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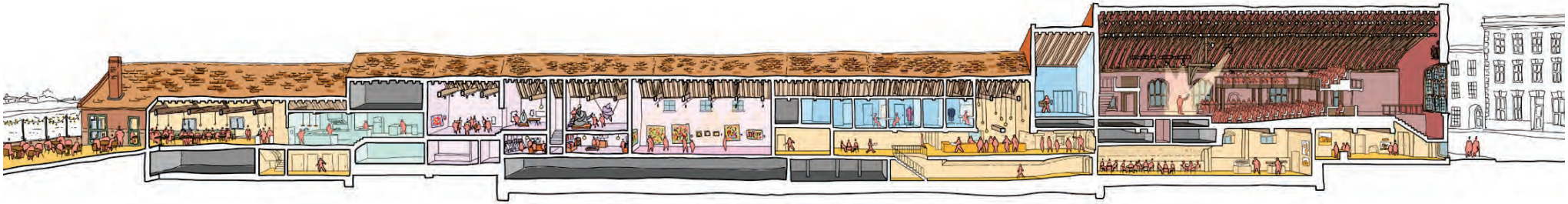

St George's Guildhall King's Lynn

RIBA Stage 4 Report

April 2025 - Rev 01

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Contents

1.0 Introduction

Key tasks carried out during Stage 4
During this workstage, the design team have developed the detail and technical design of the proposals and produced detailed packages of information. This information has been issued to the cost consultant in order to produce the Bill of Quantities, and to the tendering contractors.

Design development & change
Design changes since Stage 3 and outstanding design matters are set-out in section 2.0. The majority of changes are minor and as a result of detailed technical design/ coordination, developed detail briefing and/or to ensure regulatory compliance.

One significant change is the addition of King Street highway works into the project to enhance the public realm outside the Guildhall, improve delivery/ loading access & pedestrian safety and to provide new street furniture and landscaping (benches, public art, trees, cycle parking). RIBA Stage 4 design for King Street is progressing against a later timeframe, due for completion in early May 2025. Provision quantities have been included in the main works tender pack based on the emerging design.

Tender information
Two packs of Stage 4 design & CDM pre-construction information have been completed:
- Enabling Works Tender
- Main Works Tender

Cost
The design team are currently reviewing the Stage 4 cost plan with the Cost Consultant.

Design coordination
Given the pressures on the project programme, Stage 4 has been compressed resulting in some areas of the project being less resolved in terms of technical coordination between design disciplines. These areas have been identified below and should be addressed early in Stage 5.
- Coordination between structure & architecture generally (e.g. structural connection interfaces, lintels to builderswork penetrations, some stair/ balustrade details)
- Spatial coordination of building services in WC areas
- Positioning/ integration of electrical distribution boards
- Coordination of fabric repairs with architectural, structural and building services proposals
- Detailing and making good of fabric demolitions.
- Coordination of below-ground drainage generally
- Coordination of main works with the Heritage Interpretative elements

Similarly, the Bill of Quantities for tender pricing was produced concurrently with the Stage 4 design period and the tight coordination timescales mean that there are some discrepancies between the Bill of Quantities and the tender design information (drawings, schedules and specifications). Work is underway to identify these discrepancies so that the Bill/ design information accordingly. The updated documents will need to be costed and issued as a main construction contract variation. A cost uplift is expected and will be forecast with the Cost Consultant during the tender return review period.

Design reviews
Design reviews have been held with the client team during Stage 4 at monthly intervals. Design reviews have also taken place with the National Trust, as set-out later in this report. The developing designs have also been presented by Haworth Tompkins to the BCKLWN Town Deal Board and the Project Board.

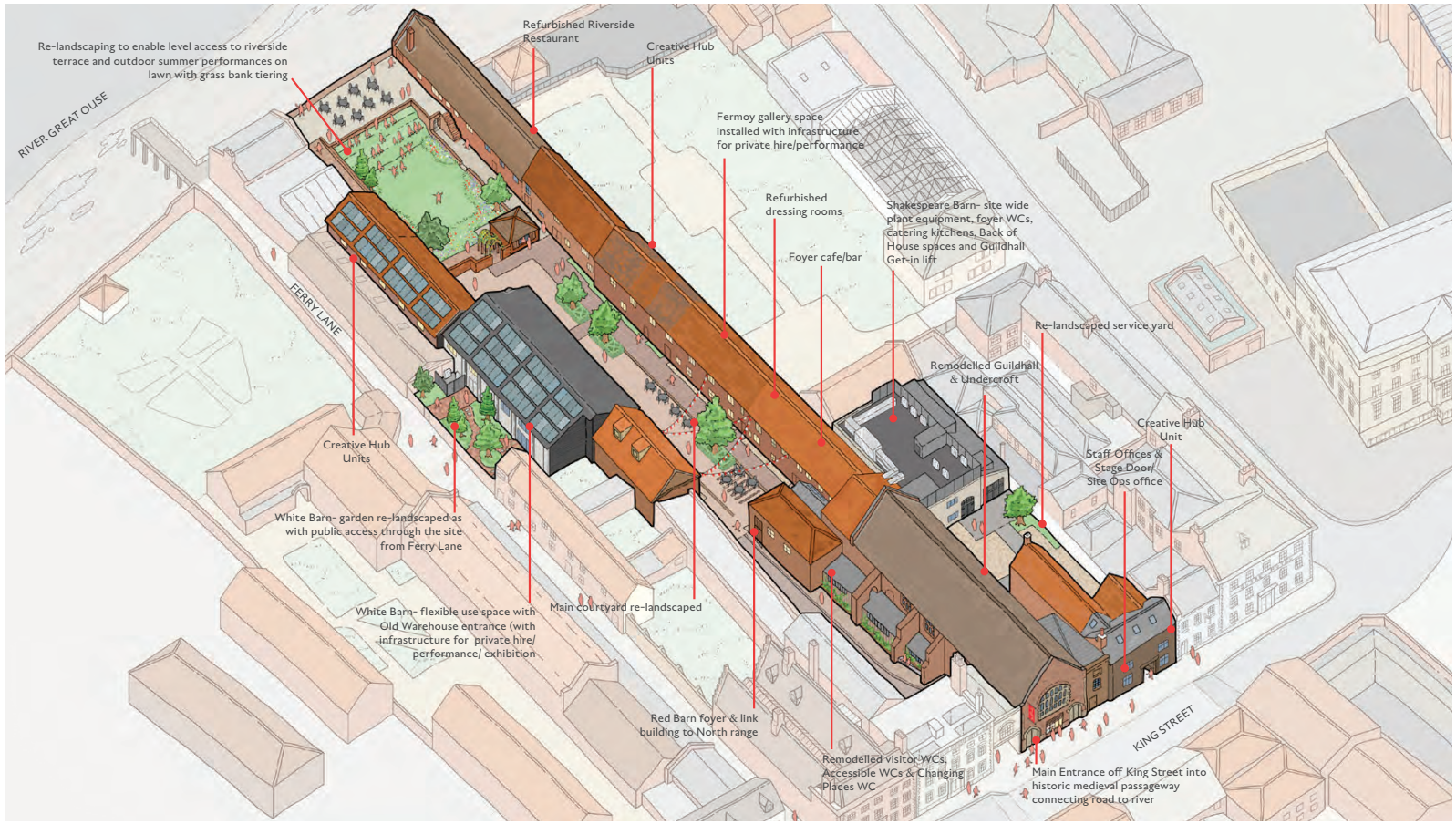
Planning & Listed Building consents
Work is progressing to discharge planning & listed building conditions in good time prior to works commencing on site. This is set-out later in this report.

Building Regulations
Stage 4 design information is ready for Building Control review and will be submitted in the coming weeks. A Building Regulations Compliance Tracker is included later in this report.

