

Bath Abbey

The Tower Roof: Re-covering etc.

Project summary

April 2025

St. Ann's Gate Architects Ltd
No.8 Rozelle Close . Littleton . Winchester . SO22 6QP
VAT: GB 388 8709 22 co.co: 13587564
t: 01722 555200 e: admin@stannsgate.com

ST. ANN'S GATE
ARCHITECTS



ST.ANN'S GATE ARCHITECTS

No.8 Rozelle Close · Littleton · Winchester · SO22 6QP

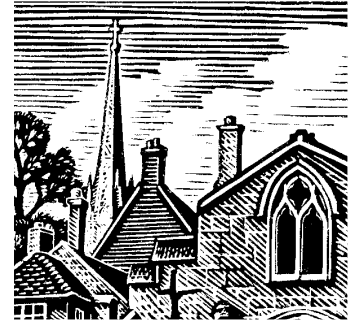
Antony Feltham-King RIBA GradDiplConsAA AABC · director/architect

Christian King ARB BA Hons DipArch · associate/architect

Steven Paylor BA(Hons) DipArch MSc RIBA · associate/architect

St.Ann's Gate Architects Ltd · VAT: GB 388 8709 22 · co.no: 13587564 · registered in England & Wales

t: 01722 555200 · e: admin@stannsgate.com · w: www.stannsgate.com



1280-07/ACFK

April 30th 2025

BATH ABBEY, BATH: TOWER ROOF PROJECT

PROJECT SUMMARY

1.00 BACKGROUND

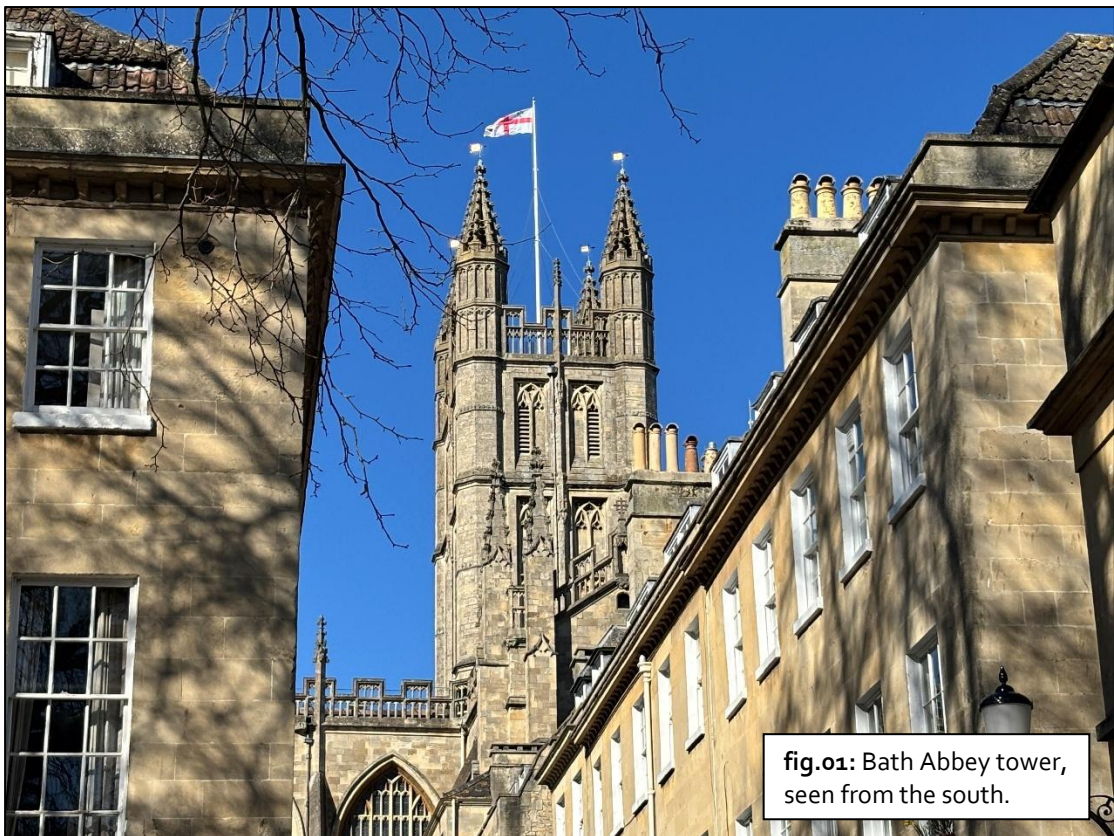


fig.01: Bath Abbey tower, seen from the south.

