |
| 1820s & 1830s (magnesian limestone, Tadcaster) | Limewash traces | Construction horizon (probable) |
| 1820s & 1830s (magnesian limestone, Tadcaster) - probable | Previous lime mortar repair to pre-1820s stone | C Tooling [C = 14thC Claw, A = 12thC Axe, B = Post-Med bolster, D = Drag, Pu = Punched, s = 11thC Axe] |
| 1840s - c.1850s (magnesian limestone - Huddleston) | OPC render (1920s and 1950s) | P Putlog hole |
| 1840s - c.1850s (magnesian limestone - Huddleston) - probable | Cementitious mortar render (1970s & 1980s) | |
| 1890s - c.1920s (oolitic limestone, New Ketton) | Stone pinked through burning | |
| 1920s - 1950s (oolitic limestone, Clapham) | Lead | |
| 1970s (magnesian limestone, Cadeby and Huddleston) | Brick/tile | |
| 1980s - 1990s (magnesian limestone, Cadeby) | Iron tie/cramp/insert | |

YORK MINSTER, East Front
East elevation
 Historic repair survey (as at Sept 2010, research ongoing)
 Historic geometry survey originally begun by John Durrill, York Minster Research, September 2005
 with subsequent updating and enhancement by Alexander Taylor BA BA (Hons) 2007 onwards
 Photographs supplied by David Hall, Carlisle House, Roxbury, Wiltshire, SN4 2PQ
 Scale 1.50 @ A0 Original Drawing no. 1800 290

Drawing 4



Limit of boarded scaffold
at point of survey

- 1820s & 1830s (magnesian limestone, Tadcaster)
- 1820s & 1830s (magnesian limestone, Tadcaster) - probable
- 1840s & 1850s (magnesian limestone, Huddleston)
- 1840s & 1850s (magnesian limestone, Huddleston) - probable
- 1898-1920s (Ketton, oolitic limestone)
- 1920s, 1930s and 1950s (Clipsham, oolitic limestone)
- 1970s (magnesian limestone - Huddleston and Cadeby)
- 1980s - 1990s (magnesian limestone, Cadeby)
- Stone replaced/removed at point of survey
- Suspected previous linseed oil application
- Limewash traces
- Previous lime mortar repair to pre-1820s stone
- OPC render (1920s and 1950s)
- Cementitious mortar render (1970s & 1980s)
- Stone pinked through burning
- Lead
- Brick/tile
- Iron tie/cramp/insert
- Construction break/re-assembly break/mis-course
- Construction horizon (probable)
- C** Tooling [C = 14thC Claw, A = 12thC Axe, B = Post-Med bolster, D = Drag, Pu = Punched, a = 11thC Axe]
- P** Putlog hole
- Point where masonry courses through
- ↔ Point where masonry courses and bonds through

YORK MINSTER, East Front, Area 5
 South turret elevation
 Archaeological Survey
 undertaken by Alexander Holton BA MA PIFA Sept 2009
 Scale 1.50 @ A0 Drawing no. 1800 296/Arch

Drawing 5