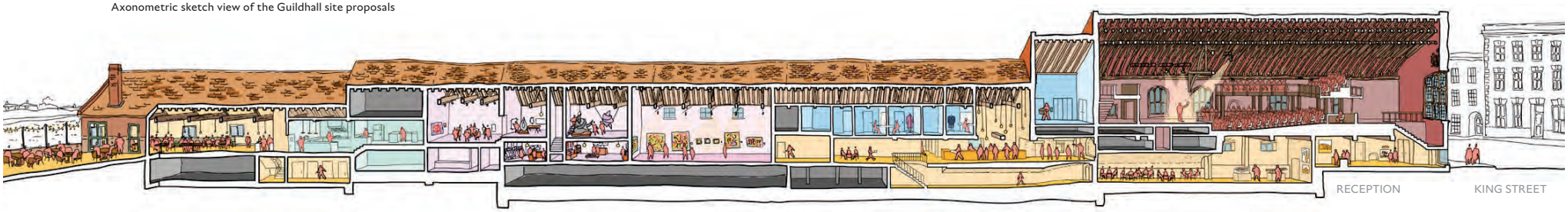
CDM
We have produced the Stage 4 Access & Maintenance Strategy and Hazard Elimination & Management Schedule. These are included later in this report. We have also produced Pre-Construction Health & Safety Information Packs for both the Enabling Works and Main Works.

Party Wall
The design team have submitted information to the Party Wall surveyor to incorporate into Party Wall notices.

Enabling Works
The Enabling Works commenced on 17 March 2025 and run until early May. These works are to strip out the 20th century theatre additions to the Guildhall (removal of stage, proscenium, seating rakes) and associated services in order to reveal the full extent of the medieval floorboards concealed beneath. This will allow archaeological investigations to progress from mid-April onwards, allowing adequate time for any further investigations and recording to take place in advance of the intended main construction works commencing in August 2025.



Axonometric sketch view of the Guildhall site proposals



Sketch long section through the northern range from Guildhall to river

2.0 Design Status

2.1 Summary of changes since Stage 3

General

Increased complexity across all aspects of the project due to greater level of design resolution & coordination between disciplines during Stage 4 – e.g. foundation design, structural interfaces with architectural layout, builderswork openings for services penetrations, fire compartmentation, material construction detailing. This is normal for a project of this complexity and is why a contingency allowance was included for this in the Stage 3 cost plan.

Architectural/ layout changes

Guildhall
- Screen joinery developed to include cabinetry housing for projector, ductwork & containment.
- Modified stair 1 (Sisson stair) balustrade now runs parallel to stair well rather than splayed.
- Mobile stair developed to access stage from stalls pit
- 2hr fire compartment line introduced between Guildhall & North Range as per client insurer recommendation.
- External containment route added between backstage roof and west gable wall.

Undercroft
- Joinery room divider screen omitted.
- Stair from reception reconfigured and entrance door widened to double glazed door with fanlight.

Tunnel
- Lobby door at west end omitted (western part of tunnel no longer to be publicly accessible.

Café bar
- New staff door added through north wall into kitchen.
- Café bar counter shortened to accommodate access corridor route in Shakespeare Barn (see below).

Red Barn
- Shutter omitted from west elevation new window (so that fig tree can be retained).

No. 29 Link
- West façade built up against buttress changed from brick to vertical zinc cladding.
- Roof and parapet form adjusted to clear liftshaft..

No. 29 King Street
- New door to provide safe maintenance access to 'trapped area' between existing external buttresses.
- Existing data cupboard in No.29 King Street reinstated.

North Range Warehouse
- Creative Hub space at first floor level – reduced in size to make space for new maintenance stair access to restaurant plant mezzanine. Stage 3 mezzanine access strategy was a drop-down 'loft' ladder into the restaurant kitchen. This is challenging for means of escape and ventilation equipment replacement. The stair provides more practical and safer access & egress.
- 2hr fire compartment lines introduced as per client insurer recommendation.
- Minor layout adjustment to Creative Hub teapoint WC & shower to improve accessibility.
- Restaurant Undercroft – demolition of 1740s vault to make space for sprinkler tank
- Restaurant finishes/ fit-out excluded from the project, including kitchen fit-out. To be by future restaurant tenant.

Shakespeare Barn
- Add corridor from café bar into get-in area to allow back-of-house ground floor route.
- Enlarge lift shaft to allow preferred lift and tolerance around base of buttress
- Substation redrafted according to provisional UKPN requirements.
- Toilets re-planned to accommodate layout changes.
- Gas meter cupboard and flue omitted because gas boiler no longer required in heating plant room.
- Pavers and pedestals to roof plant area omitted.
- Fire curtain to ground floor lobby area omitted and replaced with FR door at bottom of Stair 9.

White Barn
- Switchgear room repositioned with external door access. Gardening store and bin store adjusted to suit.
- Lift & stair core area reconfigured to improve circulation and access control strategy.

White Barn Annexe
- Stair reconfigured to improve circulation layout.
- 4 no. windows at G+1 south elevation omitted. Windows in this elevation upgraded to FR30 as they are on a party wall.

Old Warehouse
- Solar panels omitted from roof (neighbour comment during planning determination process).

Building Services

General
- Restaurant designed to be a tenanted area with sub-metering to heating, water & electrical consumption.
- Existing services to No. 29 King Street retained, including gas boiler, to minimise project costs. Existing No.29 heating system retained where feasible – new radiators proposed as necessary. Pipework running through Guildhall oversized to allow for future connection of No.29 to site-wide heating system (i.e. if remaining gas boiler removed). Space allowed on roof for additional air source heat pumps for additional load.

Electrical
- Greater extent of MICC cabling to meet NT requirements.
- Lighting design developed to key public areas (to Stage 3 level of detail).
- Lightning protection system detail developed as an isolated protection system with finials on the roofs to provide improved property protection and meet NT standards.
- PVs omitted from the old warehouse roof to minimise the planning risk (PVs remain on the White Barn and White Barn Annex).
- IT racks added around the site.

Mechanical
- New gas supply omitted as the total heat load can now be accommodated by the heat pumps.
- GIS conditioning omitted from the White Barn - GIS conditioning is not required for the whole volume, so the environment systems have been reselected to suit.
- Extract fans serving dressing rooms replaced with MVHR. Existing extract fans serving No.29 retained.
- MVHR added for Shakespeare Barn Dry Store.
- Air Source Heat Pump for hot water for restaurant omitted.
- Cold Room Unit for restaurant relocated to Bin Store.
- 2no. buffer vessels rationalised to 1no. in Shakespeare Barn.
- All underfloor heating omitted (replaced with radiators).

Public Health
- Water supply to sprinkler tanks and White Barn to be a secondary supply run below ground rather than having a single supply to site (significant coordination savings).
- Non-softened water supply omitted.
- Existing water meters serving No.29 and No.29C retained.
- Reduced number of SVPs to atmosphere by inclusion of Air Admittance Valves.

Fire detection & prevention
- Horizontal Dry Riser omitted.
- Aspirating fire detection omitted from all areas except Guildhall (replaced with standard smoke detectors).
- 1m3 sump proposed for basement with drainage through NWR façade for floor protection of sprinkler tank room.

Lifts
- Main goods lift reduced in size to be a standard product rather than bespoke lift.

Landscape areas
- Greater extent of below ground services routing in the landscape areas.
- Provision of small power to landscape.

Structure

General
- Considerably more structural detail and complexity compared to Stage 3.

Guildhall
- Various amendments made to coordinate with building services. For example, heavier but shallower steel beam to accommodate more space for services below the stage, and various trimming elements around the stage floor.

