# Bath Abbey

## The Tower Roof:

## Re-covering etc.

# Specification

including:

- Project summary
- Preliminaries
- Schedule of works
- Specification
- Health and safety section

April 2025

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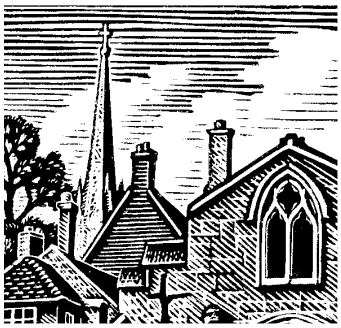

1280-07/ACFK

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.

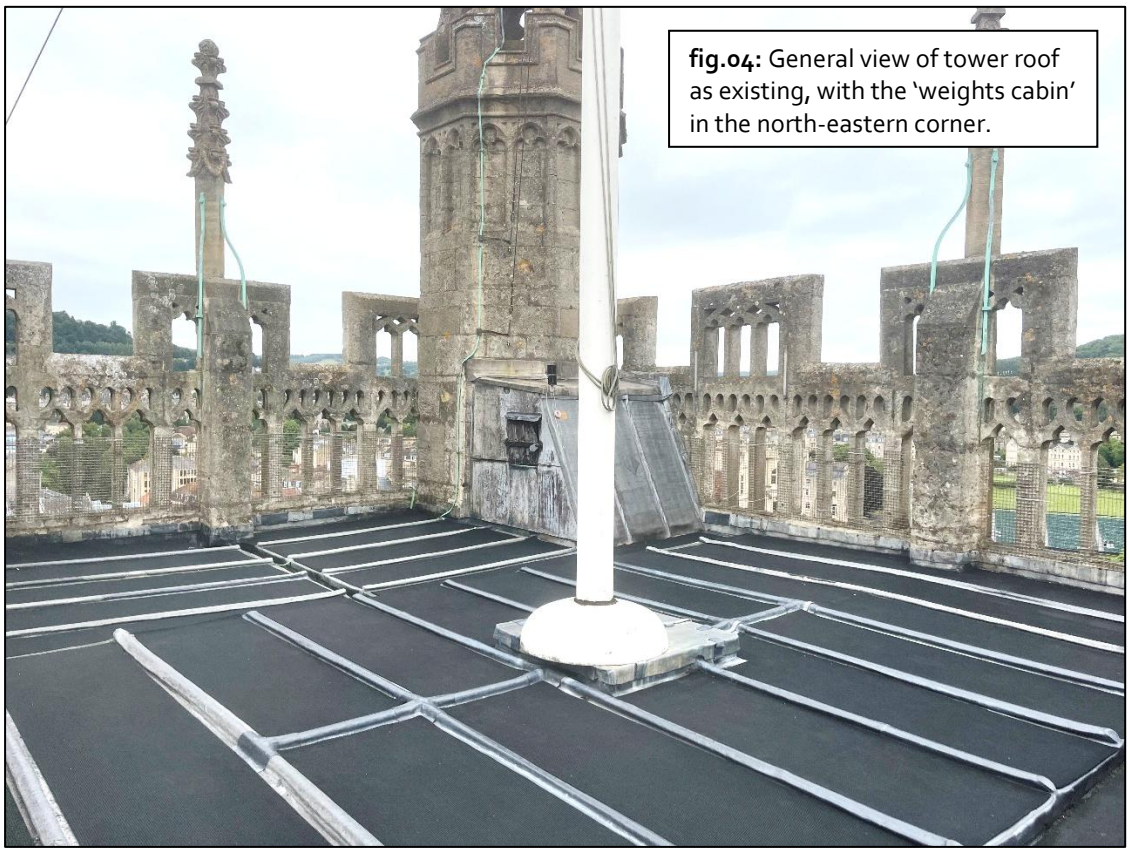

**fig.04:** General view of tower roof as existing, with the 'weights cabin' in the north-eastern corner.

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, MIStructE 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

**fig.05:** View of the bells and 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. Bother 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.06 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.

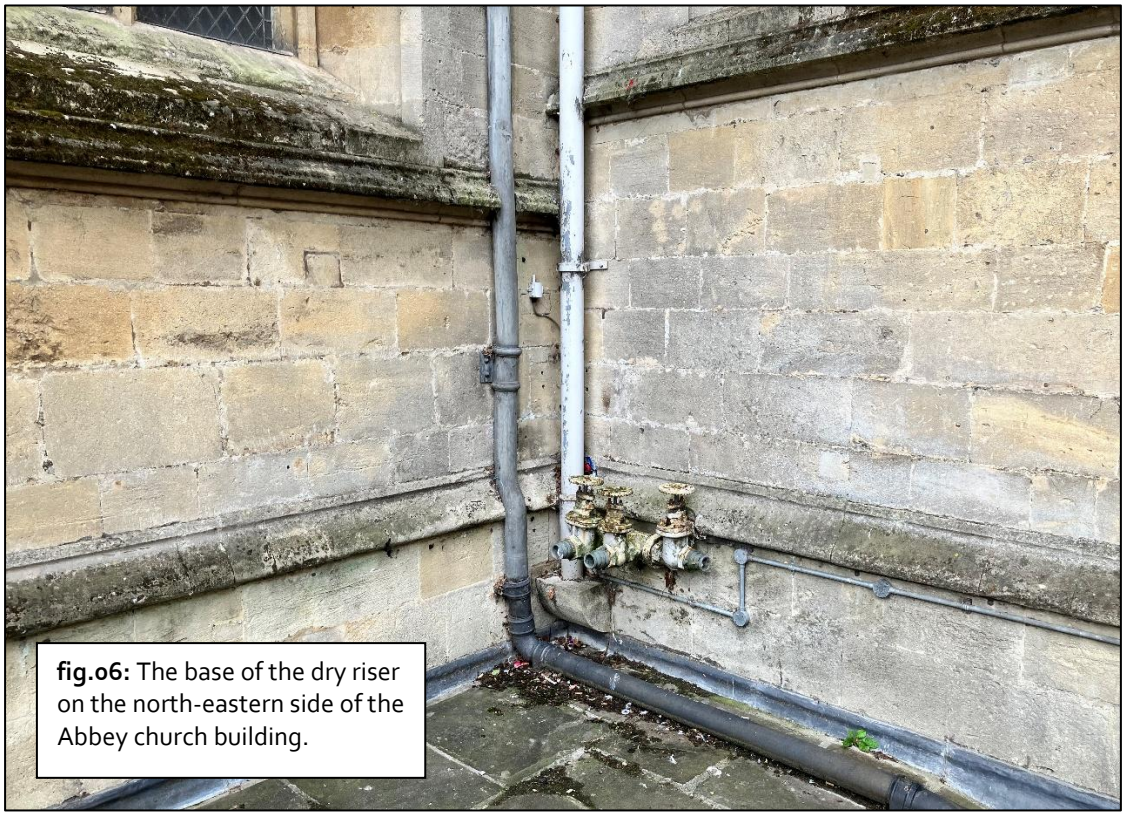

**fig.06:** The base of the dry riser on the north-eastern side of the Abbey church building.

## 4.00 SUMMARY

**fig.07:** The view from the roof, looking south towards Beechen Cliff

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.

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Bath Abbey Architect
St.Ann's Gate Architects Ltd. Winchester
April 2025

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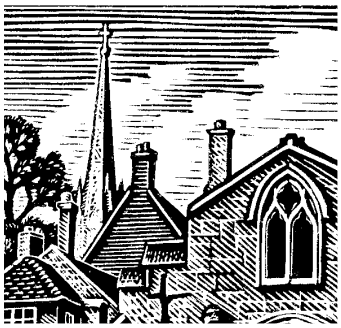

1280-07/CJK/AFK

March 2025

# **BATH ABBEY, BATH**: TOWER ROOF PROJECT

## **PRELIMINARIES - for approval**

### **A10 PROJECT PARTICULARS**

110 THE PROJECT:

| | |
|---|---|
| Name: | Bath Abbey: Tower roof works etc. |
| Nature: | Re-covering of the central tower roof etc. |
| Location: | Bath Abbey, Bath |
| start: | date to be agreed – likely early January 2026 |
| complete: | date to be agreed – likely late April 2026 |

120 EMPLOYER (CLIENT):
The Rector, Churchwardens and PCC of Bath Abbey
No.9 Kingston Buildings
Bath
BA1 1LT

Abbey Executive Director: Frank Mowat
tel: 01225 422462
email: office@bathabbey.org

130 PRINCIPAL CONTRACTOR
to be selected by competitive tender

140 ARCHITECT (hereinafter referred to as 'CA'):
St.Ann's Gate Architects Ltd.
No.8 Rozelle Close, Littleton
Winchester SPO22 6QP

- Abbey Architect: Antony Feltham~King RIBA GradDiplConsAA AABC
tel: 01722 555200
mobile: 07771 870082
email: antony@stannsgate.com

150 CONTRACT ADMINISTRATOR (hereinafter referred to as 'CA'):
St.Ann's Gate Architects Ltd., as above

160 PRINCIPAL DESIGNER with respect to CDM 2015 (hereinafter referred to as 'PD'):
St.Ann's Gate Architects Ltd., as above

## A12 THE SITE/EXISTING BUILDINGS

110 THE SITE
As described on A10 above.

140 EXISTING MAINS/SERVICES:
The incoming supplies will not be affected by the proposed works. Assume incoming mains are capable of supporting the small additional loads imposed by the proposed repair works in progress.

200 ACCESS TO THE SITE: NB: Traffic restrictions are onerous on the surrounding highways and the approach to the Abbey church building. Contractors must satisfy themselves as to the adequacy of their allowances for access for scaffolding, deliveries etc. See health and safety section and drawings for suggested arrangements for access.

220 USE OF THE SITE:
- Do not use the site for any purpose other than carrying out the Works.

230 SURROUNDING LAND/BUILDING USES:
- The Abbey church building is surrounded by publicly accessible land on all sides – ie. it is an 'island site'.
- To the south east quadrant is a small open area with Kingston Buildings to the immediate south. These building contain the Abbey offices.
- To the south west and to the west are two open spaces, much used by the public. Immediately to the south-west are the Bath Pump Rooms and the Roman Baths.
- To the north-west is a parade of shops.
- To the north is Orange Grove. This public highway provides potential contractor access to the site area.

240 RISKS TO HEALTH AND SAFETY:
- The nature and condition of the site/building cannot be fully and certainly ascertained before it is opened up. See health and safety section for details. The accuracy and sufficiency of this information is not guaranteed by the Employer or the CA and the Contractor must ascertain for themselves any information they may require to ensure the safety of all persons and the Works.

## A13 DESCRIPTION OF THE WORK

120 THE WORK:
The work is described fully in the schedule of works, and includes the following:
- Erection of safe and secure scaffolding and hoardings.
- Assessment of the condition of the roof structure and deck and the
- Assessment of the condition of the masonry to the surrounding fabric.
- Removal of cement-based pointing to the masonry of parapet and pinnacle where accessible and re-pointing using lime-based materials, together with localised replacement of decayed masonry elements.
- Repairs to roof structure if required.

- Re-covering of the roof with new EPM covering on new ply deck.
- The construction of a new level GRP walkway grid above the EPDM covering to protect the covering and to provide a safe and secure walkway for public tours.
- The construction of a new seating arrangement in the centre of the roof around the existing flagpole.
- Removal of redundant dry riser where accessible from scaffolding.

## A15 THE CONTRACT

910 MINOR WORKS BUILDING CONTRACT 2024 (MW24)

10 Requirement: Allow for the obligations, liabilities and services described therein against the headings:

20 THE RECITALS:

30 First - THE WORKS AND THE CONTRACT ADMINISTRATOR: The work comprises:
Bath Abbey: Tower roof works etc.
Architect/ Contract Administrator: See clause A10/140.

40 Second - CONTRACT DOCUMENTS: Contract drawings: As listed in clause A11/120.

50 Third – priced documents – ie the tender return, or as amended via negotiation.

60 Fourth – as stated

70 Fifth – as stated

80 Sixth – does not apply

90 Seventh – does not apply

100 THE ARTICLES:

110 2 – CONTRACT SUM: as agreed post-tender

120 4 - ARCHITECT/ CONTRACT ADMINISTRATOR: See clause A10/140.

130 5 – CDM REGULATIONS: PRINCIPAL DESIGNER / PRINCIPAL CONTRACTOR
PRINCIPAL DESIGNER is architect/CA
PRINCIPAL CONTRACTOR is appointed main contractor

140 6 - BUILDING REGULATIONS (where applicable) PRINCIPAL DESIGNER / PRINCIPAL CONTRACTOR
PRINCIPAL DESIGNER is architect/CA
PRINCIPAL CONTRACTOR is appointed main contractor

150 7 - ADJUDICATION: see clause 7.2

160 8 –ARBITRATION – does not apply

170 9 –LEGAL PROCEEDINGS – as stated

180 CONTRACT PARTICULARS:

190 Fourth Recital - BASE DATE: Base date: agreed contract start date

200 Fourth Recital and clause 4.2 - CONSTRUCTION INDUSTRY SCHEME (CIS): Employer at the Base Date is not a 'contractor' for the purposes of the CIS.

210 Fifth Recital - CDM REGULATIONS 2015: The project is notifiable.

220 Sixth recital – does not apply

230 Seventh recital – does not apply

240 Article 8 - ARBITRATION: Article 7 and Schedule 1 do not apply.

250 Clause 2.2 - COMMENCEMENT AND COMPLETION: Date for Commencement of the Works: see
Date for Completion: see A10/110

260 Clause 2.8 - LIQUIDATED DAMAGES: At the rate of: £500.00 per week

270 Clause 2.10 - RECTIFICATION PERIOD: Period: twelve months

280 Clause 4.3 – VALUATION DATES: monthly

290 Clause 4.3 – PAYMENTS BEFORE PRACTICAL COMPLETION.: Percentage: 95%

300 Clause 4.4 – PAYMENTS AFTER PRACTICAL COMPLETION.: Percentage: 97.5%

310 Clauses 4.4 and 4.9 – not applicable

320 Clause 4.8.1 - SUPPLY OF DOCUMENTATION: Period: Three months

340 Clause 5.3 - CONTRACTOR'S INSURANCE - INJURY TO PERSONS OR PROPERTY: Insurance cover (for any one occurrence or series of occurrences arising out of one event): £5,000,000.00

350 INSURANCE OF THE WORKS ETC.
ALTERNATIVE PROVISIONS: Clause 5.5 applies.

360 Clause 5.5 - PERCENTAGE TO COVER PROFESSIONAL FEES: Addition: 15%

370 Clause 5.6 – INSURANCE ARRANGMENTS 'by other means' – does not apply

380 Clause 7.1 – NOMINATION AND NEGOTIATION OF DISPUTES – to be agreed

390 Clause 7.3 - ADJUDICATION: The Adjudicator is to be nominated:
Nominator of Adjudicator: President or Vice president of the RIBA

## A16 TENDERING/SUBLETTING/SUPPLY

110 SCOPE: These conditions are supplementary to those stated in the invitation to tender and on the Form of Tender.

120 TENDERING PROCEDURE will be in accordance with the principles of the NBS Guide to Tendering for Construction Projects 2011.

161 EXCLUSIONS: If the Contractor cannot tender for any part(s) of the work as defined in the tender documents he must inform the CA as soon as possible, defining the relevant part(s) and stating the reasons for his inability to tender.

170 ACCEPTANCE OF TENDER: The Employer and his representatives:
- Offer no guarantee that the lowest or any tender will be recommended for acceptance or accepted.
- Will not be responsible for any cost incurred in the preparation of any tender.

191 PERIOD OF VALIDITY: Tenders must remain open for consideration (unless previously withdrawn) for not less than 13 weeks from the date fixed for the submission or lodgement of tenders. Information on the date for possession/commencement is given in section A20.

315 PROJECTS WITHOUT QUANTITIES: Tenders must include for all work shown or described in the tender documents as a whole or clearly apparent as being necessary for the complete and proper execution of the Works.

320 PRICING OF SPECIFICATION: Alterations and qualifications to the specification must not be made without the written consent of the CA. Tenders containing unauthorised alterations or qualifications may be rejected. Costs relating to items in the specification which are not priced will be deemed to have been included elsewhere in the tender.

331 THE PRICED SPECIFICATION must be submitted within one week of request.

341 ERRORS IN THE PRICED DOCUMENTS will be dealt with in accordance with the 'Code of Procedure for Single Stage Selective Tendering' 1994, Alternative 1 (the word 'documents' being substituted for 'bills of quantities').