- 1.01 The quinquennial inspection 2023 identified the tower roof as a high priority for attention. The lead roof covering is actively leaking into the spaces below, and the layout of the leadwork could usefully be amended to improve the roof's ability to shed rainwater efficiently. The tall flagpole penetrates the roof covering, in order to achieve an adequate structural fixing, but this is problematic for weathering.
- 1.02 The tower roof is also a key part of the Abbey's visitor roof tour experience - the views of the Abbey, and the surrounding city, from this vantage point, are unrivalled. However, foot-traffic directly on the roof covering is best avoided, for the longevity of the roof covering, and for safety.

- 1.03 In 2024 the Abbey Authorities and their design team explored ways to introduce an enhanced visitor experience to the tower roof, by potentially placing an elevated viewing platform centrally on the roof. This would have provided a raised level from which visitors could have seen out and over the tower's perimeter parapet. An outline scheme was the subject of informal discussions with the statutory approval bodies and consultees, including the Bath & Wells Diocesan Advisory Committee (the DAC), Bath & North East Somerset Council (B&NES), Historic England (HE), the Society for the Protection of Ancient Buildings (the SPAB), and the Bath Preservation Trust (BPT).
- 1.04 Whilst the majority of the consultees provided positive support ¹ for the outline proposals, the formal pre-application response from B&NES was less supportive. Their response document dated 31.10.24 (ref.24/02666/PA04) considered the proposals and suggested that the proposed viewing platform would detrimentally affect the appearance of the tower, going on to conclude: *'Given its height ... it is considered that the platform would result in a prominent and harmful addition. The importance of the Abbey in the city is such that this would also be considered harmful in the context of the World Heritage Site inscriptions [sic].'*
- 1.05 In the light of this response from one of the two statutory approval bodies, **the Abbey has opted to focus on the essential re-covering of the roof, to address the active surface water leaks into the fabric, and to enhance and make safer the experience for visitors on guided tower tours.**

2.00 THE CURRENT SITUATION

- 2.01 The quinquennial inspection of the Abbey church building 2023 by the current architect identified the present lead roof covering of the tower one of the most urgent fabric items to address. The lead covering is leaking, allowing water to penetrate into the belfry below. This puts the tower's timber roof structure, the bell frame, and the belfry floor structure at long term risk as a result of rot and decay. Holding repairs and temporary coverings in the belfry are not long-term solutions.



fig.02: The tower roof, photo showing flagpole connection and rubber matting laid over lead roof covering



fig.03: The belfry, where temporary protections are in place to contain water ingress

¹ Such as informal advice offered by the Bath & Wells DAC, contained in their *Advice Note following informal visit of 29 August 2024 Tower roof: Repairs, re-covering and new visitor viewing platform* Reference nr 2024-101812

2.02 The roof structure has been examined by the Abbey Architect ², the consultant structural engineer ³, and an eminent historic buildings consultant ⁴. The proposals contained in this document are a result of their combined work. The bells and bell frame were inspected by Nicholson Engineering Ltd. and also by Whites of Appleton in 2024 and their assessment of the condition of the bell frame is taken into account.

2.03 The lead roof covering

- a The lead roof covering dates from the last major campaign of work to the tower, in 1947. The lead covering was replaced, laid onto new (or possibly C19th) sarking boards. The flagpole was replaced in 1999 and some of the 1940s lead bays have been renewed, probably dating from the same period. The lead bays are covered in rubber matting to protect the surface of the lead from footfall, and to provide a non-slip surface, as the tower roof is the highest point on the Abbey's public roof tour itinerary. Water is held against the lead surface under the matting, and cracks in the lead covering are concealed by the matting.