Red Barn
- The foundation scheme has been developed; the existing slab is to be demolished and replaced with 150mm thick concrete slab.
- Details of lintels around the existing and new openings developed.

North range Warehouse
- The new café-bar will sit above a raised 100mm deep concrete plinth on top of existing floor .
- Supplementary beams have been included below the floor of the theatre equipment room to facilitate the openings required for the ventilation plant.
- Backstage dormer roof increased in size to accommodate ductwork.
- Details of the restaurant toilet internal structure developed to include new beam and block floor supported on masonry upstand walls and mass concrete footings, with non-load bearing clockwork cubicle walls above.
- Infill walls and part of vault within the undercroft below the restaurant are to be removed to make room for the sprinkler tank. Screw piles to the sprinkler tank slab are now deemed not to be required, and the slab may be cast directly on top of the existing floor structure with an additional levelling screed poured on top of the existing floor.

- A new steel beam at roof level has been introduced to support the restaurant AHU (including pad stones in existing masonry walls) as required for building services. If existing structure is found to be adequate the beam could be omitted. In addition to a new steel beam, the AHU will be accessed via a new stair and new opening with lintel above.

Shakespeare Barn
- The pad foundations scheme from Stage 3 has been redesigned to a raft slab. This allows for a more flexible layout of the below ground drainage pipes which no longer need to avid pad locations. This also mitigates the likelihood of needing to underpin along the north party wall, which should provide a significant cost saving .

White Barn
- Timber screens in the white barn garden with associated pad foundations beneath introduced to form plant enclosure.

White Barn Annexe
- Timber stair specified at stage 3 has been replaced with steel stair.
- New and existing openings have been coordinated with the architectural layout. A new lintel is required over openings in the north elevation. Existing openings bricked up to south external wall to suit architectural layout.

Surface water drainage

The surface water drainage design has undergone significant development to meet the requirements set out in the Anglian Water surface water drainage policies, and to coordinate this with the landscape proposals.

A greater number of existing rainwater pipes - mostly located in the east Maltings Yard, but also at the White Barn Garden - are now being disconnected from the existing combined sewage system and diverted to the river via the primary route through the Maltings Yard.

The increase in surface water flow through the Maltings Yard has prompted the need for an attenuation storage tank below the main concourse. This is in part due to the flow being restricted by the size of the existing pipework in the Maltings Yard, but also due to the potential for the system becoming tidally locked at the outfall. (Note: Tidal locking is the term for when the level of the tide at the outfall of the pipe rises above the level of the water within the drainage system, preventing water from being discharged into the river). The design requirements for the tidally-locked system will need to be agreed with the Lead Local Flood Authority.

Surface water attenuation storage has been provided in the Shakespeare Courtyard in order to restrict surface water run-off to the existing rates, in line with the Anglian Water surface water drainage policy. These include a combination of geocellular storage tanks and gravel sub-bases. The attenuation storage has been designed conservatively assuming that the run-off rates include both foul and surface-water run-off rates. This will need to be confirmed with Anglian water.

Theatre Technical

- Development of loudspeaker system details and inclusion of Alive Norfolk feedback for preferred loudspeaker system and rigging strategy
- Custom step unit included to access high-level rigging bar above gallery seating
- Relocation of upstage motorised truss further downstage, to create masked crossover and performer entrances behind upstage full black, and a corresponding shuffling of the rest of the rigging bars.
- Simplification of Stage 3 Lighting scheme in backstage area and location of control panels for lighting in the Guildhall.
- Simplification of Stage 3 Paging system and coverage.
- Seating to Undercroft (for Heritage interpretation) added to main auditorium seating tender information.

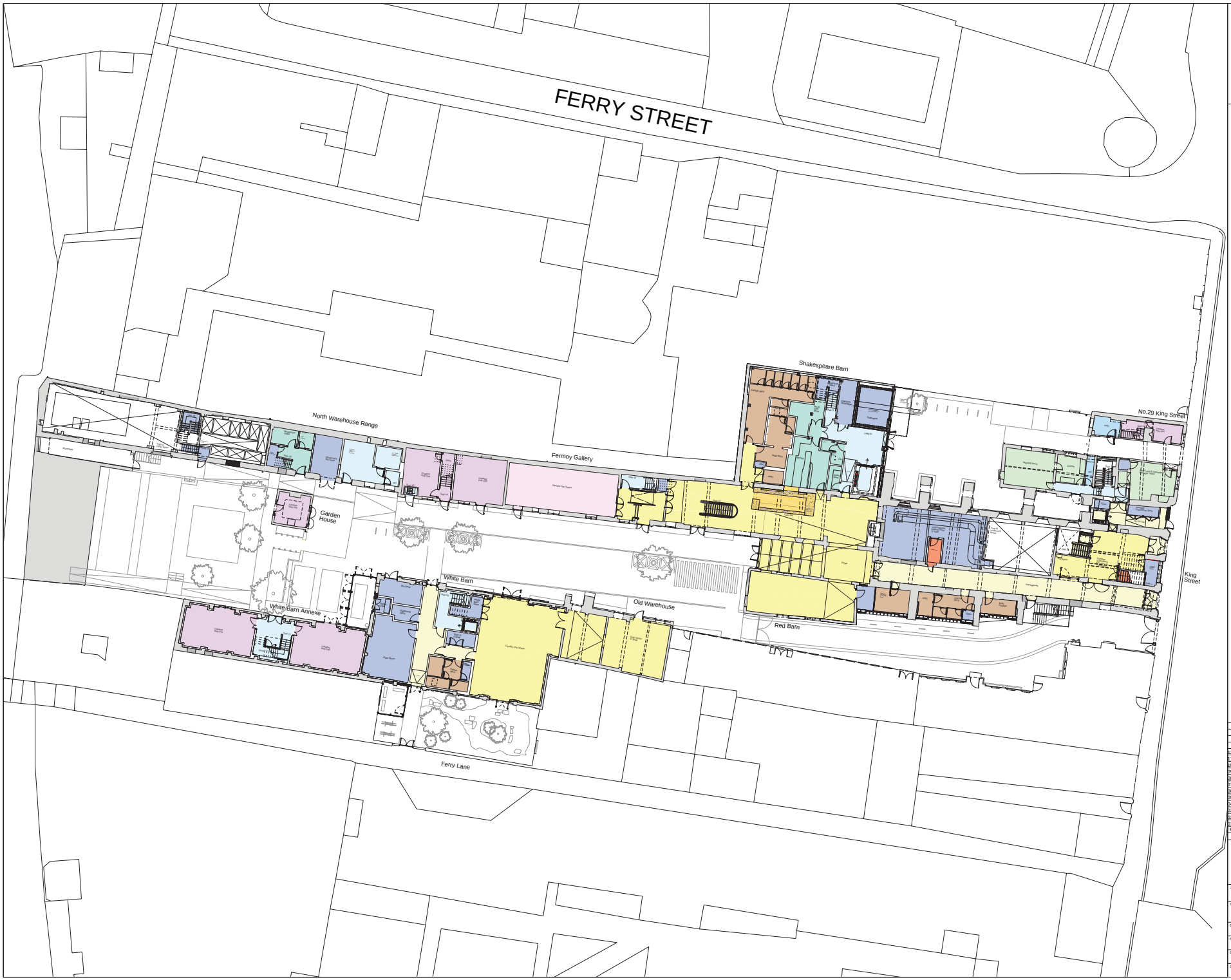
Landscape Design

- Works to King Street Highway added to scope of the project to enhance the public realm outside the Guildhall, improve delivery/ loading access & pedestrian safety, provide new street furniture and landscaping (benches, public art, trees, cycle parking).
- 9 no. additional cycle parking stands incorporated to meet planning requirements.
- Composting area added to White Barn garden.
- Minor adjustments to surfacing types and widths in Maltings Yard
- Steps and retaining wall introduced alongside existing lawn boundary wall and Garden House building.
- Extent of existing planting intended for retention has been reduced due to clashes with proposed windows and doors along the North Range.
- Handrails/ balustrades added to riverside garden & terrace area following accessibility comments.
- Overhead trellis wired removed from White Barn garden.
- New surfacing to access passageway through No. 29 due to new service trenches being formed.