451 A SCHEDULE OF RATES must be submitted within one week of request. The Schedule must include rates for all significant items of work including at least the following:
- roofer/leadworker
- stonemason
- labourer

516 ALTERNATIVE TIME TENDERS:
- In addition to and at the same time as his tender based upon the date or period specified in section A20, the Contractor may, at his discretion, submit an alternative tender based upon a different date for completion or period.
- If any such tender is accepted the date for completion inserted in the Appendix to the Contract will be the date stated in the alternative tender or determined from the period stated in the alternative tender.

535 SUBSTITUTE PRODUCTS: If the Contractor wishes to substitute products of different manufacture to those specified, details must be submitted with the tender giving reasons for each proposed substitution. Substitutions which have not been notified at tender stage may not be considered. Substitutions sanctioned by the CA will be subject to the verification requirements of clause A31/200.

551 HEALTH AND SAFETY INFORMATION: A statement must be compiled before commencement, describing the organisation and resources which the principal contractor proposes and undertakes to provide to safeguard the health and safety of operatives, including those of subcontractors and of any person who may be affected by the works, including:

- A copy of the contractor's health and safety policy document, including risk assessment procedures.
- Accident and illness records for the past five years.
- Records of previous Health and Safety Executive enforcement action.
- Records of training and training policy.
- The number and type of staff responsible for health and safety on this project with details of their qualifications and duties.

555 CDM PRE-CONTRACT HEALTH AND SAFETY PLAN:
Note the health and safety section which forms part of this document.

## A31 PROVISION, CONTENT AND USE OF DOCUMENTS

DEFINITIONS AND INTERPRETATIONS

130 IN WRITING: When required to notify, inform, instruct, agree, confirm, obtain information, obtain approval or obtain instructions do so in writing.

140 APPROVAL (and words derived therefrom) means the approval in writing of the CA unless specified otherwise.

200 EQUIVALENT PRODUCTS:

- Where the specification permits substitution of a product of different manufacture to that specified and such substitution is desired, before ordering the product notify the CA and, when requested, submit for verification documentary evidence that the alternative product is equivalent in respect of material, safety, reliability, function, compatibility with adjacent construction, availability of compatible accessories and, where relevant, appearance. Submit certified English translations of any foreign language documents.
- Any proposal for use of an alternative product must also include proposals for substitution of compatible accessory products and variation of details as necessary, with evidence of equivalent durability, function and appearance of the construction as a whole. If such substitution is sanctioned, and before ordering products, provide revised drawings, specification and manufacturer's guarantees as required by CA.

225 REFERENCES TO BSI DOCUMENTS are to the versions and amendments listed in the BSI Standards Catalogue current at the date of tender.

270 SIZES: Unless otherwise stated:
- Products are specified by their co-ordinating sizes.
- Cross section dimensions of timber shown on drawings are nominal sizes before any required planing.

280 FIX ONLY means all labours in unloading, handling, storing and fixing in position, including use of all plant.

290 SUPPLY AND FIX: Unless stated otherwise all items given in the schedule of work and/or on the drawings are to be supplied and fixed complete.

**TERMS USED IN REFURBISHMENT/ALTERATION**

311 REMOVE means disconnect, dismantle as necessary and remove the stated element, work or component and all associated accessories, fastenings, supports, linings and bedding materials, and dispose of unwanted materials. It does not include removing associated pipework, wiring, ductwork or other services.

321 KEEP FOR REUSE means:
- During removal prevent damage to the stated components or materials, and clean off bedding and jointing materials.
- Stack neatly, adequately protect and store until required by the Employer or for use in the Works as instructed.

331 REPLACE means:
- Remove the stated existing components, features and finishes.
- Provide and fit in lieu new components, features or finishes which, unless specified otherwise, must match those which have been removed.
- Make good as necessary.

341 REPAIR means carry out local remedial work to components, features and finishes as found in the existing building, re-secure or refix as necessary and leave in a sound and neat condition. It does not include:
- Replacement of components or parts of components.
- Redecoration.

351 MAKE GOOD means carry out local remedial work to components, features and finishes which have been disturbed by other, previous work under this Contract and leave in a sound and neat condition. It does not include.
- Replacement of components or parts of components.
- Redecoration. The meaning of the term shall not be limited by this definition where used in connection with the defects liability provisions of the Contract.

361 EASE means make minor adjustments to moving parts of the stated component to achieve good fit in both open and closed positions and ensure free movement in relation to fixed surrounds. Make good as necessary.

371 TO MATCH EXISTING means use products, materials and methods to match closely all visual characteristics and features of the existing work, with joints between existing and new work as inconspicuous as possible, all to approval of appearance.

**DOCUMENTS PROVIDED ON BEHALF OF EMPLOYER**

440 DIMENSIONS: The accuracy of dimensions scaled from the drawings is not guaranteed. Obtain from the CA any dimensions required but not given in figures on the drawings nor calculable from figures on the drawings.

**DOCUMENTS PROVIDED BY CONTRACTOR**

711 TECHNICAL LITERATURE: The Contractor is required to keep copies of the following on site, readily accessible for reference by all supervisory personnel:

- Manufacturers' current technical literature relating to all products to be used in the Works.
- Those parts of BS 8000 'Workmanship on Building Sites' which are invoked in the specification.

720 MAINTENANCE INSTRUCTIONS AND GUARANTEES:
Retain copies delivered with components and equipment (failing which, obtain), register with manufacturer as necessary and hand over to CA on or before Practical Completion.

## A32 MANAGEMENT OF THE WORKS

120 INSURANCE: Before starting work on site submit documentary evidence and/or policies and receipts for the insurance required by the Conditions of Contract.

130 INSURANCE CLAIMS: If any event occurs which may give rise to any claim or proceeding in respect of loss or damage to the Works or injury or damage to persons or property arising out of the Works, forthwith give notice in writing to the Employer, the CA and the Insurers. Indemnify the Employer against any loss which may be caused by failure to give such notice.

140 INSURANCE: Note that terrorism cover is to be specifically excluded from insurance relating to this project.

212 PROGRAMME:

- As soon as possible and before starting work on site prepare in an approved form a programme for the Works, which must make allowance for all:
- Planning and mobilisation by the Contractor
- Subcontractor's work
- Work resulting from instructions issued in regard to the expenditure of provisional sums
- Work by others concurrent with the Contract
- Submit two copies to the CA.

261 PROJECT TEAM MEETINGS:

- The CA will hold periodic project team meetings to review progress and other matters.
- The meetings will take place in the Abbey offices.
- The CA will chair the meetings and take and distribute minutes.

290 NOTICE OF COMPLETION: Give CA at least one month's notice of the anticipated dates of Practical Completion of the whole or parts of the Works.

420 EXISTING WORK: The extent and location of renewal of existing work must be agreed, at least on a provisional basis, with the CA before the work is started. Remove existing work in ways which will reasonably minimise the amount of removal and renewal.

430 ESTIMATED COST OF VARIATIONS: If the CA issues details of a proposed instruction with a request for an estimate of cost, submit such an estimate without delay and in any case within seven days.

## A33 QUALITY STANDARDS/CONTROL

MATERIALS AND WORK GENERALLY

110 GOOD PRACTICE: Where and to the extent that materials, products and workmanship are not fully detailed or specified they are to be:
- Of a standard appropriate to the Works and suitable for the functions stated in or reasonably to be inferred from the project documents, and
- In accordance with good building practice.

121 GENERAL QUALITY OF PRODUCTS:
- Products to be new unless otherwise specified.
- For products specified to a British or European Standard obtain certificates of compliance from manufacturers when requested.
- Where a choice of manufacturer or source is allowed for any particular product, the whole quantity required must be of the same type, manufacture and/or source unless otherwise approved. Produce written evidence of sources of supply when requested.
- Ensure that the whole quantity of each product required is of consistent kind, size, quality and overall appearance.
- Where consistency of appearance is desirable ensure consistency of supply from the same source. Do not use different colour batches where they can be seen together.
- If products are prone to deterioration or have a limited shelf life, order in suitable quantities to a programme and use in appropriate sequence. Do not use if there are any signs of deterioration, setting or other unsatisfactory condition.

131 PROPRIETARY PRODUCTS:
- Handle, store, prepare and use or fix each product in accordance with its manufacturer's current printed or written recommendations. Inform CA if these conflict with any other specified requirement. Submit copies when requested.
- The tender will be deemed to be based on the products specified and recommendations on their use given in the manufacturers' literature current at the date of tender.
- Where British Board of Agrèment certified products are used, comply with the limitations, recommendations and requirements of the relevant valid certificates.

141 CHECKING COMPLIANCE OF PRODUCTS: Check all documentation and the products themselves to ensure compliance with the project documents. Where different types of any product are specified, check to ensure that the correct type is being used in each location. In particular, check that:

- The sources, types, qualities, finishes and colours are correct, and match any approved samples.
- All accessories and fixings which should be supplied with the products have been supplied.
- Sizes are correct. Where tolerances are critical, measure a sufficient quantity to ensure compliance.
- The delivered quantities are correct, to ensure that shortages do not cause delays in the work.
- The products are clean, undamaged and in good condition.
- Products which have a limited shelf life are not out of date.

151 PROTECTION OF PRODUCTS:
- Prevent over-stressing, distortion and other damage.
- Keep clean and free from contamination. Prevent staining, chipping, scratching or other disfigurement, particularly of products exposed to
  view in the finished work.
  Keep dry to prevent premature setting, moisture movement and similar defects. Where appropriate store off the ground and allow free air movement between stored products.
- Prevent excessively high or low temperatures and rapid changes of temperature in the products.
- Protect adequately from rain, damp, frost, sun and other elements as appropriate. Ensure that products are at a suitable temperature and moisture content at time of use.
- Ensure that sheds and covers are of ample size, in good weatherproof condition and well secured.
- Keep different types and grades of products separately and adequately identified.
- Keep products in their original wrappings, packings or containers until immediately before they are used. Wherever possible retain protective wrappings after fixing and until shortly before Practical Completion.
- Ensure that protective measures are fully compatible with and not prejudicial to the products/materials.

161 SUITABILITY OF RELATED WORK AND CONDITIONS: Provide all trades with necessary details of related types of work. Before starting each type of work, ensure that:
- Previous work is appropriately complete, in accordance with the project documents, to a suitable standard and in a suitable condition to receive the new work.
- All necessary preparatory work has been carried out, including provision for services, openings, supports, fixings, damp proofing, priming and sealing.
- The environmental conditions are suitable, particularly that the building is suitably weathertight.

171 GENERAL QUALITY OF WORKMANSHIP:
- Operatives must be appropriately skilled and experienced for the type and quality of work.
- Take all necessary precautions to prevent damage to the work from frost, rain and other hazards.
- Inspect components and products carefully before fixing or using and reject any which are defective.
- Fix or lay securely, accurately and in alignment.

- Where not specified otherwise, select fixing and jointing methods and types, sizes and spacings of fastenings in compliance with the relevant specification section.
- Provide suitable packings at screwed and bolted fixings to take up tolerances and prevent distortion. Do not overtighten.
- Adjust location and fixing of components and products so that joints which are open to view are even and regular.
- Ensure that all moving parts operate properly and freely. Do not cut, grind or plane prefinished components and products to remedy binding or poor fit without approval.

181 BS 8000: BASIC WORKMANSHIP:
- Where BS 8000 gives recommendations on working methods, compliance will be deemed to be a matter of industry good practice and not a requirement of the CA.
- If there is any conflict or discrepancy between the recommendations of BS 8000 on the one hand and the project documents on the other, the latter will prevail.

191 WATER FOR THE WORKS: If other than mains supply is proposed provide evidence of suitability.

**SAMPLES/APPROVALS**

211 SAMPLES: Where approval of a product is specified the requirement for approval relates to a sample of the product and not to the product as used in the Works. Submit a sample or other evidence of suitability. Do not confirm orders or use the product until approval of the sample has been obtained. Retain approved sample in good, clean condition on site. Ensure that the product used in the Works matches the approved sample.

230 APPROVALS: Where and to the extent that products or work are specified to be approved or the CA instructs or requires that they are to be approved, the same must be supplied and executed to comply with all other requirements and in respect of the stated or implied characteristics either:
- To the express approval of the CA or
- To match a sample expressly approved by the CA as a standard for the purpose.

**ACCURACY/SETTING OUT GENERALLY**

341 APPEARANCE AND FIT:
- Arrange the setting out, erection, juxtaposition of components and application of finishes to ensure satisfactory fit at junctions, no practically or visually unacceptable changes in plane, line or level and a true, regular finished appearance.
- Wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve obtain approval of proposals or of the appearance of the relevant aspects of the partially finished work as early as possible.

**SUPERVISION/INSPECTION/DEFECTIVE WORK**

550 DEFECTS IN EXISTING CONSTRUCTION to be reported to CA without delay. Obtain instructions before proceeding with work which may:
- Cover up or otherwise hinder access to the defective construction, or
- Be rendered abortive by the carrying out of remedial work.

560 TIMING OF TESTS AND INSPECTIONS: Agree dates and times of tests and inspections with CA several days in advance, to enable the CA and other affected parties to be present. On the previous working day to each such test or inspection confirm that the work or sample in question will be ready or, if not ready, agree a new date and time.

570 PROPOSALS FOR RECTIFICATION OF DEFECTIVE WORK/PRODUCTS:
- As soon as possible after any part(s) of the work or any products are known to be not in accordance with the Contract, or appear that they may not be in accordance, submit proposals to CA for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.
- Such proposals may be unacceptable to the CA, and he may issue contrary instructions.

**WORK AT OR AFTER COMPLETION**

611 GENERALLY:
- Make good all damage consequent upon the work.
- Remove all temporary markings and protective coverings.
- Clean the works thoroughly inside and out including all accessible ducts and voids, remove all splashes, deposits, effluorescence, rubbish and surplus materials.
- Cleaning materials and methods to be as recommended by manufacturers of products being cleaned, and to be such that there is no damage or disfigurement to other materials.
- Obtain COSHH dated data sheets for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
- Touch up minor faults in newly painted/repainted work, carefully matching colour. Repaint badly marked areas back to suitable breaks or junctions.
- Adjust, ease and lubricate moving parts as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances, valves and controls.

640 SECURITY AT COMPLETION: Leave the Works secure with all accesses locked. Account for and adequately label all keys and hand over to Employer with itemised schedule, retaining duplicate schedule signed by Employer as a receipt.

650 MAKING GOOD DEFECTS: Make arrangements with the employer and give reasonable notice of the precise dates for access to the various parts of the Works for purposes of making good defects. Inform CA when remedial works to the various parts of the Works are completed.

## A34 SECURITY/SAFETY/PROTECTION

**GENERALLY**

114 CONSTRUCTION HAZARDS: Commonplace hazards should be controlled by good management and good site practices.

125 HSE APPROVED CODES OF PRACTICE: Comply with the following:
- Management of health and safety at work.
- Managing construction for health and safety.

130 SECURITY: Adequately safeguard the site, the Works, products, materials, plant, and any existing buildings affected by the Works from damage and theft. Take all reasonable precautions to prevent unauthorised access to the site, the Works and adjoining property.

140 STABILITY: Accept responsibility for the stability and structural integrity of the Works during the Contract, and support as necessary. Prevent overloading: details of design loads may be obtained from CA.

150 OCCUPIED PREMISES:
- The church building will be occupied and used during the Contract.
- Carry out the Works without undue inconvenience and nuisance and without danger to occupants and users.

170 EMPLOYER'S REPRESENTATIVES SITE VISITS:
Inform the CA in advance of all safety provisions and procedures (including those relating to materials which may be deleterious) which will require the compliance of the Employer or their representatives when visiting the site. Provide protective clothing and/or equipment for the Employer and their representatives as appropriate.

**PROTECT AGAINST THE FOLLOWING:**

221 NOISE:
- Comply generally with BS 5228.
- Noise levels from the works are to be kept below 85 dB(A) when measured from occupied areas of the church building or adjacent premises.
- Fit all compressors, percussion tools and vehicles with effective silencers of a type recommended by manufacturers of the compressors, tools or vehicles.
- Do not use or permit employees to use radios or other audio equipment in ways or at times which may cause nuisance.

231 POLLUTION: Take all reasonable precautions to prevent pollution of the site, the Works and the general environment including streams and waterways. Note specific requirements for the containment of dust within the working area, and fort the protection of the workforce during dust-creating works.