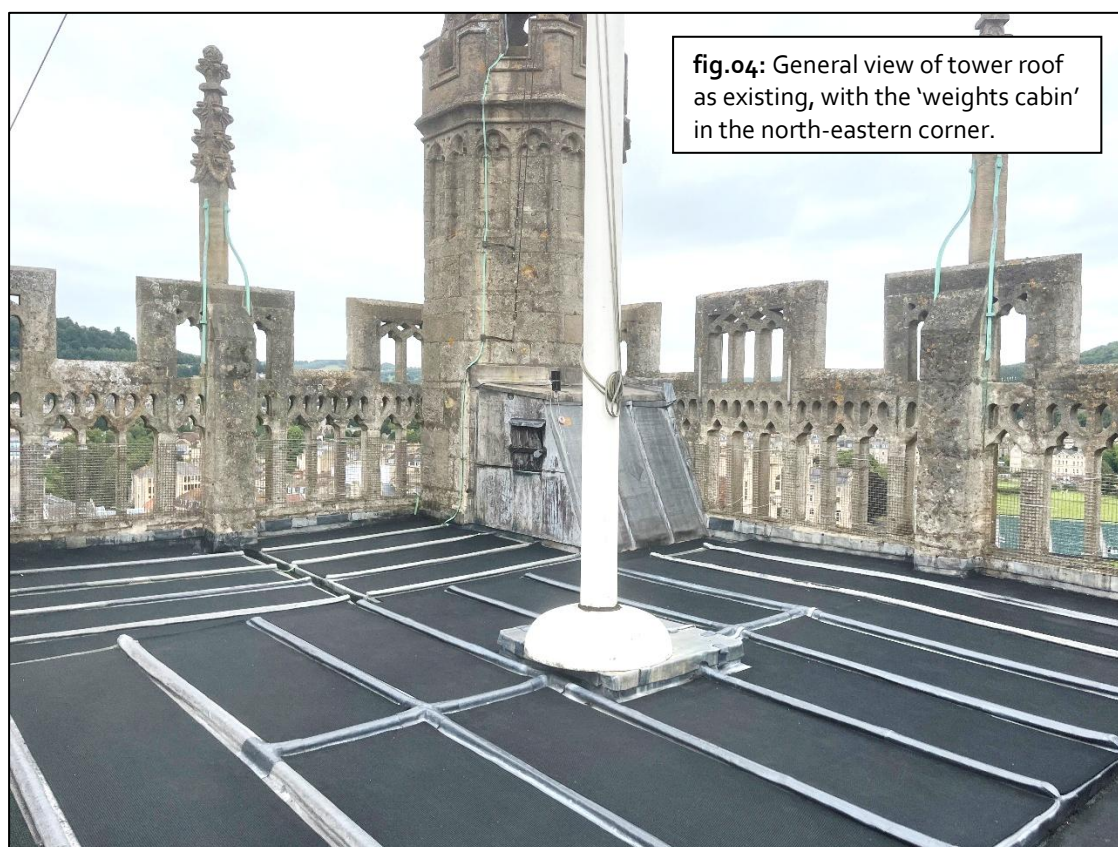


fig.04: General view of tower roof as existing, with the 'weights cabin' in the north-eastern corner.

- b The layout of the roof deck is such that surface water can only escape the roof to north and south, and a central 'ridge' means that there is only one outer per side. The traditional leadwork layout, running to these single point outlets, dictates that there are many lead-drip details, all of which are potential points of water ingress if the outlets block. Further, the lead covering itself is coming towards the end of its service life.

² Antony Feltham-King RIBA GradDiplConsAA AABC of St. Ann's Gate Architects Ltd. supported by associate architect Christian King ARB BA Hons DipArch

³ Henry Pinder BA (Hons), MA (Cantab.), MEng, CEng, MStructE of Pinder Structural Consulting

⁴ Dr. Michael Shapland FSA of Archaeology South-East, UCL Institute of Archaeology

2.04 The roof structure

- a The Historic Buildings Assessment ⁵ by Dr.Shapland, carried out in the summer of 2024, notes the following in relation to the history of the roof and its history of repair:
- b *The flat roof of the belfry comprises a pair of substantial cross beams, dividing it into three bays which are spanned by shorter axial beams, which in turn carry the smaller joists that bear the sarking boards of the lead roof above. A further three cross beams are present at a lower level to the roof. The structure is the result of four principal phases of development: the rebuilding of the abbey c.1500, or perhaps its restoration c.1550, 18th century repairs (perhaps in 1814), using timbers scavenged from earlier contexts, more extensive repairs in the later 19th century under George Gilbert Scott, and the replacement of the sarking boards either then or when it was re-leaded in 1947. The three lower cross-beams are probably 18th century (?1814), probably installed for structural support or as a bell-hoist.*
- c *This study has concluded that the earliest phase of the roof structure is of high overall heritage significance, and that its 18th and later 19th century phases of repair are of moderate heritage significance. The sarking boards and 20th century timbers are afforded low heritage significance. There are not considered to be any setting issues in relation to this structure.*