Shakespeare Courtyard

- New concrete surfacing to make good area following removal of Guildhall fire escape stair.
- Quantity of cycle racks increased.
- Rain garden planting between Guildhall buttresses and along No. 29 west façade omitted.

The latest GA plans and elevations of the proposals are shown on the following pages.



DO NOT SCALE

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THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

Area Key

- Performance
- BOH
- FOH
- FOH Circulation
- FOH WC
- Bars
- Catering
- Admin
- Creative Hub
- Gallery
- Plant
- Existing Walls
- Existing Blocked Opening within Existing Wall
- Proposed Masonry Infil within Existing Wall

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11	19/02/25	GA Issue for Tender Backgrounds
10	17/12/24	Issue for Coordination
09	16/10/24	Stage 4 GA Freeze
08	16/04/24	Stage 3 Costing
07	18/03/24	Stage 3 GA Freeze
06	16/02/24	GA Updates
05	19/01/24	GA Revisions & Room Numbers
04	20/12/23	Stage 3 Issue GA Revisions
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302: ST GEORGE'S GUILDHALL

DRG: PROPOSED G+0 PLAN

DRG No: STGG-HTL-ZZ-00-DR-A-00100 REV: 12

SCALE: 1:200@A1 1:400@A3 DATE: 19/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

1/ PROPOSED AUDITORIUM GALLERY PLAN
1:200 @ A1

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DRG No: STGG-HTL-ZZ-01-DR-A-00101 REV: 11

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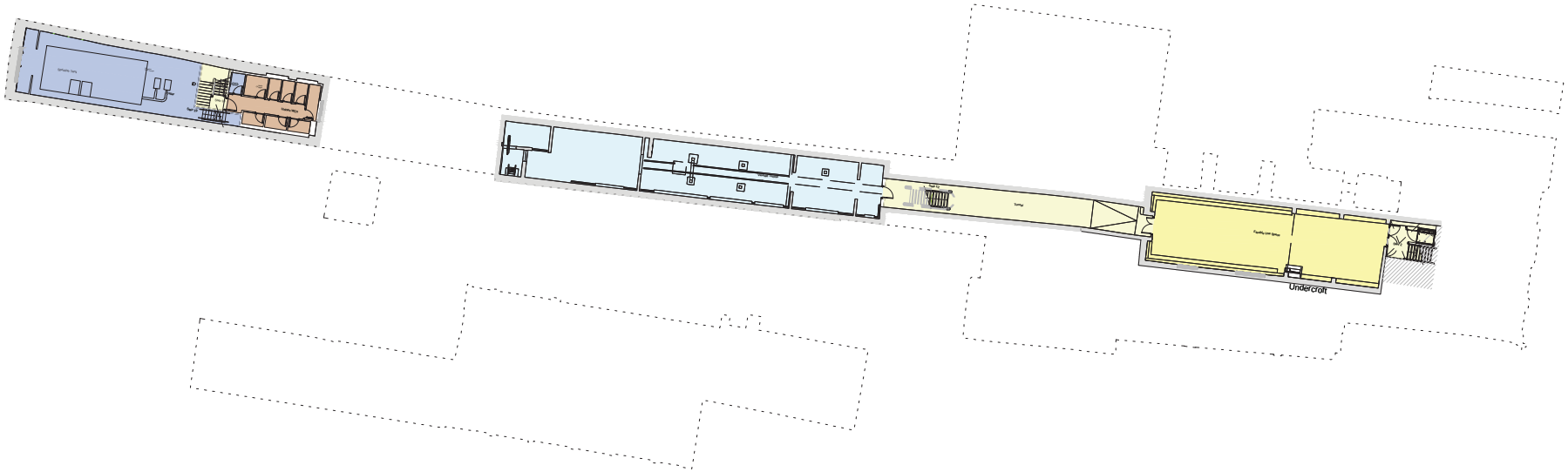
DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



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JOB: 2302: ST GEORGE'S GUILDHALL

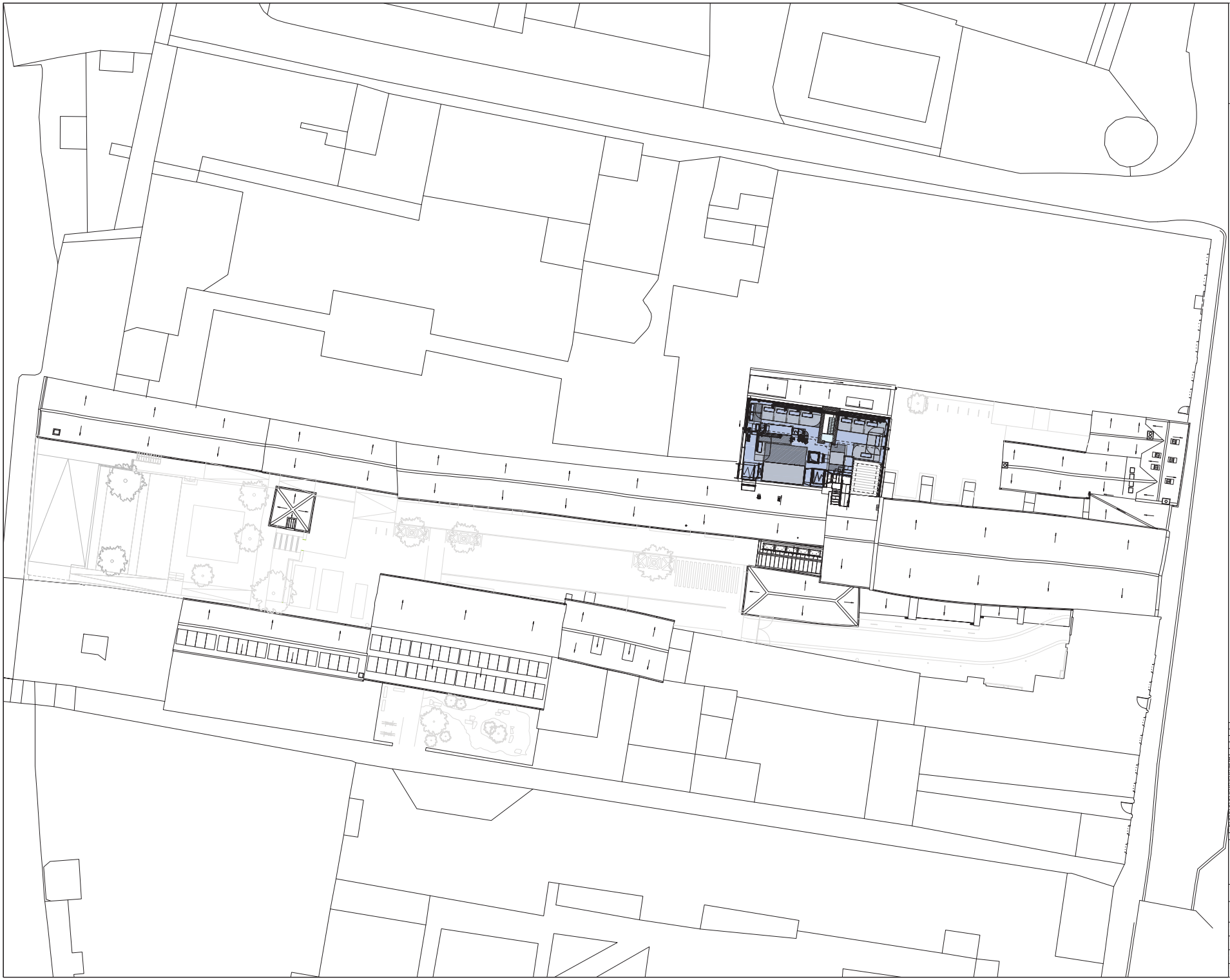
DRG: PROPOSED BASEMENT PLAN

DRG No: STGG-HTL-ZZ-B1-DR-A-00099 REV: 11

SCALE: 1:200@A1 1:400@A3 DATE: 25/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