240 NUISANCE: Take all necessary precautions to prevent nuisance from smoke, dust, rubbish, vermin and other causes.

260 FIRE: Take all necessary precautions to prevent personal injury, death, and damage to the Works or other property from fire. Comply with Joint Code of Practice 'Fire Prevention on Construction Sites' published by the Building Employers Confederation, the Loss Prevention Council and the National Contractors' Group.

263 FIRE: Smoking will not be permitted on the site.

280 MOISTURE: Prevent the work from becoming wet or damp where this may cause damage. Dry out the Works thoroughly. Control the drying out and humidity of the Works and the application of heat to prevent:
- Blistering and failure of adhesion.

- Damage due to trapped moisture.
- Excessive movement.

285 INFECTED TIMBER: Where instructed to remove timber affected by fungal/insect attack from the building, do so in a way which will minimise the risk of infecting other parts of the building.

290 WASTE:
- Remove rubbish, debris, surplus material and spoil regularly and keep the site and Works clean and tidy.
- Remove all rubbish, dirt and residues from voids and cavities in the construction before closing in.
- Ensure that non-hazardous material is disposed of at a tip approved by a Waste Regulation Authority.
- Remove all surplus hazardous materials and their containers regularly for disposal off site in a safe and competent manner as approved by a Waste Regulation Authority and in accordance with relevant regulations.
- Retain waste transfer documentation on site.

**PROTECT THE FOLLOWING:**

410 WORK IN ALL SECTIONS: Adequately protect all types of work and all parts of the Works, including work carried out by others, throughout the Contract. Wherever work is of an especially vulnerable nature or is exposed to abnormal risks provide special protection to ensure that damage does not occur.

420 PIPE ORGAN: Particular attention must be paid to preventing dust from reaching the Abbey's pipe organ. Work with the Abbey's organ specialist to shroud the instrument in a dust-proof enclosure , whilst allowing the organ to remain playable.

430 ROADS AND FOOTPATHS: Adequately maintain roads and footpaths within and adjacent to the site and keep clear of mud and debris. Any damage to roads and footpaths caused by site traffic or otherwise consequent upon the Works must be made good to the satisfaction of the Local Authority or other owner. Bear any costs arising.

440 SITE SET UP: The extent and layout of the site set-up and the scaffolding will be subject to detailed discussion before commencement. Refer to drawings for indicative layout.

450 EXISTING FEATURES: Prevent damage to existing buildings, fences, gates, walls, roads, paved areas and other site features which are to remain in position during the execution of the Works.

460 EXISTING WORK: Prevent damage to existing property undergoing alteration or extension and make good to match existing any defects so caused. Remove existing work the minimum necessary and with care to reduce the amount of making good to a minimum.

470 EXISTING FURNITURE, FITTINGS AND EQUIPMENT: Prevent damage to any furniture, fittings or equipment left in the existing property. Move as necessary to

enable the Works to be executed, cover and protect as necessary and replace in original positions.

481 ADJOINING PROPERTY: Prevent trespass of workpeople. Take all reasonable precautions to prevent damage to adjoining property. Obtain permission as necessary from the owners if requiring to erect scaffolding on or otherwise use adjoining property, and pay all charges. Clear away and make good on completion or when directed. Bear the cost of repairing any damage arising from execution of the Work.

490 EXISTING STRUCTURES:

- Provide and maintain during the execution of the Works all incidental shoring, strutting, needling and other supports as may be necessary to preserve the stability of existing structures on the site or adjoining, that may be endangered or affected by the Works.
- Support existing structure as necessary during cutting of new openings or replacement of structural parts.
- Do not remove supports until new work is strong enough to support the existing structure. Prevent overstressing of completed work when removing supports.

## A35 SPECIFIC LIMITATIONS ON METHOD/SEQUENCE/TIMING

130 METHOD/SEQUENCE OF WORK:
To be agreed, to limit disruption to the church.

140 ACCESS TO THE SITE: See section A12.

150 USE OF THE SITE: See section A12.

155 SCAFFOLDING: Ensure that standing scaffolding is erected sufficiently early and/or dismantled sufficiently late to suit the programmes of all subcontractors. A 3.6m high hoarding will be required where scaffolding is accessible from outside. This will be required to comply with the insurance requirements of the church and to address potential the security concerns.

190 WORKING HOURS:
Assume normal working hours are permitted with the following exceptions:

The Abbey church has a daily roster of services for which quiet is required. Thus quiet working only may be permitted during the following service times:

- Morning Prayer 8.30am to 9.00am Monday, Tuesday, Wednesday and Thursday.
- Evening Prayer or Choral Evensong 5.30pm to 6.15pm every weekday.
- Holy Communion 12.00 noon to 12.30pm, on every Wednesday.

In addition allow for up to two hours or additional stoppage per month to allow for funerals of other unplanned events.

- However regular checking with the Abbey office will be required to anticipate stoppages for funerals or other unplanned events during the contract period.

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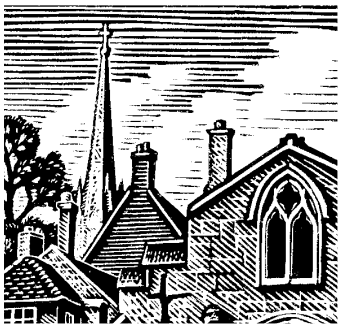

1280-07/CJK/AFK March 2025

# **BATH ABBEY, BATH**: TOWER ROOF PROJECT

## SCHEDULE OF WORKS - for approval

NB: to be read in conjunction with the drawings and preliminaries as well as Structural Engineers' drawings and specification. Drawing references: St Ann's Gate Architects drawings; 1280-07- 300, 301, 310, 311, 312, 350, 351, 352, 353, 354, 355, 356, 357, 360, 361 & 362.

| **1.00** | **PRELIMINARIES**<br><br>Refer to accompanying drawings and technical specification | Pricing (£) |
|---|---|---|
| 1.01 | CDM and BSA requirements | **£** |
| 1.02 | Insurances: refer to preliminaries | **£** |
| | **Site Set Up:** refer to site set up drawing 1280-07-301. | |
| 1.03 | Provide fenced compound with suitable welfare facilities to the north-east side of the Abbey as shown on the site set up drawing 1280-07-301. Allow for 4m solid hoarding (allow for plywood) to compound. Note: part of the compound will be located on the public pavement beside the Abbey. The contractor will be responsible for any approvals from relevant local authorities for this and or additional safety requirements i.e. pavement licence etc. The exact details are to be confirmed before the start of works. | **£** |
| 1.04 | Water and power are available onsite in agreement with client if required. Make suitable allowance. | **£** |
| 1.05 | Site supervision: Working site foreman to be on site at all times. | **£** |
| | **Protection & Enabling Works** | |
| 1.06 | Window Protection:<br>• Allow for protection to all windows effected by scaffolding access on to Tower Roof. Protection to be translucent Correx sheeting (thickness to suit) on a soft wood timber frame wedged to fit openings or equal approved. | **£** |

| | | |
|---|---|---|
| 1.07 | Protection to belfry/bells:<br>• Allow for adequate protection to belfry/bells below Tower roof during any opening up of roof boardings for inspection: refer to clause 2.02 below. The exact nature of this is to be agreed before the start of the works but for pricing allow for temporary plastic sheeting. | **£** |
| 1.08 | Lightning Protection to Tower Roof:<br>• Allow for the temporary removal/alteration of existing lightning protection to Tower roof to enable works to be carried out, allowing for temporary protection during works.<br>• After completion of the works reinstate lightening protection to Tower roof to suit new roof coverings, mesh decking, balustrade guarding and bench. Provide updated test certification. | **£** |
| | **Scaffolding:** refer to specification and relevant drawings including site set up drawings 1280-07-301. | |
| 1.09 | General requirements:<br>• Allow for external access scaffolding on to the Tower roof of the Abbey suitable for work including any crane, lift, hoists and stairs etc.<br>• The ascending lifts should give access to the Abbey's existing fire-fighting dry riser pipework, which is to be removed as part of this project. Thus boarded lifts are required adjacent to the dry riser.<br>• The exact design and arrangement of the scaffolding is to be agreed before the start of the works with the architect and to be approved by the structural engineer. This will include a full set of design drawings and any necessary calculations required by the structural engineer.<br>• The scaffolding is to comply with current Health and Safety requirements, providing adequate, safe and secure access to Tower roof: refer to specification section B10. If fixings are required into the building fabric; the location and type must be discussed and approved by the architect. Any fixings to be into stone jointing NOT into the stone.<br>• A basement chamber is located in the location where the scaffolding is to be erected at ground level – between the north Transept and Choir. The scaffolding is not to bear on to this chamber and if necessary is to bridge over it. Access on to scaffolding is to be carefully controlled and any ladders at ground level removed when not in use and if kept on site secured. Scaffolding to be fully netted.<br>• Note: care is to be taken during the erection and dismantling of the scaffolding to avoid damage to the fabric of the Abbey. Venerable parts of the fabric (pinnacles/tracery etc) must be fully protected if contained within scaffolding: refer to section 1.06 above for window protection. Note: the flag pole to the Tower roof has eight | **£** |

| | | |
|---|---|---|
| | wire stays, these will need to be protected during erection and dismantling of scaffolding and works.<br>• Refer to specification and drawings. | |
| **2.00** | **WORKS**<br>*Refer to accompanying drawings and technical specification* | Pricing (£) |
| | **Removal of lead flat roof coverings to the tower roof.** | |
| 2.01 | General requirements:<br>• Allow for the careful removal of all the existing lead flat roof coverings to the tower roof as shown on drawing 1280-07-310. This is to include gutter linings, sump outlets, cover flashing and timber batten rolls etc.<br>• The removal of the existing lead works is to be done in agreed sequences with the architect and structural engineer to allow for opening up of roof boards and inspection of supporting roof timbers: see section 2.02 below.<br>• Existing Oak roof boards to be retained: ensure they are firmly fixed down.<br>• Note: the works do not include the removal of any of the pitched and flat lead coverings to **Weights Cabin** situated in the north east corner of the roof. For information on the works to the Weights Cabin refer to section 2.06 below.<br><br>Allow Provisional Sum of £500.00 for replacement of any damaged oak boards (exact size to be confirmed onsite). | **£**<br><br>**PS £500.00** |
| | **Structural repairs to roof beams and or joists to the tower roof.** | |
| 2.02 | General requirements:<br>• In coordination with the removal of the lead covering above allow for the opening up of roof boarding as indicated on the structural engineers' drawings to allow for the inspection of roof beams and joists below and or their repair/replacement. Refix roof boarding after inspection works. Replace any damaged Oak roof boards: see section 2.01 above.<br><br>Allow Provisional Sum of £5,000.00 for any unknow timber repairs to joist and or beams. | **£**<br><br>**PS £5000.00** |
| | **Flag pole base** | |
| 2.03 | General requirements:<br>• The flag pole base is to have the circular GRP dome weathering removed and the localised timber offset upstand removed so that the line of the surrounding roof boarding will then be extended to the flagpole to match the rest of the roof: allow for new oak boards to match: refer to drawing 1208-07-352. | **£** |

| | | |
|---|---|---|
| | **Seating base fixings** | |
| 2.04 | General requirements:<br>• Allow for the creation of solid softwood timber upstand fixing points for proposed bench seating before laying of new roof coverings: refer to drawing 1208-07-355, 356 & 357. Spec Ref: G20/30C & J42/15. To be coordinated with new circular benching clause 2.09 below. | **£** |
| | **Plywood sub-base covering** | |
| 2.05 | Allow for the supply and fixing:<br>• Following completion of all above works allow for the supply and fixing of 18mm external grade plywood (spec Ref G20/20) coverings over the existing oak boarding, upstand, guttering, sump outlets etc, to provide suitable subbase for new EPDM coverings. All fixings to be stainless steel. Refer to drawings and specification. | **£** |
| 2.06 | **Weights Cabin** | |
| | The works to the Weights Cabin is to consist of:<br>• Inspection and repair as required existing lead coverings to Weight Cabin: exact detail to be agreed with architect onsite.<br>• Allow for new Code 5 lead cover flashings using existing chase with new lime based mortar to match existing.<br>• Allow for any adjustment to length of lead coverings at base with new EPDM upstand detail including plywood: to include and new lead flashing if required. specification reference H71/35.<br>• To include repair and redecoration of small timber hatch opening including metal ironmongery.<br>• Ensure lightening protection reinstalled to leadwork after works. | **£** |
| 2.07 | **New EPDM Roof Coverings** | |
| | Allow for the supply and fixing of:<br>• 1.5mm fully bounded RubberGard EDPM single ply roofing membrane with protective geotextile membrane. To be fitted to all flat roof areas including, gutters, outlet and up-stands, flagpole etc all as per manufacturers details and recommendation: to give minimum 20-year warranty. Specification reference J42/15. <u>Note: no insulation required.</u><br>• To include for new code 5 lead cover flashing's to all masonry up-stands and abutments including weights cabinet using existing chases with new lime base mortar to match existing: specification reference H71/35. | **£** |

| | | |
|---|---|---|
| 2.08 | **Glass Reinforced Polyester (GRP) Non-Slip Grating Walkway** | |
| | Allow for the supply and fitting new raised walkway:<br>• To consist of Glass Fibre-Reinforced (GRP) moulded open mesh gratings with anti-slip gritted surface fitted on top of adjustable supporting system suitable for application and which allows free drainage beneath. Specification reference L30/460.<br>• To be carefully cut around flag pole and new benching with stainless steel trims as required: flagpole trim to be circular.<br>• To consist of one main level at +64.10 but also lower level +63.93 access from access tower. This level is to have single 170mm step up to main level with high-visibility anti slip nosing and LED down lighting: refer to drawing 1207-08-362.<br>• Exact layout and design of walkway to be agreed before installation with architect. | **£** |
| 2.09 | **New Circular benching:** | |
| | Allow for supply and fixing of:<br>• Circular external timber bench in two parts, to be fitted around existing flagpole. To be constructed of heat treated Acoya timber seating in shaped segments fitted on top of supporting galvanized metal frame and legs. To have LED downlighting. Refer to specification clause N10/25A and detailed drawings 1280-07-355, 356 & 357.<br><br>Allow £200.00 for commemorative brass plaque to seating. | **£**<br><br>**PS £200.00** |
| 2.10 | **Guarding to parapet openings** | |
| | Allow for the supply and fitting:<br>• Stainless-steel mesh guarding to be fitted to all lower level tracery openings and to all four sides of Tower roof parapet: eight separate lengths. To be stainless steel rope mesh fitted to stainless steel tubular frame with supporting brackets securely screwed to masonry. Refer to specification section L37/100A and drawing 1280-07-360. | **£** |
| 2.11 | **Stone Repointing:** | |
| | General requirements:<br>• Allow for the repointing with NHL 3.5 lime based mortar (to match existing mortar) of the masonry above new roofing up to and including the coping stones to the parapet. Existing pointing to be removed to a depth of around 25mm depending on size of joint.<br>**Allow Provisional Sum of £500.00 for additional pointing to be agreed on site.** | **PS £500.00** |

| | | |
|---|---|---|
| 2.12 | **External Door** | |
| | Allow for repair a redecoration of existing timber door from access turret including ironmongery: specification reference M60. | **£** |
| 2.13 | **Proposed Electrical Work:** | |
| | Allow for the supply and fixing of:<br>• 1x external quality double power socket (IP66 rated). To be fitted at low level and include any wiring and or extension /adapting to existing services. Assumed existing power is adequate.<br>• External quality LED down-lighting to step change in raise walkway and to proposed circular bench. To including wiring and switch (external grade).<br>• All to be designed to work from existing electrical supply to tower and Belfry below Tower roof. .<br>All wiring to be suited to environment and 'armoured' as required and or contained within conduit. Note: assume existing system electrical system is capable of taking new<br><br>Provisional Sum for potential additional works to existing electrical supply to Tower roof if required. **PS £1000.00** | **£**<br><br>**PS £1000.00** |
| 2.14 | **Removal of redundant Fire Hydrant pipework (dry riser)** | |
| | Removal of external redundant fire hydrant pipework at ground level between North Transept and Choir (accessible from scaffold) and at Chancel roof level. Exact details and extent of work to be agreed onsite after erection of scaffolding. Including making good to stonework. Allow for provisional sum **£2,500.00.** | **PS £2500.00** |
| | | |
| **3.00** | **On completion** | |
| 3.01 | Strike scaffolding, remove all temporary protection and clear site of all dust and debris. Make good any defects caused during the works. Ensure all rainwater goods and outlets are running clear in work area. Return any keys or passes to client and leave site secure. Carefully clean stain glass windows and Belfry (where accessible). Note: for lightning protection refer to section 108 above. | **£** |
| 3.02 | Provide all necessary health and safety and building manual documentation to the client and architect. | **£** |
| | | |

| | | |
|---|---|---|
| **4.00** | **Work Costs** | |
| 4.01 | Contingency: allow £5,000.00 (exclusive of VAT) | **£ 5,000.00** |
| 4.02 | **TOTAL COSTS FOR WORKS (exclusive of VAT) =** | **£ .00** |
| 4.03 | VAT (show separately) | **£ .00** |
| **4.05** | **GROSS TOTAL =** | **£ .00** |

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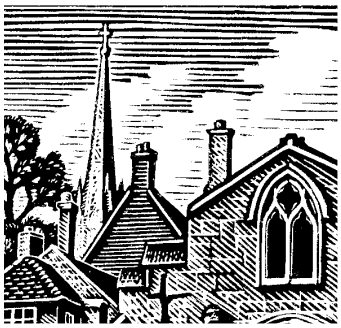

1280-07/CJK/AFK

March 17th 2025

# **BATH ABBEY, BATH**: TOWER ROOF PROJECT

## **SPECIFICATION – for approval**

NB: to be read in conjunction with the drawings and preliminaries as well as Structural Engineers' drawings and specification. Drawing references: St Ann's Gate Architects drawings; 1280-07- 300, 301, 310, 311, 312, 350, 351, 352, 353, 354, 355, 356, 357, 360, 361 & 362.