2.05 The bell frame



⁵ Belfry Roof Structure, Bath Abbey, Somerset, Historic Buildings Assessment Dr.Michael Shapland FSA, August 2024

- a The timber bell frame dates from the C17th, originally built for eight bells, but extended to accommodate ten in 1774. The frame (actually three frames linked together ⁶) is supported by three large oak beams spanning east-west, and these in turn are supported by six spanning in the opposite direction.
- b Whites of Appleton inspected the frame in June 2024 and their report ⁷ notes that modifications to the frame over the years, mainly to accommodate mechanisms related to the clock, have affected the structure. They attended to some repairs in 2004 and again in 2014, addressing problems caused by a water leak through the north-western corner of the roof, and deterioration where rot had set in in localised places. Repairs were generally achieved through the use of steel strengthening brackets etc.
- c Their report concludes as follows: '*...we do not consider it to be a particularly good example of this design of frame from this period, particularly as the bell frame is no longer in its original condition, having been adapted and repaired over the years, as well as considerable sections having been cut out for clock hammers. Bell frame movement is moderate and every effort has been made to strengthen it and in this respect it is currently sound and requires no maintenance works other than the routine tightening of the ironwork.*' These conclusions are echoed by Nicholson Engineering in their report. Necessary repair and maintenance of the bells and frame were carried out by Whites of Appleton in 2024, under list A of the Faculty Jurisdiction (Amendment) Rules 2019.

3.00 THE TOWER ROOF: PROPOSED SOLUTION

- 3.01 Options for the re-covering of the tower roof have been considered. These include simply renewing the lead covering, in its existing configuration, laying new leadwork onto a deck with revised geometry to potentially improve the flow of water to the outlets, or replacing the lead roof covering with a new jointless roofing material.
- 3.02 A new lead roof covering would be laid to the latest technical standards as suggested by the Lead Sheet Association. Heavy lead would be employed (code seven or possibly code eight), as this would give the likely longest life for this approach. However, any lead roof covering will inevitably involve points where water might penetrate into the roof, and from there into the belfry and beyond. Lead laid in the traditional manner entails drip joints across the falls, and rolled seams running with the falls. All are potential points of water ingress in the case of blockages further down the system. A possible layout is shown in St. Ann's Gate Architects' drawing 1280-07-sk03.
- 3.03 There are only two points of egress for the surface water, one on the north side of the tower, and another on the south. These outlets run through the base of the parapet with lead-lined chutes, draining to lead hoppers and downpipes, fixed to the tower masonry. It is difficult to envisage how additional outlets could be made without major impact on the appearance of the tower. As a result of the plan-form of the roof, and the existing high point (in effect, a shallow 'ridge' running east-west across the mid-point of the roof) the southern half of the roof drains to the southern outlet, and the northern half to the northern outlet. This would also be difficult to change.

⁶ see report by Nicholson Engineering Ltd. of Bridport, dated January 2024

⁷ report on the Bell Installation at the Abbey Church of Saint Peter and Saint Paul, Bath, Somerset; Whites of Appleton, Oxfordshire June 2024