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JOB: 2302: ST GEORGE'S GUILDHALL

DRG: PROPOSED ROOF PLAN

DRG No: STGG-HTL-ZZ-RF-DR-A-00103 REV: 11

SCALE: 1:200@A1 1:400@A3 DATE: 25/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

1 / PROPOSED KING STREET EAST ELEVATION
1:100

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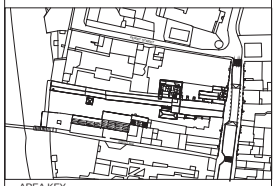

AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	11/02/25	Issued for Billing
09	31/01/25	Issued for Billing
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
04	19/01/24	GA Revisions & Room Numbers
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

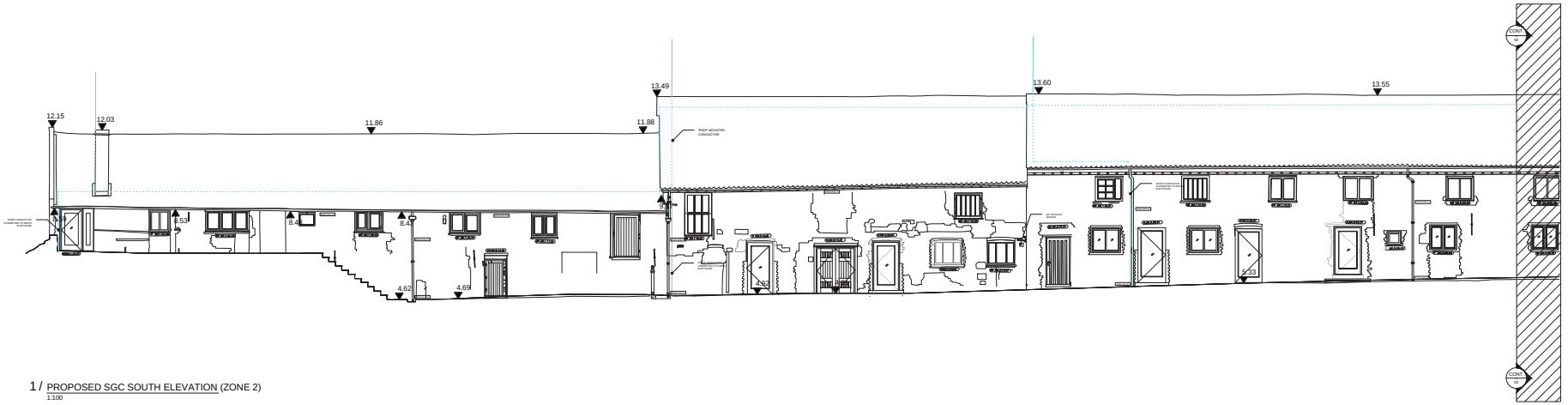
DRG: PROPOSED KING STREET EAST ELEVATION

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00300 REV: 11

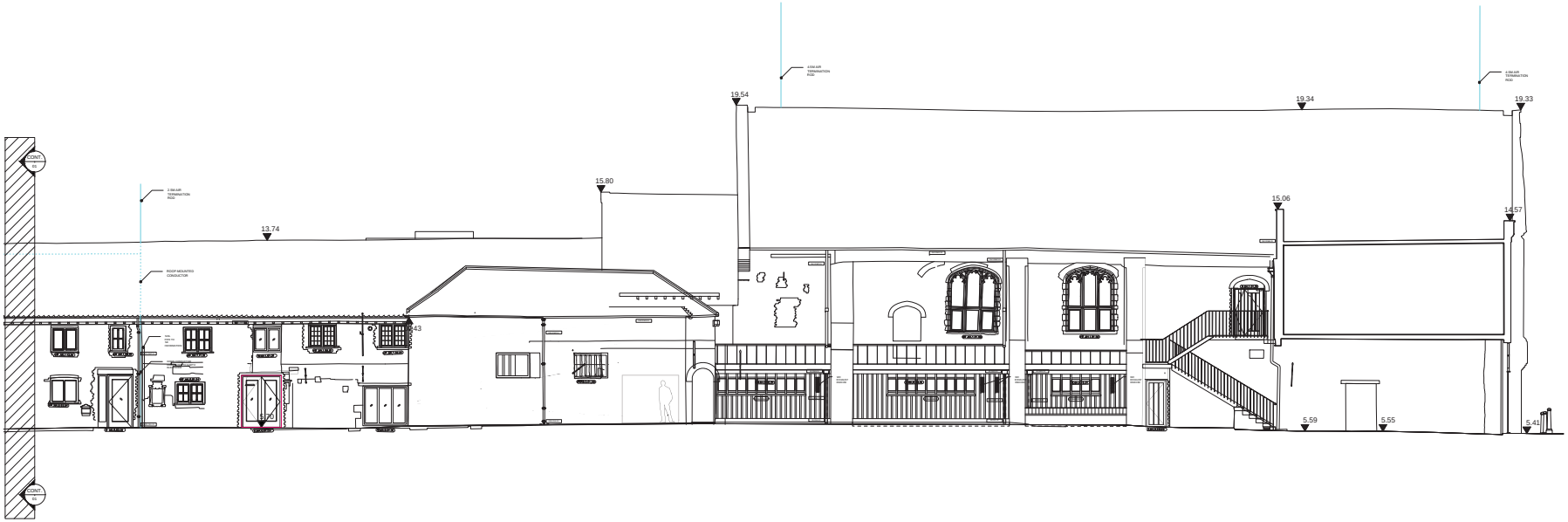
SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1 / PROPOSED SGC SOUTH ELEVATION (ZONE 2)
1:100



2 / PROPOSED SGC SOUTH SOUTH ELEVATION (ZONE 2)
1:100

DO NOT SCALE

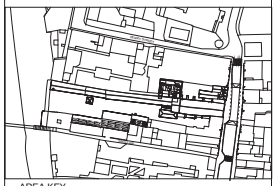
THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	11/02/25	Issued for Billing
09	31/01/25	Issued for Billing
08	16/10/24	Stage 4 GA Freeze
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06	18/03/24	Stage 3 GA Freeze
05	16/02/24	SA Updates
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03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

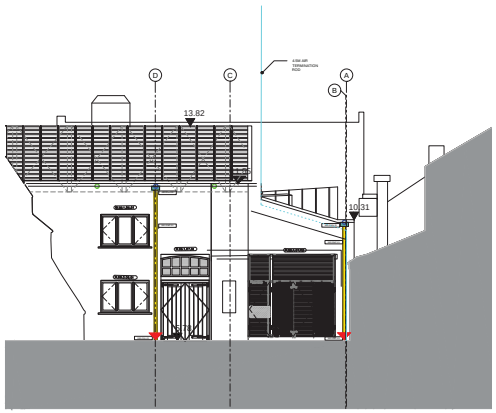
DRG: PROPOSED ST GEORGES COURTYARD SOUTH ELEV