### B10 SCAFFOLDING: To Tower Roof

10 GENERALLY:

- The scaffolding is to provide access on to the Tower roof of the Abbey from ground level for both materials and personal. The exact design and arrangement of the scaffolding is to be agreed before the start of the works with the architect and to be approved by the structural engineer. This will require a full set of drawings of the proposed scaffolding layout and any necessary calculations required by the structural engineer.
- The scaffolding is to comply with current British Standard and/or be in accordance with current Health and Safety Executive regulations and guidance providing adequate, safe and secure access to the Tower Roof. If fixings are required into the building fabric the location and type must be discussed and approved by the architect. Any fixings to be into stone jointing NOT into the stone, if pull out test results confirm this is possible.
- External scaffolding at ground level is to have 3.6m solid hoarding at ground level and to be fully netted and alarmed. Access on to scaffolding is to be carefully controlled and any ladders at ground level removed when not in use and if kept on site, secured.
- Note: care is to be taken during the erection and dismantling of the scaffolding to avoid damage to the fabric of the Abbey church building.
- Refer to specification and drawings.

20 METAL SCAFFOLDING
To comply with BS 1139. All scaffolding to be hot dipped galvanised.

30 TIMBER SCAFFOLD BOARDS
To comply with BS 2428.

40 TELESCOPIC PROPS AND STRUTS: to BS 4074.

50 LADDERS
To comply with BS 1129 and BS 2037.

60 SOFTWOOD BOARDS
To be stress graded to BS 4978: Obtain certificates and use in accordance with BS 5268.

70 PRESERVATIVE
Timber preservative treatment to British Wood Preserving Association Standards Nos. 112-116.

80 TIMBER SIZING
All sizing to comply with BS 4471 Part 1 1978.

90 PLYWOOD SHEETING
To be exterior quality 19mm thick, to comply with BS 6566.

100 STRUCTURAL STEELWORK
Sizes and properties to comply with BS 4 Part 1 1972 and Bs 4848 Part 2 1975.

110 COUPLERS AND FITTINGS
To be drop-forged to comply with the relevant British Standard.

120 SCAFFOLDS
Erect and maintain and inspect to BS 5973 & BS 5974 and all statutory regulations.

130 FALSEWORK: erect and maintain to BS 5975 and all statutory regulations.

160 SAFETY NETTING
To comply with BS 3913.

170 DEBRIS NETTING
Wrap knitted high density polyethylene monofilament yarn 100-100gms reinforced with eyeletted strips at 1m intervals.

175 PLASTIC SCAFFOLD SHEETING
- Monoflex Super T Plus or equal approved fixed in accordance with BS 5973 & BS 5974.

190 CORRUGATED STEEL ROOF SHEETS: To comply with BS 3083.

200 NON STRUCTURAL TIMBER
Timber for non-structural use to be Softwood graded to minimum stress grade.

**WORKMANSHIP**

**GENERALLY**

210 ERECTION AND DISMANTLING OF SCAFFOLDING
Scaffolds and falseworks are to be erected and dismantled in accordance with all relevant sections of British Standards including BS 5973: 1990 and in accordance with current H & SE regulations.

Particular care must be taken when erecting and dismantling scaffolding in close proximity to windows and vulnerable parts of the fabric of the Abbey which must be protected at all times. All to be agreed prior to start of works with CA

220 ACCEPTANCE: of the scaffold does not relieve the contractor of his responsibility to provide a safe and secure structure and to maintain it in such condition throughout the contract.

230 METHOD STATEMENTS:
The detail design and extent of the scaffold is to be agreed with CA before commencement on site.
The responsibility for the designs and calculations rests with the scaffolding contractor.

240 PLATFORM LOADINGS
Design scaffolds to carry loads at least as great as those tabulated below:

| PLATFORM | LOADING |
|---|---|
| Inspection, painting, decorating and access | 0.75kN / m² |
| General roof work. | 2.0kN / m² |
| Roof tile and general storage. | 3.0kN / m² |

250 LOADINGS TO EXISTING STRUCTURE
Loads from all temporary structures are only to be transmitted to the existing building at specific points agreed with the CA and structural engineer including extension of scaffold to provide temporary roof if proposed. Likewise, any proposals for horizontal restraint from uplift and lateral forces are to be previously agreed with the CA and structural engineer.

260 FOUNDATION LOADING
The sub-contractor is to satisfy the structural engineer that the permissible ground bearing pressure will not be exceeded under any combination of design loading.

270 FALSEWORK LOADS
They shall be designed to sustain all vertical and horizontal loads applied. Refer to British Standards as necessary.

280 WIND LOADING
To be calculated in accordance with BS 5973 Section 6.

290 SNOW LOADS
Snow loads to be applied as appropriate to BS 6399 Part 3.

**SAFETY & SECURITY**

300 INSPECTIONS
The following inspections will be required:

Materials to be inspected before use.
Scaffold before it can be used by others.
Scaffold for handover certificates.
Scaffold - weekly - visual check.
Lighting - weekly - check all light fittings.
Scaffold - 6 monthly - mechanical check.
Scaffold after bad or excessively dry weather or particularly high winds.
Inspections must be carried out by a competent person and the results (including faults found) must be recorded.

310 PROTECTION

External scaffolding is to have solid hoarding 3.6m high at ground level, be fully netted and alarmed. This is to help prevent unauthorised access onto the scaffolding. Where the scaffold is in close proximity to windows or vulnerable parts of the external fabric of the Abbey they are to be protected by boarding.
Adequate precautions are to be taken to protect both workmen, members of the public and from falling debris.
Temporary signage if required.

320 LOOSE ITEMS

To be removed from the scaffold as work proceeds. No spare fittings, poles or boards are to be left above ground level accept in gantry storage areas.

330 COMPONENTS

Components to be transferred by hand, pulley or joist. NO dropping or throwing upwards of fittings will be permitted.

340 SECURITY

Scaffolding is to have solid hoarding 3.6m high and fully netted as described in section B10 above. This is to prevent unauthorised access onto the scaffolding.
Remove ladders at end of day and secure.

350 SIGNAGE

Clear access should be maintained at all times. Warning notices and safety rails will be used to prohibit entry to incomplete parts of the scaffold structure.

360 USE BY OTHERS

Allow sub-contractors and others employed directly by the client free use of the scaffolds and falseworks. They are also to ensure that all users of the scaffold and falseworks are aware of the maximum design loads.

**DESIGN**

370 DESIGN GENERALLY:

The design of scaffolding to a listed building requires special attention and consideration, particularly on the method of attachment.
Method of fixing must be agreed by the CA prior to commencing the work. Note: fixing into jointing not masonry. Provide details of loadings to CA and structural engineer.

380 THE MAIN CONTRACTOR'S DESIGN RESPONSIBILITIES:
The main contractor and scaffolding sub-contractor are to ensure that their scaffolding design takes into account all relevant standards and regulations, and the requirements of statutory bodies and the Employer.
In addition, the design is to take into account the following considerations:
Programming aspects.
Safety of the public and users of Abbey church.
Prevent dust and debris entering the interior of the church
Security against unauthorised entry and wilful damage.

390 CLEARANCES
Minimum clearances of 300mm shall be given to all elements. Elsewhere vertical clearances of 600mm to all pitched roof ridges.

**FOUNDATIONS**

400 BASES
The contractor is to satisfy himself and the structure engineer and CA that the permissible bearing pressure of the ground or structure below falsework or scaffold structures is not exceeded. Where falsework or scaffolding is founded on soil, railway sleepers or similar sized treated timbers are to be used as sole plates, set on an even, level bed. Support standards at ground level must be kept to an absolute minimum to reduce the possibility of archaeological disturbance. No loads to be transferred to the existing structure. All to be approved by structural engineer before erection.

410 METAL BASEPLATES
Where a foundation is levelled concrete or other masonry of adequate thickness and loadbearing ability, agreed by structural engineer, a metal baseplate may be used rather than a timber sole plate.

**ERECTION GENERALLY**

420 STANDARDS
Tubes should be straight and the ends square. Alloy and steel tubes will not be mixed unless specifically designed and approved. Joints in adjacent standards should be staggered and made with an expanding spigot pin only where no uplift or tension occurs and with a sleeve coupler where the tension is less than 317 kg. For joints where the tension exceeds this figure, a suitable lap tube and parallel fittings should be used. There is to be a baseplate under every standard. Distances between standards should not exceed 1.8 metres for 3 kN/m² B10/230.

430 LEDGERS
Ledgers are to be max at 2.0m spacing on independent tied scaffolds. Ledgers should be secured to the standards with right angle couplers. Joints in ledgers may be made with sleeve couplers. Joints should be arranged CA that in adjacent lifts they do not occur in the same bay.

440 BRACING
Braces should be fixed as close as possible to the nodes. Ledger bracing should generally be on alternate pairs of standards within 300mm of the node. Ledger bracing

from the inside ledger to the guard rail level of the lift below may be used provided that every pair of standards is CA braced instead of every alternate pair.

450 TOE BOARDS

Toe boards and end toe boards or other barriers should be installed up to a sufficient height to prevent materials and tools falling off the platform and must be fixed to all working platforms. When toe boards are used, they should be placed inside the standards, be fixed to prevent movement and be of a minimum height of 150mm. The gap between the top of the toe board and the guard rail should not exceed 760mm. To accommodate the access of persons or the movement of materials, toe boards and guard rails may be removed but they must be replaced as soon as practicable.

460 FANS

Access ways and working platforms need to have protection fans erected to prevent injury from materials falling on to persons passing adjacent to or beneath the scaffold. Fans should be designed if they extend more than 2m (6ft 6in) beyond the face of the scaffold. Fans should not be used as working platforms or storage areas.

Fans are to be double boarded with sandwiched tarpaulin in accordance with the relevant Code of Practice, and as defined in "SCAFFOLD DESIGN".

470 BOARDING

Where a person is liable to fall a distance of more than 2m from platforms, gangways and runs, the width should be a minimum of 6 boards for working platforms and a minimum of 3 boards for access only but it may be preferable for smaller spans to be used if greater loads are expected.

Boards should butt and not overhang their end supports by more than 150mm. The inside gap near a wall should be as small as practicable, but a 300mm gap is permitted if a man is to work sitting at the edge.

Each board should be supported with maximum spans as shown below. The end overhang should not be less than 50mm (2 in) nor more than four times the board thickness unless effective steps are taken to prevent tipping. Where ends of boards meet they should be butted closely together. At corners, boards should preferably be butted and not overlapped CA as to obviate tripping hazards. Boards to be mechanically secured against uplift due to wind forces with clips fitted to every lift of the scaffold.

| Nominal thickness of board | | Max. span between board bearers | |
|---|---|---|---|
| 32 | (1.25 in) | 1.0 | (3 ft 3 in) |
| 38 | (1.5 in) | 1.5 | (5 ft) |
| 50 | (2 in) | 2.6 | (8 ft 6 in) |
| 63 | (2.5 in) | 3.2 | (10 ft 6 in) |

Table: Maximum spans of scaffold boards single planking.

480 GUARD RAILS

Scaffold platforms from which a person may fall more than 2.0m should have a guard rail and end guard rails fixed inside the standards at a height of between 910mm and 1,150mm above the level of the decking and any raised part of it.

If the gap between the bottom of the guard rail and the top of the toe board is greater than 750mm a second lower guard rail or higher toe board is required.

Brick guards or other suitable vertical protection should be provided where materials may fall from the scaffold in addition to the debris netting. These screens can be hung from the guard rails and should be secured to prevent outward movement.

**TEMPORARY ROOFS / NETTING**

510 DEBRIS NETTING

Tarpaulin sheets anti-debris sheets and hoarding, etc must not be fixed to a scaffold unless the scaffold has been specially designed for them.

**FIXINGS**

520 MODIFICATIONS

All modifications to existing scaffolds should be carried out in such a way that stability is not impaired. As a general rule, supplementary components should be added before those which are to be removed are uncoupled and taken away. Work should only be undertaken by a competent scaffolder. Loose material should not be stored on the scaffold but should be lowered or handed down to the ground.

If a guard rail has to be removed to allow movement of materials, it should be replaced at the earliest possible moment. Similarly, whenever an access ladder is moved, the gap should be closed at once by extending the existing guard rails and toe boards.

530 MATERIAL CHANGES

Obtain permission of the CA to modify the use and / or design of any existing scaffold or falsework. The contractor shall conduct such checks as necessary to prove the adapted structure is adequate for the intended purpose.

540 POINTS OF CONTACT AND TIES

All points of contact between scaffolding and falsework and the permanent works to be agreed with the CA. Cause no damage to adjacent fabric. All horizontal tube ends touching, or within 25mm of the face of the permanent work are to be fitted with plastic caps. All bracing against existing building to be via spreaders and polyethylene foam protection.

The ties which are provided should restrain the scaffold and assist the standards to act as load carrying vertical members.

Ties are to be installed at a minimum rate of 1 / 25m². Spacing should not exceed 8.5m vertically or horizontally. All ties should be spaced evenly over the face of the building and connections should be made with right angle couplers. The use of buttresses is also permitted where space allows. If wire ties are used, the stability of the scaffold must be ensured by transoms that abut to the structure.

550 TYING IN

Careful consideration must be given to the tying of the scaffold structure so as to meet the performance of the structure with the minimum movable ties.

Through ties are favoured with reveal ties used where tubes cannot go through windows or opening.
Box ties will not be allowed unless specifically agreed with the CA.
Anchor ties are to be used only when agreed with CA. Masonry to be repaired after removal.

560 FIXINGS to secure temporary works may be installed in mortar joints of masonry that is to be removed and the joints made good at completion of the works with lime pointing to match existing.

**ACCESS**

570 ACCESS
On working platforms used for the deposit of materials, a clear passageway for persons at least 430mm wide should be maintained between the deposited material and one side of the working platform. For the passage of materials, the clear passageway on the working platform should be at least 600mm.

580 MOTORISED HOISTS
Where necessary, install motorised hoist to be used for raising material to working platforms. Locations of hoists to be agreed with the CA.

590 MANUAL HOISTS
The tube supporting a gin-wheel should be secured at two points with right angle couplers and braced. Lifted load should not exceed 50kg. Maximum cantilever without bracing 750mm.

**BONDING & EARTHING**

600 BONDS
Bonds shall be as short as possible and made from 50sq.mm standard copper conductor sheathed in green PVC. Connections to rods or scaffold structure are to be purpose made clamps.
Bond all extraneous building metalwork to the scaffolding including balustrades, metal roofing, rainwater pipes etc. All vertical pipes to be earthed at both top and bottom.

610 LABEL BONDS
Label each earth bond with a 'Traffolite' or similarly inscribed black plastic label with 6mm minimum white lettering 'SCAFFOLDING SAFETY EARTH".