- 3.04 Consequently, in order to provide the Abbey with the most reliable way to keep surface water out of the interior, the option to install a jointless membrane is the preferred choice. Although it is recognised that the guarantees associated with such membranes usually extend to a maximum of thirty years, as opposed to the expected life-span of a properly laid lead roof of one hundred years, the primary need to reliably keep water out of the building is considered to trump the lifespan consideration.
- 3.05 Further, the new membrane will be protected from mechanical damage by means of a walkway grid (see 3.08 below) which will be a further asset in assuring longevity by protecting it from mechanical damage. If and when the membrane needs repair, this can be done locally with patch repairs. When the membrane reaches the end of its service life, it can be replaced with a new version, one half at a time, with the central 'ridge' as a break-point.
- 3.06 St. Ann's Gate Architects' drawing 1280-07-350 illustrates the roof plan as proposed. Once the existing lead covering is taken up, the existing timber deck will be inspected and reviewed. Localised opening-up will be undertaken in areas specified by the structural engineer and the architect, to carry out a check on the supporting structure.
- 3.07 Once those checks are complete, the existing decking will be relaid and a new 18mm thick ply deck will be laid, to act as the substrate for the jointless membrane. An ethylene propylene diene monomer (EPDM) rubber membrane is proposed in this instance, as this material is durable and inert, and has a higher percentage of natural material (ie. rubber) than other membranes such as mesh reinforced polyvinyl chloride (PVC) single ply material. EPDM expands and contracts with temperature changes, making it necessary to glue it to the substrate for a smooth finish and to prevent rippling, and therefore ponding.
- 3.08 Once the roof covering is applied and the abutments are made watertight, a new walkway grid across the entire area of the tower roof will provide a safe flat and level surface for visitors to walk upon, and to protect the roof membrane as noted above. The grid units will be supported using a proprietary adjustable support-leg system (see St. Ann's Gate Architects' drawing 1280-07-352 which also shows the simplified weathering detail at the base of the flagpole, which is currently another weak-point in the roofing system). Note that the flagpole is in good condition and is well-restrained by means of two tiers of guy-ropes, attached to the tower's corner pinnacles.
- 3.09 Due to the need to bring the finished walkway level to the same level as the threshold of the newel access stair in the south-western corner, a lower area of walkway grid is proposed locally in this area. This entails a step up onto the main walkway surface and this will be made 'manifest' by means of a contrast edge strip. A discreet strip of lighting under this step nosing will highlight this change of level in low light conditions.
- 3.10 The Abbey proposes to install a seating bench around the flagpole. This is to be installed in memory of the late Barry Cooper who was a devoted member of the Abbey community for over thirty years, and was especially committed to engaging with visitors as a tower tour guide. The details of the bench are shown in drawings 1280-07-355, 356 and 357. The bench is designed to run in a circle around, but spaced away from, the flagpole, to increase the seating capacity and to discourage unauthorised climbing of the flagpole.

- 3.11 It is proposed to include some very low level illumination below the benches. This will be low-level in every sense of the word, in order to provide some safety lighting when the tower is used during twilight or night-time hours ⁸. No additional illumination is proposed, noting that the tower is currently up-lit from lower positions ⁹.
- 3.12 In relation to ecology, the Abbey commissioned Nicholas Pearson Associates of Corston, Bath, to undertake a 'Bat and Bird' report (incorporating a 'preliminary roost assessment') in January 2025. Their subsequent report ¹⁰ noted that '*...no definitive evidence of roosting bats was recorded.*' Nonetheless, the Abbey has commissioned an emergence survey in the appropriate season to confirm these findings.
- 3.13 In order to prevent falls through the openwork perimeter parapet, the existing rather ad-hoc mesh fixed to timber battens will be removed, to be replaced with a designed system, fixed to the inner face of the parapet. The gauge of mesh and the stainless steel wire proposed is such that the mesh will not be visible from ground level, but will offer an appropriate level of protection to those visiting the tower top ¹¹. The details are shown in St. Ann's Gate Architects' drawing 1280-07-360.
- 3.14 The pre-application response from B&NES ¹² noted the following: *In order to improve visitor information and access it is suggested that the following be considered:*
- *Improvement to the deck to prevent trip hazards.*
 - *Information panels set at the current viewing level.*
 - *If seating is preferred, this can be provided at the current level.*
 - *A new flag post can also be provided*
 - *Understanding structural changes to the roof structure that are required to accommodate the above points.*
 - *The Tower is largely illuminated at present and consideration should be given to how impact of illumination on ecology can be improved.*
- 3.15 The designs as currently proposed respond positively to all of these points. To recap:
- Trip hazards are minimised by the inclusion of a walkway grid deck across the entire roof area, sitting above the new waterproof membrane.
 - The precise design of information panels to enhance engagement is yet to be finalised, but these will be integrated into the design of the proposed bench or the safety mesh to the balustrading around the perimeter, set behind the merlons.
 - Seating will be provided at the current level, as described in 3.11 above.
 - The existing flag pole is sound and will be retained, with a revised weathering detail where the new roof covering abuts.
 - The structure of the roof has been inspected, studied and reported-on by the design team. No significant repair works are anticipated, although the opportunity of

⁸ The tower is occasionally used for night-time 'star-gazing' events linked to the Herschal Museum of Astronomy in New King Street. .