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00301 REV: 11

SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1/ PROPOSED SHAKESPEARE BARN EAST ELEVATION
1:100

DO NOT SCALE

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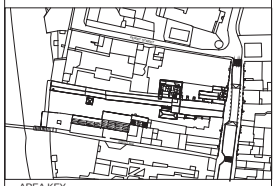
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	11/02/25	Issued for Billing
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JOB: 2302:ST GEORGES GUILDHALL

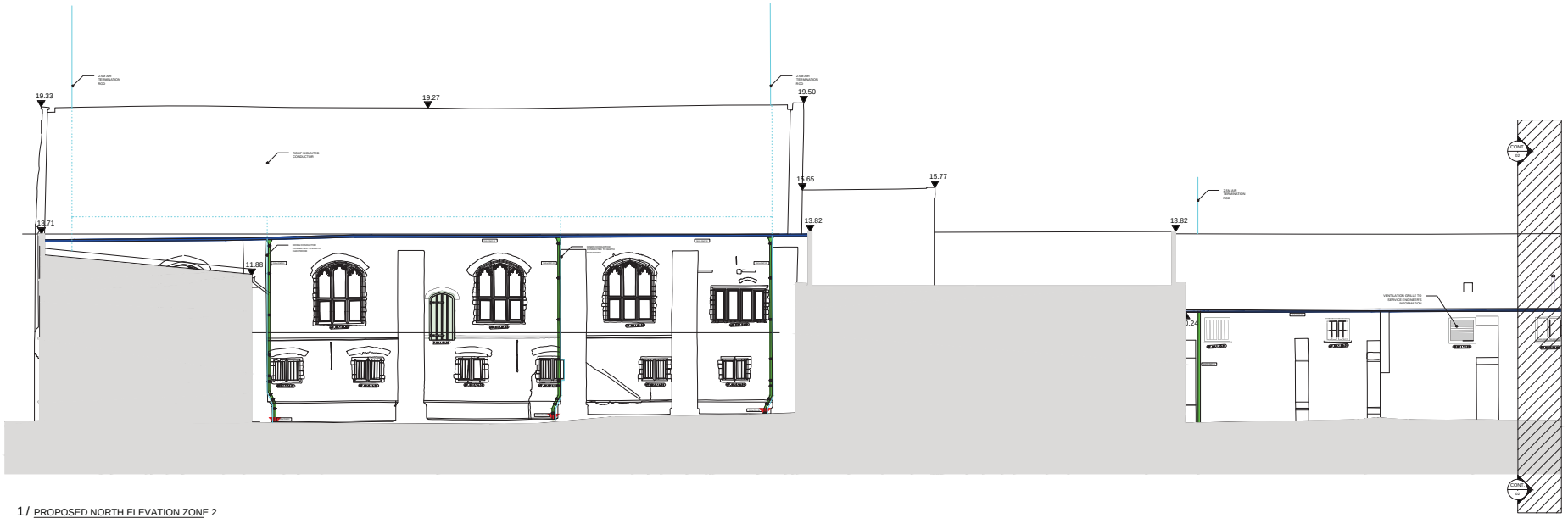
DRG: PROPOSED SHAKESPEARE BARN ELEVATION

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00302 REV: 11

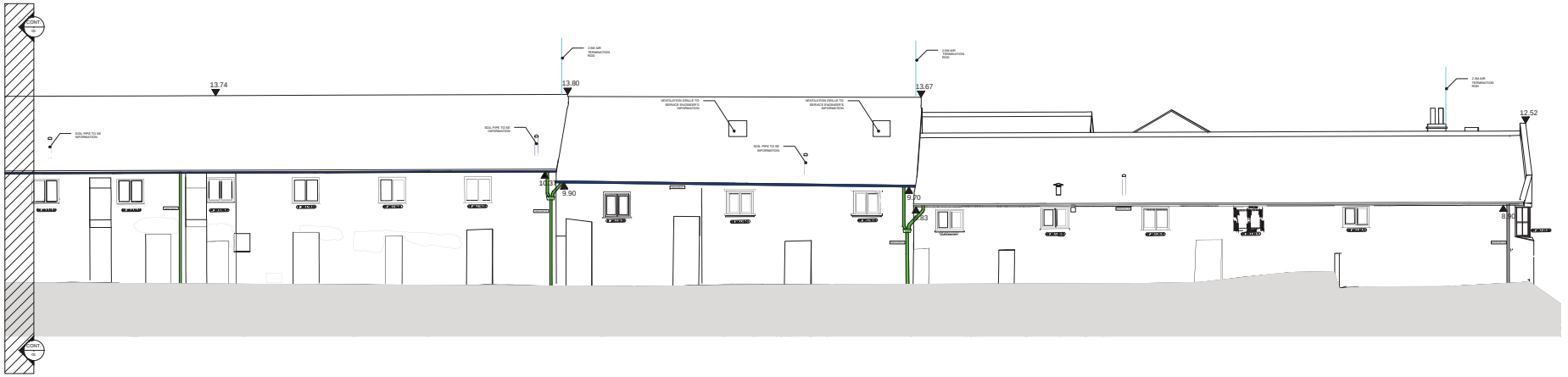
SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1/ PROPOSED NORTH ELEVATION ZONE 2
1:100



2/ PROPOSED NORTH ELEVATION ZONE 1
1:100

DO NOT SCALE

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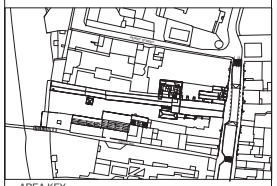
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	11/02/25	Issued for Billing
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JOB: 2302:ST GEORGES GUILDHALL

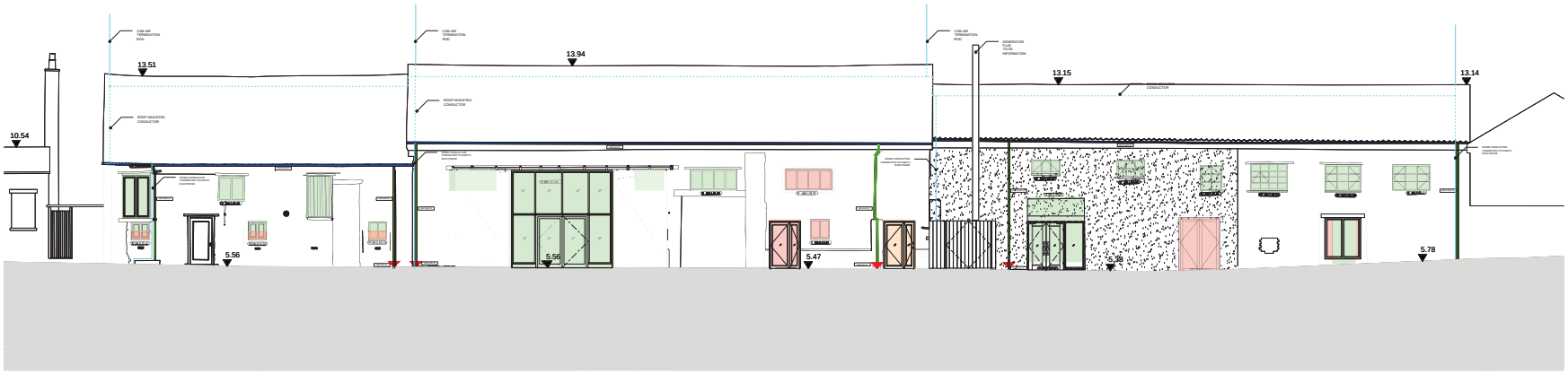
DRG: PROPOSED GUILDHALL / NORTH ELEVATION

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00303 REV: 11

SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1/ PROPOSED SGC NORTH ELEVATION
1:100