620 MAINS ELECTRICAL EARTHING TERMINAL
Mains electrical earthing terminal to be connected into the scaffold earthing system, where applicable. Purpose made clamp to be used and 16sq mm stranded copper cable sheathed in green PVC to be used from the scaffold to the earth terminal.
Earthing of the scaffold system is to be indicated on the design drawings submitted as a method statement CA that the CA can circulate the proposals for comment. Generally, the scaffold installation is to comply with current regulations.

630 EARTH ELECTRODES

The scaffold shall be bonded at its base to existing lightning protection earth electrodes.

640 TEST RESISTANCE VALUE

- The contractor is to provide a certificate of test results completed by a competent person. Test resistance value to earth of the system in OHMS shall not exceed the product given by 10 times the number of electrodes used. The whole earth termination network shall have a combined resistance to earth NOT exceeding 10 OHMS, and excluding bonding to other metal parts of the building.

TAKING DOWN SCAFFOLDS

690 DISMANTLING

Because of the changes which may have been made in a scaffold structure during its working life, it cannot be assumed that dismantling can be carried out in the reverse order to the erection. The scaffold, especially its tying and bracing, should be inspected prior to dismantling and an appropriate dismantling sequence determined. The procedure for dismantling should be planned and should proceed generally from the top in horizontal sections. It may be necessary to fit temporary ties or rakes to ensure that the dismantling can be safely accomplished.

Before dismantling commences, notices should be erected prohibiting use except by the scaffolders. During dismantling, no component should be removed which endangers the stability of the remaining structure. Scaffolding is to be cleared of any debris or material before dismantling.

700 ANCHOR CAPS

Not allowed – allow for repointing with lime mortar to match.

## FX MATERIALS AND TECHNIQUES TO BE USED IN THE CLEANING, REPAIR AND CONSERVATION OF LIMESTONE MASONRY (if required)

**10 Conservation Cleaning Methods:**
Use a combination of the following techniques to achieve the best balance of cleaning, as agreed on site with the CA.

**20 Dry brush and vacuum**
Use a hand-held brush to loosen surface dirt and remove by vacuum.

**30 'Thermatech' hot water cleaning system**
Clean stonework surfaces using temperature control set at maximum of 150 ˚C, max pressure of 30 bars. Check that all moss, algae, lichens and superficial dirt can be removed without damaging stonework surface. May also be used to rinse off residue for other techniques.

**40 Poultice**
Clay and paper poultice with active ingredients such as ammonium carbonate or EDTA. Establish dwell time via trials.

**50 Heavy duty latex poultice**
Contains EDTA and is applied as a thick paste (2-4mm) to heavily discoloured areas. Remove by peeling away. Rinse with warm water and sponge.

**100 Removal of existing cement based pointing and previous repairs**
- All Portland cement-based re-pointing and repairs from the earlier phases are to be removed. As a general rule all cement removal to be carried out by hand using a hammer/dummy and sharp tungsten chisels.
- NB: Angle grinders must not be used.
- Cement bedding/jointing mortar around 19th and 20th century replacement stonework to be retained, as removal may cause more harm than good, unless otherwise instructed by CA.

**110 Iron Removal**
Any embedded ironwork currently causing damage, or likely to cause future damage, is to be carefully removed. Mechanical techniques are restricted to masonry 'stitch' drilling; disc cutters and hand grinders must not be used. Again, such removal must be discussed with the CA before any removal work commences and express approval given.

**120 Pinning and Dowelling of new and existing masonry**
All pinning and dowelling to be carried out using threaded stainless steel rod (grade 316) or keyed phosphor bronze set in either fine non-hydraulic lime mortar or hydraulic lime for non-structural work and polyester resin for structural work.

## F21 NATURAL STONE WORK

To be read with preliminaries, general conditions and drawings.

**NB: No major replacement of stonework is envisaged. However, where new localised renewal is required, then the following specification is to be used:**

**10 ALL REPLACEMENT STONEWORK,** as agreed on site where absolutely necessary:

- **Size of worked stone**: replacement stone shall be worked to match the existing stones withdrawn from the fabric.
- **Finish**: tooled to match existing. Where required, final working, tooling and finishing will be carried out on site to ensure that the new work aligns correctly with the existing historic fabric surfaces to the approval of the CA. On no account should these existing historic fabric surfaces be dressed in-situ, dragged or otherwise worked in any way.
- **Stone Suppliers: Note:** Sample of intended bed to be used to be approved by CA before any bulk orders placed.
- For new stone details:
- **Box Ground Bath Stone**
- Supplier: Lovell Stone Group:
  Head Office: Downs Quarry, Kingston Rd, Langton Matravers, Swanage, Dorset, BH19 3JP
- **Mortar**: As mortar specification section Z21.
- **Bond**: As existing.
- **Joints**: Flush, brushed and/or sponged to bring aggregate to surface.
- **Features**: Cutting to allow for cramping and joggles as necessary.

**GENERAL REQUIREMENTS/PRODUCTION**

**20 ADVANCE REGISTRATION**

Obtain stone from the supplier(s) specified. Take responsibility for supply, quality and delivery to suit the progress of the work.

**30 OPERATIVES**

Cutting, dressing, laying and jointing of stone to be carried out by skilled stonemasons only. Provide documentary evidence of previous experience and details of comparable work carried out to date.

**40 PRODUCTION**

- Ashlar stone to be cut and dressed:
- After seasoning but before delivery to site, including shaping, finish(s) and all sinkings for fixing and lifting devices except where final working, tooling and finishing is directed to be carried out on site by the CA.
- So that exposed and joint surfaces generally are square, true planes free from hollow or rough areas.
- With minimal deviation from specified dimensions to ensure that specified joint widths are maintained.
- So that natural bed is horizontal in plain walling, vertical and at right angles to wall face in projecting stones (i.e. edge bedded) and at right angles to line of thrust in arches.

**45 - DEVELOPMENT OF CARVED DETAIL**

- Skills and experience of stonemasons to be allocated to this task to be presented to design team at outset, for comment and approval.
- Senior stonemason to take responsibility for development of accurate and appropriate mouldings/profiles for new work, based on evidence available from the building itself, from historic photographs and drawings (large scale copies will be made available), other similar details on the Abbey church building.
  It is important to arrive at working dimensions and forms by checking from different examples of the same masonry feature, i.e. do not take measurements in isolation. Use various means of measurement, in particular callipers, sinking squares and depth gauges.
- Drawings and other research to be presented to CA for comment before moving on to next stage.
- Masons to then develop 3D representations of proposed new detail, using clay formed onto existing stone in-situ, and/or forming polystyrene 'models' for approval.
- Resulting maquettes to be presented to CA and client for comment before moving on to next stage.
- Allow for one further 'iteration' of the above process.
- Obtain CA written approval of final maquette before moving on to carve the final stone for fixing on the building.

**50 IDENTIFICATION**

Mark each block/dressing clearly to indicate the natural bed and position in the finished works.

**60 INSPECTION OF STONE**

All completed blocks/dressings must be carefully inspected and checked by the stone producer for match with approved sample(s) and compliance with drawings and specification before dispatch to site.

## LAYING, JOINTING AND RE-POINTING

**100 WORKMANSHIP GENERALLY**

- Store dressed stone clear of the ground, protect from inclement weather and keep under cover at all times prior to laying. Prevent soiling, chipping and contamination by salts and other deleterious substances.
- Thoroughly 'wet up' stones and lay on a full even bed of mortar with all joints filled and to joint widths to generally match existing work adjacent. Use temporary lead or stainless steel distance pieces to ensure joint width; remove when mortar is sufficiently strong.
- Masonry shall be supported.
- Joint widths in ashlar should be between 3 mm and 6 mm: joints in hood moulds and other joints in weatherings to be between 2 mm and 3 mm.
- Joint widths in pieced work should be 3 mm maximum, feathering out to 1 mm at the surface.
- Keep courses, all wall faces, angles and features in line with existing but allowing for the weathered surfaces of the existing and to the satisfaction of the CA. Set out carefully, to ensure satisfactory junctions and joints with adjoining or built-in elements and components.

- Keep stonework clean during construction and until Practical Completion. Always wipe off all mortar runs and dribbles as they occur, then check that there is no residual 'bloom'. Ensure that no mortar encroaches on face when laying. Turn back scaffolding boards at night and during heavy rain. Rubbing to remove marks or stains will not be permitted.

**POINTING AND RE-POINTING**

The aim throughout is that all mortar repairs should resemble the host stone in colour and texture and be exactly in line with, yet not obscuring, it at any point.

**110 RAKING OUT**

- Carefully rake out the Portland cement-based mortar mixes in exposed joints, back to the lime-based bedding mortar. Use an appropriate sharp tool.
- Note that joint depth is relative to joint width rather than to a generalised specification; thus removing all mortar back to a 'standard' depth is inappropriate for the historic fabric.
- Consider if it is necessary to remove all residual cementitious pointing. Hard and well-recessed mortars may result in consequential damage during extraction; it may be less damaging to leave them in-situ and apply a shallow fill on top. A correctly mixed lime mortar can be made to adhere to relatively shallow 'facial' joints, as well as to deeply recessed joints. Confirm depth of raking out with CA in all cases prior to removal of any material.
- Take care to wear a suitable face mask during raking out operations as the cement used in some mortar repairs may be deleterious.
- Where fine joints are to be re-pointed the joints are to be raked out to a depth at least equal to the width of the joint and deeper if possible without damaging stonework, i.e. adjacent arrisses.
- Where old mortar has become sandy and de-natured or has failed it should be cleaned out and deep tamped leaving at least 25 mm for the final pointing.
- Mechanical cutting of joints is not to be undertaken without the express written permission of the CA. Well-sharpened hand tools (i.e. quirk chisels or various blade tools) of the correct width must be used so as not to damage the ancient stones or in any way widen the joints.

**111 DRY BRUSHING OUT**

- Clean out all debris thoroughly by brushing along each joint, or blowing out with a portable compressor unit. Remove all dust from the masonry face and remove all debris from foot of the work area before commencing wet work.

**112 DAMPENING**

- Use a fine mist spray (fitted to a hand-operated pump sprayer unit or hosepipe) or flick with a stock brush and bucket. Continue with a more controlled application from the pump sprayer.
- Introducing water into the work area and surrounding masonry is absolutely necessary to counter suction of water from the mortar. However, extreme care should be taken not to flood the heart of the masonry, or the lower sections of the elevation which may already be damp.
- Wet once and allow time for absorption. Re-apply as many times as is necessary, paying particular attention to the varying rates of absorption across the work area and to

prevailing weather conditions. Ensure wetting extends to at least 150 mm beyond the work area for each application.

## 113 PREPARATION OF 'GALLETS'

- Small pieces of terracotta tile 'gallets' are to be used where areas of mortar pointing exceed 25 mm$^3$. The colour is to be yellow/buff to give a reasonable colour match to the local Bath stone.
- Tiles are to be handmade (i.e. not machine pressed), rough textured and frost resistant. The approved supplier is:
  Cambridgeshire Tile and Brick Co. Ltd.
  Goosehall Farm, Factory Road, Burwell, Cambs. CB5 0BN
  tel. 01638 743953
- Either new whole or breakage grade tiles from this supplier are permitted provided that they are properly fired.
- New material only is to be used as salvaged materials may be contaminated with aggressive salts.
- Tile gallets are deemed necessary for the following reasons:
  - To counter shrinkage of mortar during carbonation.
  - To give structural support to the mortar; initial application and long-term.
  - To reduce the volume and mass of mortar, thereby accelerating carbonation.
  - To economise on mortar.
- Tile gallets are to be prepared in a range of suitable sizes and shapes appropriate to the specific work area.
- Prepare gallets by breaking each tile with a hammer. Use flat and end-on blows to delaminate tile and produce gallets of varying thicknesses. Volumetric accuracy of each gallet (i.e. its precise size and shape) is vital in carrying out small tile and mortar repairs.

## 114 APPLICATION OF 'TACK COAT'

- Provide a 'sticky' interface to improve adherence of mortar to stone inside joint faces.
- Carefully apply tack coat to inside faces of joint and ensure uniform application.
- Allow tack coat to 'take up' and become 'cheesy' before consolidating cavities and pointing the wider joint.
- Leave all fine joints to the latter stages of the work in each section of wall or scaffold lift.

## 115 POINTING

- Flush finish throughout. Whilst fine joints in ashlar work may be filled in a single application, the filling of deeper cavities should be carried out in several stages:
- Carefully smear a small quantity of mortar on the back and sides of the lacuna.
- Add more mortar and bed in gallet(s) as necessary.
- Fill joint flush, erring on the slightly proud side.
- Keep the work dampened and well sheltered. Rain and water from operations being carried out in other work areas must not be allowed to run down any masonry faces immediately after they have been pointed.

## 116 PRESSING IN

- Compaction or 'pressing in' of the joint is vital in order to counter the effects of shrinkage and cracking as the mortar carbonates. The rate of cracking should be assessed and adequate time allowed for pressing in as and when cracks start to appear.

- Some mortars may require pressing operations to be carried out over a period of a day or more before the work becomes suitably stable. Water dampening can be used to slow the rate of cracking but extreme care should be exercised not to flood the work area. The final pressing involves neatening up the joint edges and levelling as necessary.
- For maximum sensitivity towards the surrounding historic surfaces, a small hand-size block of foam (e.g. high-density, pink under-floor foam is an ideal tool) should be used to produce the perfect texture.

**117 PARING BACK**

- When the work has dried out to a 'leather hard' state, carefully pare back the mortar surface with a sharp trowel edge or spatula to achieve the following:
- Remove the white film of 'laitance' to create and open-pored surface to aid carbonation of the mortar.
- Blend in the new work with adjacent existing/retained pointing.
- Achieve the required flush finish.
- Note that a stiff bristle brush may be used as an alternative to a blade in 'opening up' the mortar surface.
- Visual assessment of the work area should be carried out after paring back to ensure broad consistency in texture and appearance. Note that some variation in texture will be necessary to make it relevant to the specific stone type(s) and finishes of each work area, e.g. mortar joints to course 'weather stone' should be textured differently to those on fine grained ashlar.

**118 DRY BRUSHING**

- Allow mortar surface to progress beyond 'leather hard' state and set firm; typically at least 24 hours after the mortar application.
- Brush off all loose material on masonry and joints using a soft bristle brush to further refine the texture of the pared back mortar.

**119 SPONGING OFF**

- It is important when patch-pointing an isolated area, filling smaller lacunae or working a single joint to avoid isolated 'white' areas showing up against an otherwise untouched surface.
- Ensure mortar surface is firm from previous operations.
- Fill bucket with clean water, soak flat clean sponge and squeeze out water.
- Pass the slightly damp sponge flat across the work using a horizontal 'swipe'/ 'planing' action.
- Use each face of the sponge once only and then rinse in clean water to avoid re-depositing lime residue on the work. Regularly replenishing the water supply, rinsing of the sponge and repeated 'planings' will help further refine and mellow a brushed surface.
- Fine joints in ashlar work are best pressed in as and when shrinkage dictates, then finished with a well-squeezed out clean, damp sponge using the planing action described above.
- Cleanliness and a clean supply of water are essential throughout the sponging off operations.

## 120 INCLEMENT WEATHER

- Do not use frozen materials and do not lay on frozen surfaces.
- Do not lay stone, attempt any mortar pointing and/or repairs or apply sheltercoat when air temperature is at or below 5°C unless mortar has a minimum temperature of 5°C when laid and walling is thermally protected.

## 130 PROTECTION

- Arrange the work so that there is sufficient time at the end of each day to consolidate, re-dampen and cover up work areas as necessary.
- Check condition of previously worked areas the following morning.
- Work should be planned and carried out such that it will not suffer over a weekend, unless adequate labour can be provided to tend it as necessary.
- Prevent damage to stonework, particularly arrises and projecting features. Protect with wooden slats, boards, etc., securely fixed. Remove at Practical Completion.
- Ensure work is shielded from strong sunlight, drying winds, driving rain and frost. Scaffolding should be erected such that vertical sheeting and damp hessian can be left in-situ to create a suitable environment for controlled carbonation of mortar repairs and sheltercoating.
- Prevent staining and other disfigurement of stonework during the works. Ensure that scaffolding rainwater detailing is adequate to keep run-off well away from work areas.
- Take care not to let damp hessian or plastic sheeting be blown against work areas. Keep covers taut and approximately 150 mm away from vertical plane of the stonework.
- Allow for some ventilation behind the protection layers, especially at ground level. This is necessary because saturated work cannot carbonate and is vulnerable to freezing at low temperatures.