⁹ A separate planned change of flood-lighting luminaires on the roofs of the Abbey will follow an existing pattern of improvement by using energy efficient LED-lamped fittings, replacing the existing 'old-tech' luminaires. The advice of the consultant ecologist will be sought but the use of light sources with a colour temperature of 3000K are understood to be acceptable in relation to potential bat flightpaths.

¹⁰ Bat and Bird Report, Bath Abbey, Bath City Centre; Nicholas Pearson Associates, NPA 30092 0400 dated 31.03.25.

¹¹ ie. guarding to a level greater than 1100mm above the walkway grid level, thus in excess of the requirements of the Building Regulations Approved Document K.

¹² *ibid*

opening up the roof will be taken to inspect the roof structure at even closer quarters.

- Advice has been taken regarding illumination and only minor and localised lighting is proposed as part of these works. The colour temperature of any new lighting will be 300K or lower, which is understood to be appropriate in terms of avoiding disturbance to over-flying bats.

- 3.16 Two other elements of work are proposed to be carried out in parallel with the roof works described above. These are repairs to the masonry of the tower, and the other is the removal of the redundant 'dry riser' pipework. Both of these works are to be carried out, to make beneficial use of the temporary access to be provided for the tower roof works.
- 3.17 The masonry structure of the Abbey is in generally good order, following many years of good husbandry by the Abbey Authorities and their professional advisors. However, there are areas of localised masonry decay, and hard cementitious pointing, which may be addressed while access is available for these works.
- 3.18 The large bore pipework which snakes up the external face of the building in the north eastern and south-western returns is the dry riser system, installed to assist in firefighting many years ago (see fig.o6 below). The Abbey, its insurers and the Avon Fire & Rescue Service have noted the poor condition of the pipework, and have concluded that it is no longer required for effective firefighting, should the eventuality arise. Rather than perpetuate its existence and continue to maintain it, the pipework is to be removed in a phased programme of work as access allows. In this instance, the pipework on the north-eastern return is to be accessed via the scaffolding to be erected from pavement level to the tower roof. The metalwork will be carefully removed, and any resulting apertures in the stonework made good using matching masonry repairs.