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

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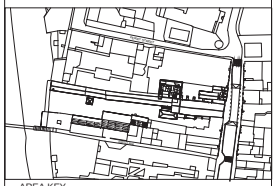
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
10	28/02/25	Tender
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08	16/10/24	Stage 4 GA Freeze
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06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
04	19/01/24	GA Revisions & Room Numbers
03	17/11/23	Measured Survey Information
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01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

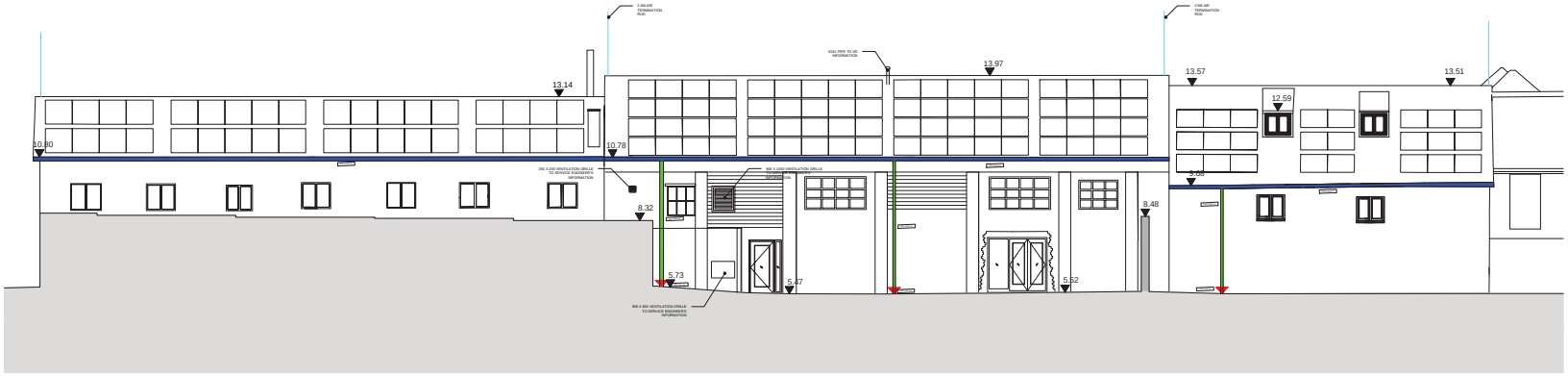
DRG: PROPOSED ST GEORGES COURTYARD NORTH ELEVATION

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00304 REV: 10

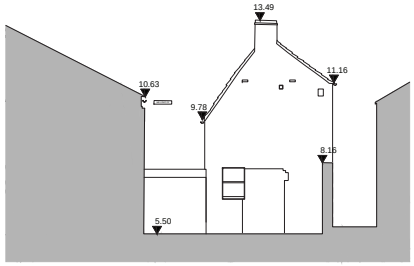
SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

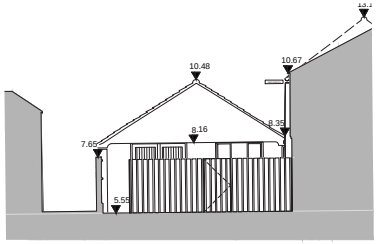
STATUS: TENDER



1 / SCULPTURAL GARDEN NORTH ELEVATION
1:100



2 / SCULPTURAL GARDEN WEST ELEVATION
1:100



3 / SCULPTURAL GARDEN EAST ELEVATION
1:100

DO NOT SCALE

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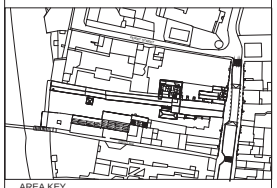
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
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JOB: 2302 : ST GEORGES GUILDHALL

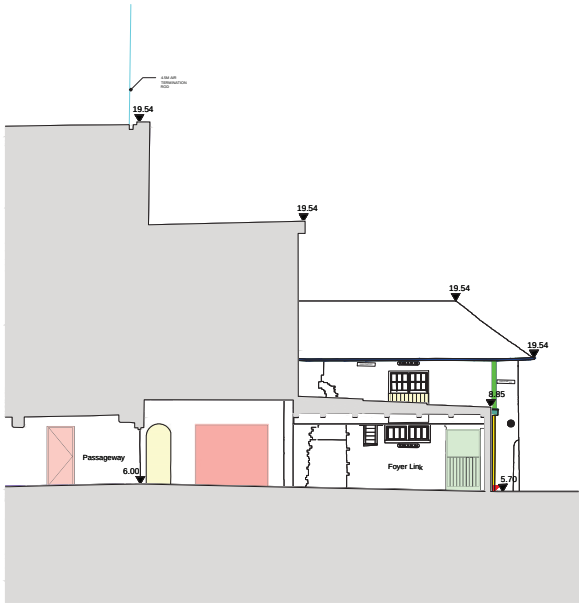
DRG: PROPOSED WHITE BARN GARDEN ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00305 REV: 11

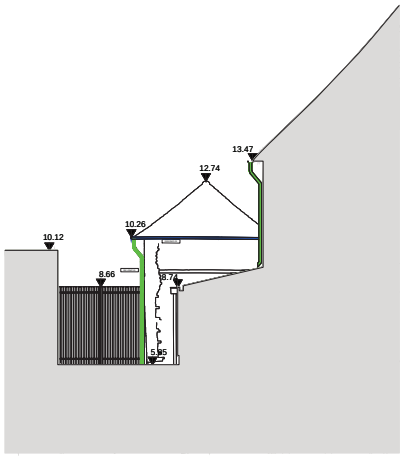
SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

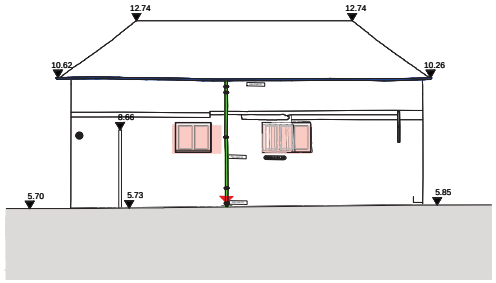
STATUS: TENDER



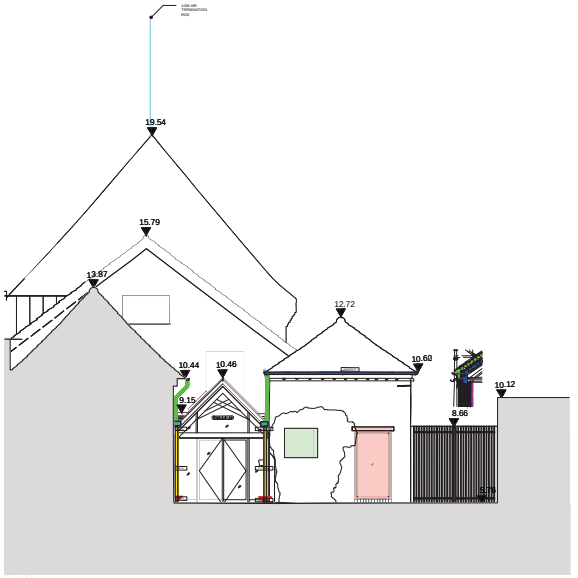
1 / PROPOSED RED BARN NORTH ELEVATION
1:100



2 / PROPOSED RED BARN WEST ELEVATION
1:100



3 / PROPOSED RED BARN SOUTH ELEVATION
1:100



4 / PROPOSED RED BARN EAST ELEVATION
1:100

DO NOT SCALE

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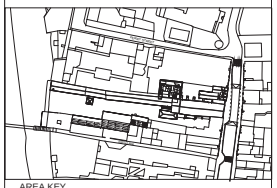
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
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01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