## G20 CARPENTRY/TIMBER FRAMING/FIRST FIXING

To be read with Preliminaries/ General conditions.

### TYPE(S) OF TIMBER

01 ROOFING GENERALLY:

Following removal of existing lead roof covering to the Tower roof in agreed sequence, areas of roof boarding are to be carefully removed to provide access for inspection of joist and beams beneath as shown on the structural engineers drawings. Set roofing boarding aside for re-use.

10 STRUCTURAL TIMBER REPLACEMENT: (IF REQUIRED)

Extent of timber replacement will be confirmed when opening up is complete and scheduling carried out. Undertake repairs to roof timbers as instructed by CA and to structural engineer's requirements.

Timber replacement should be on a like for like basis in well-seasoned English oak. Any metal fastenings required shall be of stainless steel.

15A UNGRADED SOFTWOOD FOR GENERAL USE: (IF REQUIRED)

Grading standard: To the appropriate BS EN 14081-1-compliant standard.
Grade: GS to BS 4978
Size: Various as shown on drawings or a required to suit location
Centres: To be fixed beside existing damaged truss and bolted to it.
Free from decay, insect attack (except pinhole borers) and with no knots wider than half the width of the section.
Surface finish: Sawn or wrot as scheduled.
Preservative treatment: As section Z12 and British Wood Preserving and Damp-proofing
Association Commodity Specification C8, service life: 40 years
Moisture content at time of erection: As clause 450.
Fixing to be stainless steel screws or as agreed with architect.

20 EXTERNAL GRADE PLYWOOD FOR SUBSTARTE TO EDPM:

Location: Tower flat roof, gutters & upstands
Roof boards to Standard: To an approved national standard.
Service class to BS EN 1995-1-1: Class 3
Use class to BS EN 335: Subclass 3.1
Nominal thickness: 18 mm
Appearance class to BS EN 635: E
Bonding quality to BS EN 314-2: Class 3
Finish: Sanded Unsanded
Fixing to be stainless steel screws to suit fixed into existing Oak boards
Treatment: As section Z12 and British Wood Preserving and Damp-proofing
Association Commodity Specification C8, service life: 40 years

30A EXISTING OAK BOARDING:

Take care to protect existing oak boarding to roof during works. Boards in sound condition are to be retained. Loose board to be fixed with stainless steel fixings to suit. Any replacement boards required are to be seasoned Oak to match existing. Fixing to

be agreed on site but assume stainless steel screws sized to suit with min 50mm bearing into joists beneath.

30B EXISTING HATCH OPENING TO WEIGHT CABIN:
Hatch boards to be repaired and refixed as required. Any replacement required to be seasoned timber to match. Fixing to be agreed on site but assume stainless steel crews counter sank. To be stained black to match existing.

35A PRESERVATIVE TREATMENT: if required.
Clean down and thoroughly treat timbers only were directed by CA. Only insecticides approved by Natural England can be used in the roof spaces if they are required. Ensure that the timber preservative used does not affect new or existing metal fixings. To be clear/opaque.

**GENERAL**

105 TIMBER PROCUREMENT
Timber (including timber for wood-based products): Obtained from well managed forests/plantations in accordance with:
The laws governing forest management in the producer country or countries.
International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
Documentation: Provide either:
Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, or Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood-based products.

160 GRADING AND MARKING OF SOFTWOOD
Timber of a target/ finished thickness less than 100 mm and not specified for wet exposure:
Graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as 'DRY' or 'KD' (kiln dried).
Timber graded undried (green) and specified for installation at higher moisture contents: Clearly marked as 'WET' or 'GRN'.
Structural timber members cut from large graded sections: Regraded to approval and marked accordingly.

**WORKMANSHIP**

400 CROSS SECTION DIMENSIONS OF TIMBER to match existing unless agreed with CA or Structural Engineer.

430 SELECTION AND USE OF TIMBER:
Do not use timber members, which are damaged, crushed or split beyond the limits permitted by their grading.
Ensure that notches and holes are not so positioned in relation to knots or other defects that the strength of members will be reduced.
Do not use scarf joints, finger joints or splice plates without approval.

440 PROCESSING TREATED SOFTWOOD:
Carry out as much cutting and machining as possible before treatment.
Retreat all treated timber, which is sawn along the length, ploughed, thicknessed, planed or otherwise extensively processed.
Treat timber surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer, all in accordance with Natural England requirements under Z12.

450 MOISTURE CONTENT of softwood at time of erection to be not more than:
Under cover in generally unheated spaces: 24%
Under cover in generally heated spaces: 21%
Internal in continuously heated spaces: 19%

510 PROTECTION
Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
Store timber and components under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Ensure free movement of air through the stack.
Arrange sequence of construction and cover timber as necessary during and after erection to ensure that specified moisture content is not exceeded.

550 EXPOSED TIMBER:
Prevent damage to and marking of surfaces and arrisses of planed structural timber which will be exposed to view in completed work.

**JOINTING TIMBER**

570 JOINTING/FIXING GENERALLY:
Where not specified otherwise, select fixing and jointing methods and types to match the existing sizes and spacings of fastenings to be approved by the CA and the structural engineer and in compliance with section Z20. Fastenings to comply with relevant British Standards.
Material/finish: stainless steel or other approved.

630 BOLTED JOINTS:
Locate holes accurately and drill to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger. Place washers under all bolt heads and nuts, which bear directly on timber. Use spring washers in locations, which will be hidden or inaccessible in the completed building. Tighten bolts so that washers just bite the surface of the timber and at least one complete thread protrudes from the nut. Check at agreed regular intervals up to Practical Completion and tighten as necessary to prevent slackening of joints.

650 CARPENTRY JOINTS:
Form carpentry joints as appropriate and to the CA's approval, traditionally pegged and accurately cut.

670 ROOF READINESS:
Before laying coverings ensure that:

a. All preliminary work including formation of grooves and fixing of roof outlets to correct levels is complete;
b. Roof is clear of plant and materials other than necessary for the execution of the work
c. Substrate is completely dry.

670 FIXINGS AND FASTENERS

All fixings and fasteners to be stainless steel.

## 71 LEAD SHEET COVERINGS AND FLASHINGS

To be read with Preliminaries/ General conditions

TYPES OF LEADWORK

35 COVER/ABUTMENT FLASHINGS: roof abutments

Location: Renew all cover flashings to perimeter of Tower roof coverings including to Weights Cabin. To use existing chases in stonework unless previously agreed with architect.
Lead: Code 5
Type: Rolled to BS EN 12588
Thickness: Code 5, as clause 550.
Length not exceeding 1500 mm, clipped min. 600mm spacing.
End to end joints: laps of not less than 100 mm.
Cover: not less than 100 mm.
Fixing: where joint is less than 18mm wide: Lead wedges as Clause 830.
Fixing: Where joint exceeds 18mm wide: Screw fixed as Clause 840.
Finishing: Where joint is less than 18mm wide: BLM Lead Pointing Sealant – silicone rubber recessed and with lime mortar covering.
Finishing: Where joint exceeds 18mm wide: NHL 3.5 lime mortar. Renew mortar to ensure good fixing.

## 45 LEAD COVERING TO WEIGHT CABIN:

Location: North east corner of the Tower roof.
Description: The lead covering to the Weight Cabin are to be retained but are to be checked for any defects/splits and repaired as required. The upstand abutment with the new EPDM flat roof coverings will require adjustment in the length of the lead coverings and the fixing of a code 5 under flashing. Cover flashing are to be renewed as per section 35 above.

## GENERAL REQUIREMENTS/PREPARATORY WORK

## 510 WORKMANSHIP GENERALLY:

Comply with current good practice as described in the latest edition of 'The Lead Manual' published by the Lead Sheet Association, unless specified or agreed otherwise.
Cut, joint and dress lead neatly and accurately, to provide fully waterproof coverings/flashings, free from ripples, kinks, buckling and cracks.
Do not use scribers or other sharp instruments to mark out lead.
Do not use solder on any leadwork.
Ensure that finished leadwork is fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
All exposed lead to have patination oil applied.

## 515 IN SITU LEADWELDING

**In situ application of heat will not be permitted on site unless agreed with the architect**.

If in-situ hot working is unavoidable, then institute 'permit to work system', using Abbey insurer's hot-works-permit forms. Sign off will be by main contractor's site foreman/supervisor.

In addition to other restrictions, no hot works will be permitted during final two-hour period of working day prior to contractor leaving site and an appropriate fire extinguisher is to kept onsite during works.

**610 SUITABILITY OF BASES:**

See Section G20.
Bases to be dry and free of dust, debris, grease and other deleterious matter.
Laying of lead will be taken as joint acceptance by the Main Contractor and Subcontractor if applicable of the suitability of bases.
Punch in protruding fasteners and plane or sand boards to achieve an even surface.
Give notice of defective boards that require replacement or additional works.

**650 TIMBER FOR USE WITH LEADWORK:**

Selected from sustainable sources.
Rolls/ridge capping etc: Hardwood.
Substrate: Re-laid existing Oak boards or new treated softwood boards. Where new required, dimensions to match existing (approx. 200 x 38mm) with 3-6mm 'penny' gaps between adjacent boards.
Sawn, free from wane, pitch pockets, decay and insect attack except pinhole borers.
Moisture content: Not more than 22% at time of covering.
Preservative treatment: CCA as section Z12 and British Wood Preserving Association Commodity Specification C8.

**FIXING/JOINTING LEAD**

**720 CLIPS**

Material: Copper or lead clips cut from the same thickness/ code as being secured.
Dimensions:
Width: 50mm
Length: to suit detail.
Fixing clips: Secure each substrate with either two screw or three nail fixings not more than 5mm from edge of lead sheet. Use additional fixings where lead down stands exceed 75mm.
Fixing lead sheet: Welt clips around edges and turn over 25mm.
Allow 5-6mm expansion gap between clip and lead where recommended by LSA.

**770 WELTED JOINTS:**

Form with a 50mm overlap, 25mm underlap and copper or stainless-steel clips as clause 720 at not more than 450mm centres.
Welt overlap and clips around underlay, loosely turn over and lightly dress down.

**810 FORMING OF DETAILS:**

Details may be formed by bossing or lead-burning (see clause 515 above). Lead-burned seams must be neatly and consistently formed to a thickness one third more than the sheets being joined. Do not undercut or otherwise reduce the thickness of the sheets at lead-burned seams. Filler strips to be of the same composition as the sheets being joined.
Note hot working restrictions in section 515 above.
Bossing must be carried out without thinning, cutting or splitting the lead sheet.

**830 WEDGE FIXINGS INTO JOINTS/CHASES**:

This is the preferred method of fixing. Suitable for joints less than 18mm wide.
Carefully rake out groove to a depth of at least 50mm.
Neatly turn over inner edge of lead and dress neatly into chase, first laying a bead of Sikaflex silicone into the back of the chase.
Lead wedges to be used at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
Final groove to be filled with lead-sealant to a neat finish.

**840 SCREW FIXING INTO JOINTS/ CHASES**:

For wider joints, exceeding 18mm.
Carefully rake out chase to a nominal depth of 50 mm.
Thoroughly clean out chase.
Turn up lead at back of chase and fix with stainless steel screws and washers (complying with BS1210) at 450mm centres.
Separate the lead from the mortar pointing with the use of masking tape along the back and bottom side of the joint.
Ensure the masonry is thoroughly wet and clean prior to pointing.
NHL 3.5 mortar: refer to Z21/140 for mortar pointing where joints exceed 18mm width.
Ensure mortar pointing is well compressed into the joint to ensure a good bond between mortar and masonry.

## J42 SINGLE LAYER POLYMERIC SHEET ROOF COVERINGS

To be read with preliminaries /general conditions

TYPES OF COVERING

15 SINGLE LAYER SHEET ROOF COVERINGS

Description: A high-quality EPDM roof covering system (min 1.5mm thick) fully adhered to substrate and to including all components to make fully water tight system to Tower roof and able to have raised GRP grating walkway fitted over and on to it.
Note: required to have minimum 25-year insurance-backed warranty.
Location: Tower roof as indicated on Proposed Roof drawing 1280-07-350 including gutters, sumps, upstand etc.
Substrate: 18mm external grade plywood deck securely fixed over existing oak boarding to give level surface with no deflections or backfalls: see clause G20/20 above. Roof/gutter falls are as existing. Minimum 100mm high plywood backings to be fixed to abutments upstands with masonry as recommended by manufacturer.

Preparation:
Horizontal work: The substrate will be securely fixed, clean, dry, smooth and free of contaminants such as greases, animal fats, coal tar and oil-based products. All sharp edges, nibs and rough surfaces which could damage the membrane will be removed or otherwise isolated. Should the V-Gard MAX air and vapour control layer be used, the substrate will be prepared with Elevate SA-19 Primer.
Roof covering system: RubberGard EPDM fully-adhered or equal approved: supply details.
System manufacturer: Elevate UK & Ireland
Booths Park, Springwood, Chelford Road, Knutsford
WA16 8GS. Tel: 01565 756186.

Primer type and application: As recommended by the manufacture for plywood, applied to the roof substrate (plywood) and all upstands and skirtings. For application method and guidance information, refer clause 660B.
Air and vapour control layer: Elevate V-Gard MAX Self-Adhesive Air & Vapour Control layer as recommended by manufacturer for cold roof. Note: may not be required as cold roof.
Insulation: None require – the roof is above an unheated and ventilated belfry ie. this is a cold roof.
Separating layer: N/A
Waterproof membrane: RubberGard EPDM LSFR membrane 1.5 mm to be fully adhered. 100% cured non-reinforced, Ethylene-Propylene-Diene Terpolymer (EPDM) synthetic rubber, manufactured in an ISO 9001 and ISO 14001 registered facility. Minimum un-spliced width of 3.05 m.
Specification compliance:
UL Classified/ FM Approved.
ASTM D 4637/ EN 13956 (CE Mark).
7500 hrs of Artificial Ageing as per EN 1297.
Colour to be confirmed: allow for dark grey.
Material: Rubber Polyisocyanurate (PIR)
Attachment: BA-2012 Bonding Adhesive as recommended by manufacturer.

Lap joints: 100mm min overlap with 76mm QuickSeam Splice tap as recommended by manufacturer.
Details: as required to fully complete coverings including gutters, abutment upstand, roof penetrations (flag pole etc) and sump outlet etc. All to be carried out to manufacturer's recommendation and details.
Surface protection: A geotextile protection membrane should also be installed to provide protection to the EPDM waterproofing membrane from any slight movements in the supports to walkways. Ideally any points of contact of the walkway should avoid field seams and details.
Accessories: To include QuickSeam Splice Tape. QuickSeam FormFlash internal and external Corners. QuickSeam Flashing. QuickSeam SA Flashing. QuickSeam Reinforced Perimeter Fastening Strip. QuickSeam Universal Pipe Flashing. QuickSeam Conduit Flashing. QuickSeam Penetration Pocket. QuickSeam Walkway Pad. QuickPrime Plus. Lap Sealant HS. All Purpose (AP) Fasteners. Heavy Duty (HD) Fasteners. Splice Wash (SW-100).Cleaner C-20. Water-Block Seal (S-20). Pourable Sealer S-10 (Parts A & B). Coiled Metal Batten Strip. Metal Batten Strip. Termination Bar. As required to provide a fully water proof system and to comply with manufactures reconditions and details.
**Supply with minimum 25 year Warranty.**

PERFORMANCE

210 ROOF PERFORMANCE
Roof covering: Secure, free draining and weather-tight.

230 INSULATION
Not required.

PRODUCTS

310 ANCILLARY PRODUCTS AND ACCESSORIES
Types: As recommended by manufacturer

330 TIMBER TRIMS, ETC
Quality: Planed. Free from wane, pitch pockets, decay and insect attack (except ambrosia beetle damage).
Moisture content at time of covering (maximum): 22%.
Preservative treatment: Please note organic solvent-based timber preservatives are not permitted, as these attack bitumen-based materials.

EXECUTION GENERALLY

510A ADVERSE WEATHER
General: Do not lay membrane at temperatures below 5°C or in wet or damp conditions.
Provide temporary covers and drainage as required to keep finished areas of the roof dry.
Poor weather: Suspend work in severe or continuously wet weather, unless an effective temporary roof is provided over the working area.

If unavoidable wetting of the construction does occur, take prompt action to minimise and make good any damage.
Unfinished areas of roof: Temporarily ballast incomplete areas of membrane as necessary to protect from wind action.