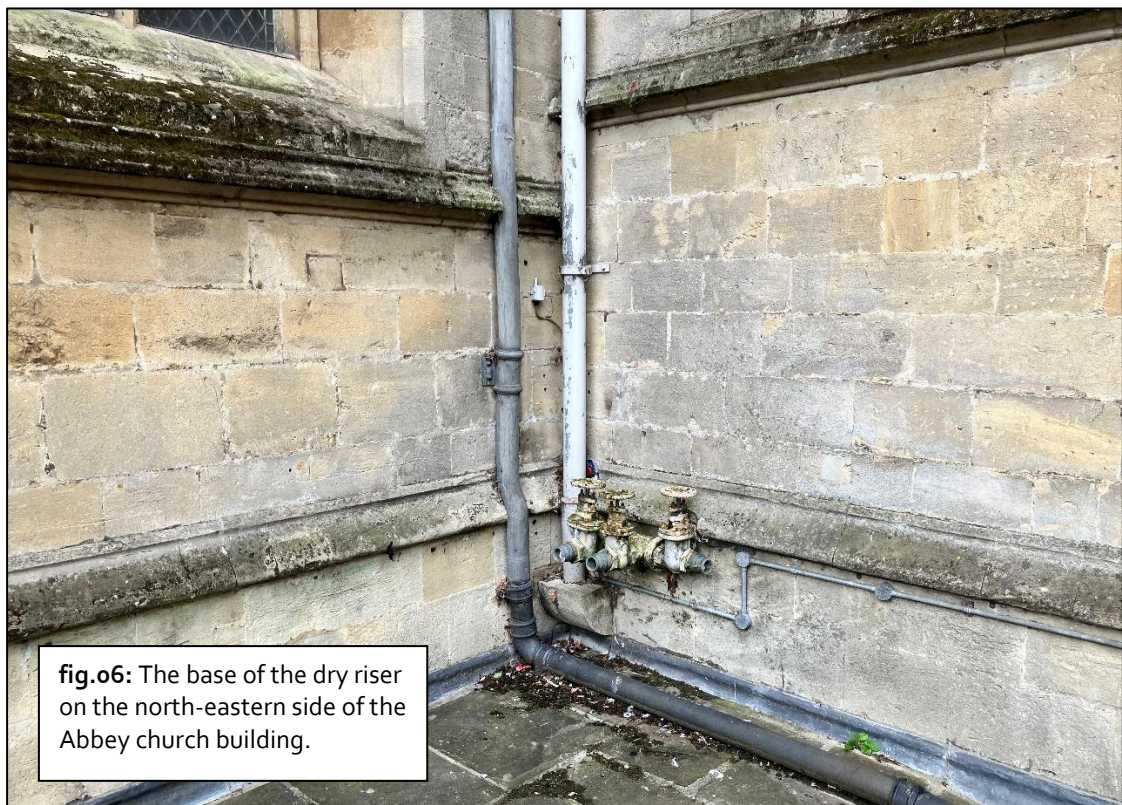
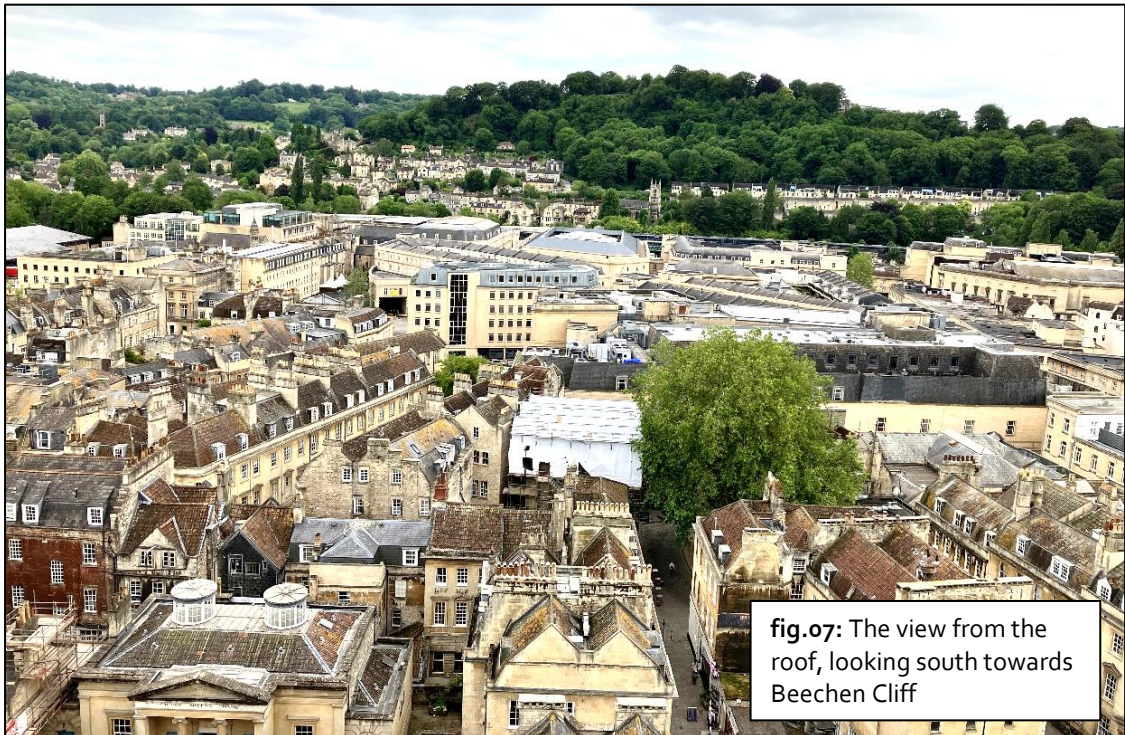


fig.o6: The base of the dry riser on the north-eastern side of the Abbey church building.

4.00 SUMMARY



- 4.01 The works as now proposed are limited to the renewal of the tower roof covering and enhanced provision for visitors on tower tours, at the current roof level.
- 4.02 The primary objective of keeping water reliably out of the interior of the historic building is to be achieved by means of the installation of a new jointless waterproof membrane.
- 4.03 The membrane is to be protected using walkway grids on support legs, which also creates a flat surface for those visiting the roof.
- 4.04 A new bench is provided for the use of visitors. This also serves as a memorial to the late Barry Cooper.
- 4.05 Ecological issues have been taken into account.
- 4.06 It is hoped that the proposals, as finally proposed, demonstrate the responsive stance of the Abbey following consultations and discussions with statutory approval bodies and other consultees during the past year.

Antony Feltham-King RIBA GradDiplConsAA AABC
Bath Abbey Architect
St. Ann's Gate Architects Ltd. Winchester
April 2025