517 GENERAL WORKMANSHIP REQUIREMENTS

Installation of the RubberGard EPDM waterproofing system may only be carried out subject to involvement in the project and inspection by Elevate Technical Services.
Workmanship should comply with current Codes of Practice, BS6229 and Manufacturers installation instructions. All waterproofing materials and system components should be supplied by Elevate, unless otherwise stated, to be included within the guarantee. Noncompliant workmanship will not be permitted (even if the system is watertight). All such faults must be remedied, before the Guarantee can be issued.
The contractor is to ensure water tightness of the roof at all times.
Where building works are to be carried out by other trades, following completion of the waterproofing, the contractor must make adequate provision for supplying protection to prevent damage to the new membranes. The final inspection (where required) will not be carried out by the Elevate Site Technician until all associated trades are complete and the roof areas are clear from all debris and protection layers.
All mechanical and electrical work to plant and equipment should be carried out by competent mechanical and electrical qualified tradesmen. All plant is to be reinstated and recommissioned on completion of the roofing works in accordance with the client's detailed specification.
Any lead work must be carried out by skilled tradesmen and in accordance with current codes of practice and the recommendations of the Lead Sheet Association.

520 INCOMPLETE WORK

End of working day: Provide temporary seal to the deck to prevent water infiltration, ensuring that the insulation, if present, is protected.
Ensure that the sequence of laying enables temporary sealing of loose membrane edges to be down on the slope and not against the flow of water.
On resumption of work: Cut away tail of membrane from completed area and remove from roof.

522 PROTECTION AND STORAGE OF MATERIALS

Store rolls of membrane and associated products in a clean, dry, well-ventilated and cool conditions.
Store materials designated by the manufacturers as temperature sensitive in facilities where temperature can be maintained at the recommended level.
Insulation products must be kept dry and protected from wet weather during storage and installation.

523 PROTECTION OF WORK

Ensure that from completion of the roof until practical completion:
The roof is not used as a working platform, unless fully protected to the satisfaction of the CA.
No paints, solvents or other volatile substances harmful to the membrane are allowed to come into contact with the roof surface.
No building materials stored on the roof.

Finished roof areas are adequately protected from damage by subsequent building operations.

**SUBSTRATE**

610A SUITABILITY OF SUBSTRATES (PLYWOOD)
Substrates generally: Secure, clean, dry, smooth, and free from frost, contaminants, voids and protrusions. The new exterior grade plywood deck, minimum 18mm thickness, conforming to BS EN 636-3 & CPD/CE compliance, fixed directly to existing boards using non corroding ring shank nails or recommended screw fasteners.
Falls: Existing where provided, the falls/cross-falls should be designed to 1:40 to achieve minimum finished falls of 1:80 to comply with drainage requirements of BS 6229:2018 and the SPRA design guide. No deflections or back-falls present if the deck is designed to achieve a 0° level finished surface (including when using tapered insulation to provide falls).
Preliminary work: Complete including:
- Formation of upstands, kerbs, box gutters, sumps, outlets grooves, chases and expansion joints.
- Fixing of battens, fillets and anchoring plugs/strips.
- Moisture content and stability of substrate: Must not impair roof integrity.
- Preparation: All such items to be rectified as necessary to eliminate the possibility of puncturing the new waterproofing system.

**EXECUTION GENERALLY**

510 ADVERSE WEATHER
General: Do not lay membrane at temperatures below 5°C or in wet or damp conditions unless effective temporary cover is provided over working area.
Unfinished areas of roof: Keep dry and protect edges of laid membrane from wind action.

520 INCOMPLETE WORK
End of working day: Provide temporary seal to prevent water infiltration.
On resumption of work: Cut away tail of membrane from completed area and remove from roof.

760 PERIMETER OF MEMBRANE
General: Secure membrane at roof edge conditions, changes of plane, kerb flashings, upstands to roof lights, etc. with mechanical fasteners.

**COMPLETION**

940 COMPLETION
Roof areas: Clean.
Outlets: Clear.
Work necessary to provide a weathertight finish: Complete.
Storage of materials on finished surface: Not permitted
Completed membrane: Do not damage. Protect from traffic and adjacent or high-level working.

## L30 WALKWAYS

To be read with Preliminaries/ General conditions

460 RAISED WALKWAY

Description: Lightweight Glass fibre-reinforced (GRP) moulded open mesh grating
Location: to Tower roof as shown on drawing 1208-07-350.
Description: high strength moulded GRP mesh grating panels finished with a hard-wearing anti-slip gritted surface fitted on top of adjustable supporting system so as to allow free drainage beneath. To be fire rated to BS476 Part 7 class O.
Colour: allow grey.
Size: 38mm thick (depending on panel sizes) with 25x25 mesh or equal approved.
Supporting system: aluminium frame (sized to suit panel sizes) on adjustable pedestals of variable height to suit application.
Manufacturer: Contractors choice to CA approval.
Accessories: as required for fully compliant system and to include trims, edging, and single step up to main level from access Turret access doorway with necessary anti slip 'yellow' nosing etc.
Note: Setting out of GRP panes to be agreed before installation: drawings required for approval.

## L37 EXTERNAL STAIRS, RAMPS HANDRAILS AND BALASTRADE SYSTEM.

To be read with Preliminaries/ General conditions

100A STAINLESS STEEL MESH GUARDING

Description: bespoke stainless-steel mesh guarding to tracery openings of all four sides of Tower Roof parapet; refer to drawings 1208-07-360.
Height: 1225mm
Length: to suit but approximately 2 x (3730mm x 2) and 2 x (2020mm x 2).To be site checked allowing for side fixings.
Material:
Frame: stainless steel (satin finish) tubular frame (size to suit – allow 32mm) with fixing brackets spaced to suit spacing of tracery mullions. Note: side fixing at ends.
Mesh: stainless steel rope mesh. Mesh size approx. 50x50mm.
Size: to suit but refer to drawings for sizes.
Fixings: securely screwed to masonry.
Other requirements: detail fabrication drawings to be issued for approval prior to manufacturer of guarding by architect and structural engineer. Grade of stainless steel to be appropriate for exposed site: allow 316 grade but submit proposal.

## N10 GENERAL FIXTURES/FURNISHING/EQUIPMENT

To be read with Preliminaries/ General conditions

25A CIRCULAR EXTERNAL BENCH

Description: bespoke external circular benching with timber seating in shaped segments fitted on top of galvanised metal frame and legs. Refer to drawings 1280-07-355, 356 & 357.

Frame:

Material: High quality zinc galvanised metal suitable for high exposed environment such as Tower Roof.

Finish: smooth and free from excessive build-up of zinc and or drips etc.

Fixing: to be securely fixed to timber fixing points as per drawings to structural engineers' approval.

Seating:

Material: heat treated Acoya timber (50 year above ground) cut and sanded to suit in segments as shown on drawings.

Appearance: smooth and free from excessive knots and splits (BS EN 942 J5).

Fixings: securely fixed to metal frame with stainless steel fixings. Fixings to be recessed (15mm) and plugged with glued timber to match.

Other requirements: detail fabrication drawings to be issued for approval prior to manufacturer of bench.

## M60 PAINTING/CLEAR FINISHING

To be read with Preliminaries/ General conditions

10 EGGSHELL/ SATIN PAINT to external timber door
Manufacturer: Submit proposals.
Product reference: Dulux Weathershield or equal approved - Submit proposals.
Surfaces: timber door.
Preparation: Degrease and abrade to provide key.
Initial coats: Primer as recommended by manufacturer.
Number of coats: As recommended by manufacturer.
Undercoats: As recommended by manufacturer.
Number of coats: Minimum of 2.
Finishing coats: Satin.
Number of coats: Minimum of 2.

20 EXTERIOR PAINT to cast iron metal work
Manufacturer: Hammarite or equal approved.
Product reference: Direct to Rust Metal Paint Satin Black or equal approved.
Surfaces: Sand with coarse sandpaper or wire brush to remove any loose paint or rust and provide key for new paint.
Preparation: Thoroughly clean and degrease.
Initial coats: Rust inhibitor if required as recommended by manufacturer.
Number of coats: 1 or 2 depending on condition.
Undercoats: not required with Direct to Rust Metal Paints.
Finishing coats: Direct to Rust Metal Paint Satin Finish colour to match.
Number of coats: minimum of 2 to ensure solid colour to CA approval.

50 APPROVAL SAMPLE:
Prepare a sample of the finished work in an agreed location. Do not proceed beyond sample stage before approval is given.

220 COMPATIBILITY:
Check all materials used are recommended by their manufacturers for the particular surface and conditions of exposure and that they are compatible with each other.
Use appropriate fillers/stoppers and any other ancillary/preparatory materials or use those which the coating system manufacturer recommends or produces for use with that coating.
Inform CA of any discrepancy in specification of coating and obtain instructions before proceeding with application.

240 SUFRACES NOT TO BE COATED:
Protection for surfaces specified as not to be coated and for fittings, fixtures and furnishings which are not included in the works, but are retained in the working area, is to be to a standard which will prevent any damage or discolouration and protect them from accidental spillage or splashing.
Where in addition such elements etc are required to be cleaned do so at appropriate stage in the works as near to final completion as practical and reinstate protection as necessary.

## PREPARATION

400 PREPARATION GENERALLY

Standard: In accordance with BS 6150.

Suspected existing hazardous materials: Prepare risk assessments and method statements

Covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.

Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.

Substrates: Sufficiently dry in depth to suit coating.

Efflorescence salts: Remove.

Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.

Surface irregularities: Remove.

Joints, cracks, holes and other depressions: Fill flush with surface, provide smooth finish.

Dust, particles and residues from preparation: Remove and dispose of safely.

Water based stoppers and fillers:

Apply before priming unless recommended otherwise by manufacturer.

If applied after priming: Patch prime.

Oil based stoppers and fillers: Apply after priming.

Doors, opening windows and other moving parts:

Ease, if necessary, before coating. Prime resulting bare areas.

622 ORGANIC GROWTHS

Dead and loose growths and infected coatings: Scrape off and remove from site

Treatment biocide: Apply appropriate solution to growth areas and surrounding surfaces.

Residual effect biocide: Apply appropriate solution to inhibit re-establishment of growths.

711 COATING GENERALLY

Application standard: In accordance with BS 6150, clause 9.

Conditions: Maintain suitable temperature, humidity and air quality during application and drying.

Surfaces: Clean and dry at time of application.

Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.

Overpainting: Do not paint over intumescent strips or silicone mastics.

Priming coats:

Thickness: To suit surface porosity.

Application: As soon as possible on same day as preparation is completed.

Finish:

Even, smooth and of uniform colour.

Free from brush marks, sags, runs and other defects.

Cut in neatly.

Doors, opening windows and other moving parts: Ease before coating and between coats.

Dust, particles and residues from preparation: Remove and dispose of safely.
Water based stoppers and fillers:
Apply before priming unless recommended otherwise by manufacturer.
If applied after priming: Patch prime.
Oil based stoppers and fillers: Apply after priming.
Doors, opening windows and other moving parts:
Ease, if necessary, before coating. Prime resulting bare areas.

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Thickness: To suit surface porosity.
Application: As soon as possible on same day as preparation is completed.
Finish:
Even, smooth and of uniform colour.
Free from brush marks, sags, runs and other defects.
Cut in neatly.
Doors, opening windows and other moving parts: Ease before coating and between coats.

## Z21 LIME MORTARS

### 10 MORTAR MIX FOR REPAIR WORKS AND RE-POINTING

- Ratio of 1 part lime to 3 parts aggregate.
- English lime putty and natural hydraulic lime (NHL) from approved sources, see clause 30 and clause 40 below.
- Sands: Suitably graded and washed local Ashton Keynes 'sharp' sand (actually 'ovoid' or rounded/sub-rounded according to English Heritage nomenclature) may be substituted subject to CA approval.
- A sample section of re-pointing will be carried out by the contractor under guidance from the CA before mix is approved for the remainder of the repair works. This operation will allow the exact aggregate grading and proportions to be adjusted and refined in order to achieve the best performing mix for the works.

### 20 APPLICATION OF MORTAR FOR MORTAR REPAIRS AND BUILD-UPS

- Cut around edge of area to be repaired with a sharp chisel to provide a neat, strong edge or rebate to work to. Always follow the irregular outline of each area of decay so as to produce a naturally unobtrusive effect, cf. a straight-edged repair outline following a square or rectangular outline which will appear dominant.
- Exercise extreme care during these operations in order to strike an appropriate balance between:

◆ Executing a thorough workmanlike task of cutting into the stone to create effective rebated perimeters to lacuna.

◆ Conscientious conservation which involves the retention of maximum historic fabric (which in itself precludes cutting out more stone than is absolutely necessary). A sensitive 'stone-by-stone' approach is vital. Repairs in particularly sensitive areas of architectural detailing will be decided on site and subject to CA approval.

- Lightly 'peck' area within this margin with sharp chisel to give a good key and to remove any loose, friable material.
- Dry brush the surface and remove all debris from stone and scaffold. Flush loose dust from surface and wet stone several times with limewater.
- Re-mix matured mortar to plastic state and add pozzolanic additive if required.
- Prepare slurry of diluted 'surfacing' mortar (refer to clause 16 for mix) to be used as a 'tack coat'.
- Paint 'tack coat' onto area to be repaired and allow some slurry moisture to be absorbed by stone.
- Take care to remove any slurry outside repair area to avoid 'halo' marks on surrounding stone.
- Apply mortar firmly by spatula, small-tool and/or rounded pointing trowel to a maximum coat thickness of 12-15 mm. Take care to pack mortar tightly into all cavities before laying in the bulk of each repair.
- Ensure an ample supply of clean, suitably shaped and dampened tile fragments for quick selection of appropriate shape(s) for each repair.
- Non-ferrous armatures may be required, e.g. ceramic armature types. They are often more useful broken up into short 'stubs'. Set them horizontally into dampened holes at an approximate depth of 10 mm using a dab of the 'buttercoat'. The location holes should be of a slightly larger diameter than the armature so that they grip.
- Compress mortar after it has stiffened slightly; typically 5 to 15 minutes after application. In general, press in the work as and when shrinkage cracks appear.

- A second coat can be applied when the first is leather hard; typically 12 to 24 hours after first application. The surface of the first coat should be keyed. Build up and compress further layers as required.
- Surface can be textured by scraping back or beating with a bristle brush when leather hard.
- Protect mortar repair after initial compression using damp cotton hessian/cloth.

## 25 SAND FOR MORTAR

- To BS 1200 unless specified otherwise.
- Sand for facework mortar to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture.

## 30 LIME PUTTY

- Use mature lime putty which has a minimum age of 3 years (essential). CC and CA reserve the right to verify source and age of lime putty used for all repairs.
- Lime putty is to be have been made by slaking freshly burnt lime, with enough water to obtain a soft mass of putty. The slaking lime must be hoed and raked and stirred until the visible slaking reaction has ceased. Sieve to remove un-burnt lumps and coagulations using a 2 mm screen.
- Lime putty, with a shallow covering of water, to have been stored for a minimum period of three years.
  There is no upper limit to the storage period, providing the lime is properly 'knocked up' prior to use.
- Obtain lime form approved suppliers, in plastic bins, dated with date of slaking.
- Approved suppliers of lime:

- Heritage Lime
  Henley Farm, Miserden, Stroud, Gloucestershire GL6 7HZ
  Tel: 01285 821751
- The Lime Centre
  Long Barn, Morestead, Winchester, Hampshire SO21 1LZ
  tel: 01962 713636
- Limebase Products Ltd.
  Walronds Park, Isle Brewers, Taunton, Somerset TA3 6QP
  tel: 01460 281921
- Rose of Jericho Ltd.
  Westhill Barn, Evershot, Dorchester DT2 OLD
  tel: 01935 83676 fax: 01935 83676
- The Traditional Lime Company
  Church Farm, Leckhampton, Cheltenham, Gloucestershire GL53 0QJ
  tel: 01242 525444
- Ty-Mawr Lime Ltd.
  Unit 12, Brecon Enterprise Park, Brecon, Powys LD3 8BT
  tel: 01874 611350
- Mike Wye & Associates Ltd.
  Buckland Filleigh Sawmills, Buckland Filleigh, Beaworthy, Devon EX21 5RN
  tel: 01409 281644

## 40 HYDRAULIC LIME

- Use Blue Lias hydraulic lime, from approved sources only.
- Approved suppliers of hydraulic lime: as clause 30 above.

**50 ADMIXTURES:** Do not use any admixtures.

**60 MAKING MORTAR**

- Measure materials accurately by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.
- By adding the sand to the lime putty, mix ingredients thoroughly to a consistency suitable for the work and free from lumps.
- Ensure 'coarse stuff' is well beaten, rammed and chopped to ensure the best mix.
- Do not add excess water to the mix. It is not required. By following the above instructions, excess water is not needed.
- Do not use an ordinary cement mixer for mixing. A traditional 'larry' or a paddle mixer may be used.
- Make up a large enough batch of mortar to complete work on each elevation at the commencement of works. This ensures consistency of mix, and also a mature coarse stuff.
- Store coarse stuff in air-tight containers, to allow for later knocking up when required. There is no upper limit for the storage period of coarse stuff if stored properly.
- Mortar is to be tipped out of the containers and the whole batch knocked up. Again, no excess water is required at this point.
- Keep plant and banker boards clean at all times.

**70 ALL LIME-BASED MORTARS**

- Are to be thoroughly protected from running or surface water for a minimum period of 36 hours after incorporation into the works.
- Unprotected work may require removal and re-instatement at discretion of the CA.

**80 LIME-BASED MORTARS**

- Must not be used in adverse weather conditions, i.e. when outside air temperature is less than 1°C.
- Work in cold weather shall be protected to ensure a minimum temperature of 5°C is maintained in the work when laid, and must be maintained for at least seven days after use.
- In any case, work with mortar shall cease at 2°C on a falling temperature and only re-commence on a rising temperature on 1°C, even when protected.
- No mortar plasticisers of anti-freezes may be used at any time.
- During any break in use of mortar, all work shall be protected against rain, frost and snow with waterproof coverings.
- Work in hot weather shall be permitted even when the air temperature adjacent to the work exceeds 25°C, so long as ambient humidity is kept sufficiently high. Avoid all draughts and hang wetted hessian on the outer scaffold. Protect the work at night with additional wetted hessian hanging slightly away from the work, this in turn to be covered by plastic sheeting.
- Wet hessian must not be allowed to blow against any of the work areas in order to avoid lime blooming.
- During any period where the temperatures exceed 25°C, all work less than three days old is to be kept moist and prevented from rapid drying out by using hessian and plastic sheeting as stated above.

**90 CEMENT**

- Do not use cement of any type for lime-based mortar repairs.

## Z22 SEALANTS

NB To be read in conjunction with the preliminaries, the schedule of works, drawings and other supporting documents.

10A LEAD SEALANT TYPE
Silicone rubber
Product: BLM Lead Pointing Sealant (grey), one-component adhesive sealant, available from:
BLM
Peartree Lane, Welwyn Garden City, Hertfordshire
tel: 0800 117 882
www.britishlead.co.uk
sales@britishlead.co.uk

20A SUITABILITY OF CHASES
Pre-application checks:
Chase dimensions: within limits specified for the sealant.
Substrate quality: surface regular, undamaged and stable.
Chases deemed unfit to receive sealant: submit proposals for rectification to CA.

30A PREPARING JOINTS:
Surfaces to which sealant must adhere:
Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
Clean using materials and methods recommended by sealant manufacturer.
Vulnerable surfaces adjacent to joints: mask to prevent staining or smearing with primer or sealant.
Protection: Keep joints clean and protect from damage until sealant is applied.

40A APPLYING SEALANTS
Substrate: Dry and unaffected by frost, ice or snow.
Environmental conditions: Do not dry or raise temperature of joints by heating.
Sealant application: Fill chases to depth of 10 mm only.
Sealant profile: slightly concave.
Protection: protect open chases from contaminants or damage until sealant has cured.

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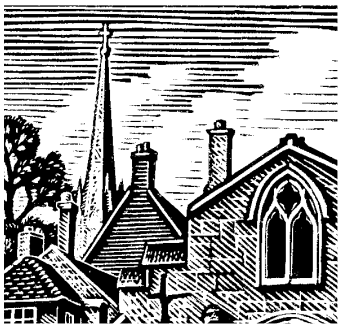

1280-07/CJK/AFK March 2025

# **BATH ABBEY, BATH**: TOWER ROOF PROJECT

# HEALTH & SAFETY SECTION - for approval

NB: to be read in conjunction with the preliminaries, the technical specification, and drawings and Structural Engineers' drawings and specification. Drawing references: St Ann's Gate Architects drawings; 1280-07- 300, 301, 310, 311, 312, 350, 351, 352, 353, 354, 355, 356, 357, 360, 361 & 362.

## 10 SITE LOCATION AND NATURE OF PROPOSED WORKS:

Bath Abbey is located in the centre of the historic city of Bath: see site location plan 1280-07-300. This is a very busy location with many restrictions on traffic and parking around the Abbey. The site is the Tower roof of the Abbey which is one of the highest structures in Bath. The Tower has very restricted access and as such the works will require a significant scaffold to both get material and personnel on to the roof.

The proposed works are described fully in the tender documents and associated drawings. It comprises a range of repair works to the Tower roof, including carpentry repairs, replacement of the failing lead roof covering with a new EPDM membrane and fitting of a new GRP walkway, circular timber bench and stainless-steel mesh guarding to the perimeter parapet.

**Summary of works:**

1. Site set up including access, welfare and security measures, required to carry out the works and for use by the contractor during the contract period.
2. The erection of external scaffolding to the northeast corner of the abbey to provide access on to the Tower roof including any protection measures to glazing etc. NOTE: the scaffolding is to be designed to bridge over a underground chamber situated at the junction of the North Transept and the Choir: refer to site set up drawing 1208-07-301 and specification section B10.The proposed scaffold design is to be approved by architect and structural engineer before erection.
3. Alteration and amendment to lightning protection to Tower roof to suit new covering etc. including final certification.
4. Removal of lead coverings to Tower roof including to gutters, outlets and cover flashing in agreed sequences Note: Historic lead coverings to 'Weights Cabin' to be retained other than cover flashings.

5. Inspection and repairs (if required) of supporting timber joists and beams to Tower roof – to include protection to Belfry below.
6. Replacement and refixing of any damaged or loose roof boarding to exposed areas of roof: to include works to flagpole base.
7. Fixing of 18mm external quality plywood over existing roof boards including gutters, outlets and to abutment upstands: to include new upstand fixing for proposed circular bench.
8. New fully adhered EPDM 1.5mm membrane roof covering to Tower roof including gutters, outlets, upstands, flagpole base etc. To including new lead code 5 cover flashing to masonry abutments with lime-based pointing to match.
9. Work to Weights Cabin including, repair of timber hatch, repair and refixing to lead coverings and new code 5 lead coverings with lime-based mortar pointing to match.
10. New circular-planned timber bench in two parts with galvanised supporting frame with associated downlight LED strip.
11. GRP open mesh anti-slip walkway including aluminium supporting frame and adjustable pedestals to suit two proposed levels to tower roof. To include step detail with high-visibility anti slip nosing with associated downlight LED strip.
12. New stainless-steel mesh guarding to lower level parapet openings.
13. Reinstatement of lightening protection to Tower roof etc.
14. Repair and decoration of Tower roof.
15. New external electric sockets to outside of Tower turret.
16. Repointing to parapet masonry and associated copings.
17. Removal of scaffold and making good to site area as required.

Clear and regular communication between the Abbey, design team and the main contractor is important during the works. Regular site meetings are to take place as well as a pre-start meeting.

**The safety of the public and Abbey users is paramount when carrying out the works including the erection of the scaffolding and the delivery of material. The contractors are to compile method statements for this in their contract phase health and safety plan.**

## 20 CONSTRUCTION ACCESS ROUTE

Site Access: The Abbey is situated in the centre of the city of Bath and is enclosed with public pathways which are heavily used: especially to the west front of the Abbey and along Orange Grove. Access roads to the Abbey are restricted and tenderers must satisfy themselves as to the adequacy of their allowances for access for deliveries etc. Delivery of materials etc should, if possible, avoid peak traffic periods and meet any relevant local authority or highway requirements. The selected contractor will be responsible for obtaining and maintaining any highways or pavement licences.

## 30 SITE COMPOUND & SCAFFOLDING:

A fenced site compound with welfare facilities will be situated on the north side of the Abbey - see site set up drawing 1208-07-301. Part of the proposed site compound is situated on the public pavement. This will require the appropriate pavement licence. is to have 4m solid hoarding at ground level and be fully netted. The internal scaffolding is to have a crash deck with debris and dust protection at the main working level of the scaffolding just below the ceiling within the belfry.

## 40 OCCUPIED PREMISES:

The Abbey will be in use during the Contract but the Tower Tours will be suspended. The Tower bells will also only be used when agreed. Temporary dust/debris protection will be used during opening up of the roof boards. The chosen contractor must carry out the Works without undue inconvenience and nuisance and without danger to occupants and users.

## 50 PLANNING AND MANAGING THE CONSTRUCTION WORKS:

The Principal Contractor shall coordinate Health and Safety of all contractors, organisation and person on site.

The Principal Contractor shall formulate specific site safety rules, organise induction training and shall ensure the effective dissemination of information to all contractors, organisation and persons onsite and or delivering to site.

The principal Contractor will be responsible for the assessment of all sub-contractors prior to appointment, in order to comply with The Construction (Design and Management) Regulation 2015.

Additional and specific rules will be developed by the Principal Contractor during the development of the Construction Phase Plan, in any event before the constriction phase starts. The construction Phase Plan will be updated through the life of the project.

Each organisation and contractor represented on site shall:

- Nominate a safety supervisor or representative who will attend safety coordination meetings held by the Principal Contractor.
- Ensure that their personnel are informed of all significant hazards onsite
- Ensure that all personnel carry out their work in a safe manner observing the rules and safety notices.

All personnel employed in the site whether employees of the Principal Contractor or other organisations or contractors, shall receive induction training before they commence work on site to advise them of the site rules and the significant findings of the site risk assessments undertaken by the Principal Contractor.

The Principal Contractor will ensure that all operatives are properly trained in their respective duties as required by the Construction (Design and Management) Regulations 2015 and the Management of Health and Safety at Work Regulation 1999.

All designers will prepare Design Risk Assessments and Method Statements and continue to update them in line with any design modifications.

The Principal Contractor must ensure that all plant and equipment brought onto the site in a safe condition, well maintained and complies with statutory requirements and procedures.

The Principal Contractor shall comply with all relevant legislation as regards noise and dust protection for workers onsite and members of the public and school. The use of radios within the site compound is to be strictly prohibited.

NOTE: Many common construction tasks can produce high levels of dust including: cutting or drilling stone, brick or roofing tiles. Silica is the biggest risk to construction workers after asbestos. Heavy and prolonged exposure to Respirable Crystalline Silica (RCS) can cause lung disease and other serious respiratory diseases.

## 60 RISKS TO HEALTH AND SAFETY:

The nature and condition of the site/building cannot be fully and certainly ascertained before it is opened up. However, the following risks may be present:

- working at height
- lead based materials
- lime based materials
- asbestos
- slips, trips and falls
- material and manual handling
- eye and skin hazard (lime)
- dust (airborne fibres and materials)
- unstable existing construction
- marauding Seagulls

The accuracy and sufficiency of this information is not guaranteed by the Employer or the Architect and the Contractor must ascertain for himself any information he may require to ensure the safety of all persons and the Works.

**70 SMOKING**

Smoking will not be permitted anywhere on the site. Any site operative found smoking on or in the Abbey building will be expelled from site immediately and without further warning.

**90 ASBESTOS**

There is no known asbestos in the Tower roof and none was visible when inspected. However, all workers and supervisors are expected to be able to recognise asbestos containing materials (ACMs) and should know what to do to protect themselves and others if such a discovery is made.

All workers and supervisors must have had sufficient asbestos awareness training and be able to prove such training or levels of experience to the client/ Contract Administrator/ Principal Designer (if appointed), prior to works commencing on site.

The Principal Contractor must make all personnel on site aware of the possible threat of asbestos under their duty of care.

Should the contractor encounter material during the work that may be ACM, work is to cease immediately and the area made safe and cordoned off. The Architect/CA must be informed immediately. Should asbestos removal be required as part of the contract works, this must only be carried out by competent and suitably licenced asbestos removal contractor and must be completed before other works are commenced. Details of the completion, removal and disposal together with records of the air monitoring are to be recorded in the Health & Safety File.

**100 CONSTRUCTION PHASE HEALTH AND SAFETY PLAN**

A Construction Phase Health and Safety Plan is required prior to commencement of work. This must be compiled by the contractor and presented to the Architect/CA and Principal Designer for comment at least two weeks prior to commencement on site.

**NB: See preliminaries section A34 for further requirements for general health and safety management. Also, section B10 of the specification for scaffolding.**

# Bath Abbey, Bath: Tower Repair Works

## DESIGN RISK ASSESSMENT FORM

This schedule is only intended to highlight significant risks associated with the building design that are: not likely to be obvious to a competent contractor/unusual and/or likely to be difficult to manage effectively. Contractors or persons carrying out the works are expected to be competent with respect to works on a building site and identify and assess all other risks associated with the work.

Significant hazards, identified and assessed using the following rating system.

| **a** | **Probability of an injury occurring from the risk** | **b** | **severity of injury** |
|---|---|---|---|
| 1 | Impossible | 1 | minor injury |
| 2 | possible | 2 | injury/disease (<3 days lost) |
| 3 | likely | 3 | reportable injury (>3 days lost) |
| 4 | very likely | 4 | major injury (>3 days lost |
| 5 | almost certain | 5 | death |

The cumulative score (a x b = c) is calculated resulting in a priority for action

| **result** | **action** |
|---|---|
| 1-4 | low priority no action – no action or design change required |
| 5-8 | low priority action – action required - protect |
| 9-10 | medium priority action – reassess design – protect or modify |
| 11-18 | high priority action – reassess design - protect or modify |
| 19-25 | urgent action - redesign |

| **hazard** | **assessment** | | | **action/ mitigation** | **remaining risk/control** | **further action required** |
|---|---|---|---|---|---|---|
| | a | b | c | | | |
| | X | X | X | | | |
| PRE CONSTRUCTION | | | | | | |
| **RISK OF FALLING:** Working at height during pre-construction/ site set up period. | 2 | 5 | 10 | Action to be taken by contractor to ensure provisions are put in place to prevent falling | Action to be taken by contractor to ensure provisions are put in place to prevent falling | Ensure tenderers are aware of risk items and experienced in this type of work. |
| **RISK OF INJURY** arising from structural collapse of basement | 2 | 5 | 10 | No load bearing on basement by scaffold unless agreed with SE | Scaffolding design to comply with SE requirements. | Ensure tenderers are aware of risk and are experienced in this type of work. |
| DURING CONSTRUCTION | | | | | | |
| **RISK OF FALLING:** As above: internal Belfry | 2 | 5 | 10 | As above | As above | As above |
| **RISK OF FALLING:** External scaffold/ roof. | 2 | 5 | 10 | As above | As above | As above |

| | | | | | | |
|---|---|---|---|---|---|---|
| **RISK OF ILLNESS:** Potential for working with existing asbestos | 2 | 5 | 10 | No asbestos is currently known to be present in the construction of the roof. | Contractor to ensure workers have Asbestos Awareness Training. | If during construction asbestos is found; the Contractor is to immediately contact the CA for further instruction. |
| **RISK OF ILLNESS:** lime/cement burns | 4 | 2 | 8 | Unavoidable design aspect | Ensure correct staff training on use of caustic materials | Contractor to ensure appropriate PPE is provided and used by site staff |
| **RISK TO HEALTH & SAFETY OF PUBLIC:** Public/clients near site in proximity to construction works. | 2 | 3 | 6 | Unavoidable design aspect | Contractor to ensure appropriate site protection, security of site, all necessary notices and signage | Site staff to be aware of public at all times, good site management and care/signage etc |
| **RISK OF DUST** Potential for creation of dust from works. | 2 | 4 | 8 | Unavoidable design aspect | Contractor to avoid onsite cutting/drilling if possible. | Contractor to ensure appropriate PPE is provided and used including face masks etc. Use of tool extraction etc. Enclose the work to prevent dust escaping to other areas. |
| **RISK OF CONTACT WITH LEAD-BASED MATERIALS:** Illness | 2 | 4 | 8 | Unavoidable design aspect | Gloves to be worn. Provide cleaning facilities | Ensure correct staff training on use of lead materials |