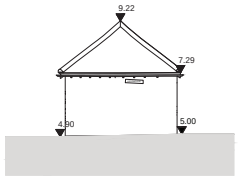
DRG: PROPOSED RED BARN ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00306 REV: 11

SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

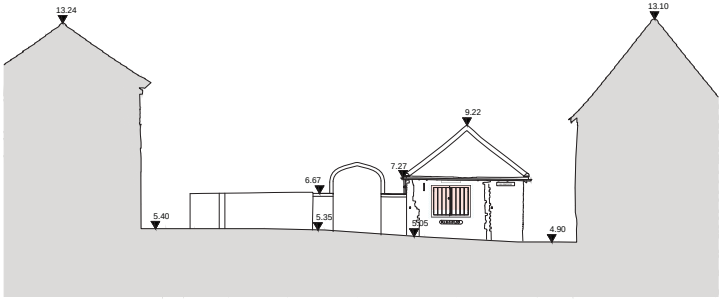
DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

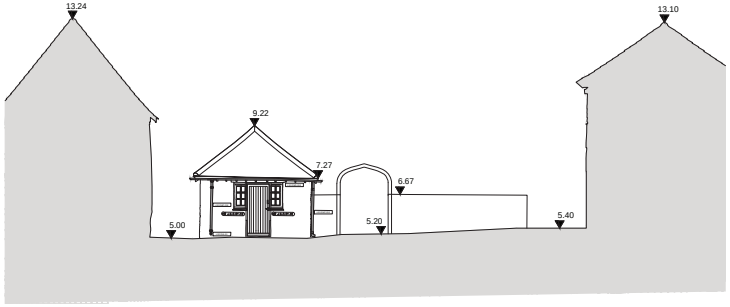


1/ PROPOSED LINEN STORE NORTH ELEVATION
1:100

2/ PROPOSED LINE STORE SOUTH ELEVATION
1:100



3/ PROPOSED LINEN STORE EAST ELEVATION
1:100



4/ PROPOSED LINE STORE WEST ELEVATION
1:100

DO NOT SCALE

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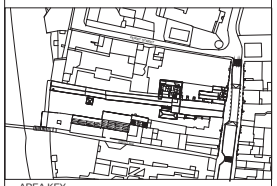
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
- RWG-01b: Circular cast iron rainwater down pipe
- RWG-01c: Rectangular cast iron hopper
- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
- RWG-03b: Zinc rainwater down pipe
- RWG-03c: Zinc hopper
- RWG-04: Parapet rainwater outlet
- RWG-05: Parapet rainwater overflow
- Existing RWGs

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	11/02/25	Issued for Billing
09	31/01/25	Issued for Billing
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	SA Updates
04	19/01/24	GA Revisions & Room Numbers
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

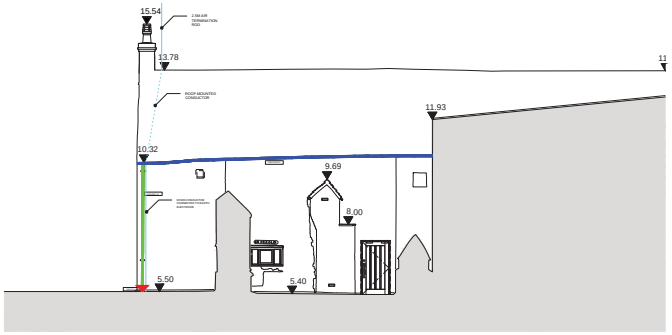
DRG: PROPOSED LINEN STORE ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00307 REV: 11

SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

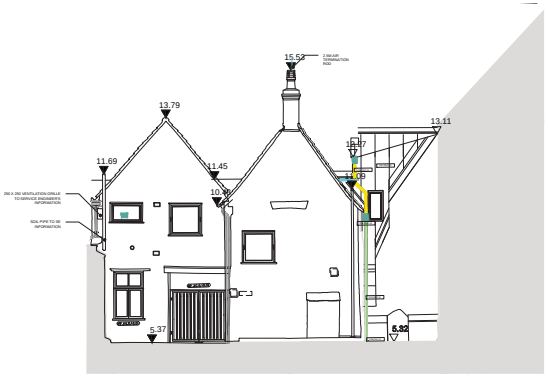
DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1/ PROPOSED NO. 29 EXTERNAL ELEVATION SOUTH
1:100

2/ PROPOSED NO. 29 EXTERNAL ELEVATION NORTH
1:100



3/ PROPOSED NO. 29 EXTERNAL ELEVATION WEST
1:100

DO NOT SCALE

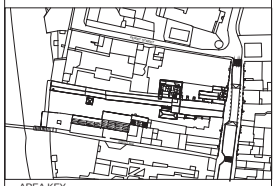
THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



AREA KEY

- Joinery Door (New)
- Joinery Door (Refurbish)
- Joinery Door (Replace)
- Joinery Window (New)
- Joinery Window (Refurbish)
- Opening (Extend)
- Opening (Unblock)
- HT Opening (Block)
- Opening (New)
- Opening (Retain)

RWGs TYPES KEY:

- RWG-01a: Half round cast iron gutter
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- RWG-02: Circular cast iron gully inlet
- RWG-03a: Half round zinc gutter
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JOB: 2302 : ST GEORGES GUILDHALL

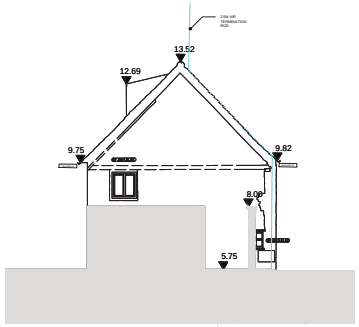
DRG: PROPOSED NO.29 KING STREET ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00308 REV: 11

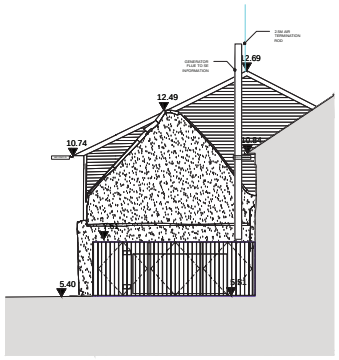
SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



1 / PROPOSED OLD WAREHOUSE WEST ELEVATION
1:100



2 / PROPOSED OLD WAREHOUSE EAST ELEVATION
1:100

DO NOT SCALE

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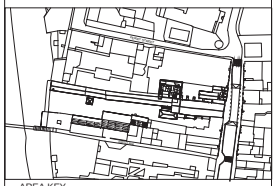
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



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JOB: 2302 : ST GEORGES GUILDHALL

DRG: PROPOSED OLD WAREHOUSE ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00309 REV: 11

SCALE: 1:100@A1 1:200@A3 DATE: 16/04/24

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

2.2 Outstanding design matters

Due to programme pressures, existing building complexity and detail brief development with the client and national trust teams, there are a number of outstanding design matters to be resolved as early as possible in Stage 5. These are listed in the schedule below.

Ref	Date: 01.04.25 Rev: 1 - STAGE 4	Client request	Coordination	Scope Gap/ Outstanding	Design Review/ sign-off/ brief reqd.
1.0 Architectural					
	General				
	Architectural lighting to key public areas and external landscaped areas Design is completed to Stage 3 only. Further design required to bring this up to Stage 4 level of detail.				
	Lighting to external areas Stage 3 proposals to be coordinated with elevations				
	Lift finishes Architectural requirements to be confirmed. Standard finishes assumed as this stage.				
	Wayfinding signage This is not included in the Stage 4 design information. Not included in design team scope. Suggest instruction to HT to carry out design for tender.				
	Loose FFE & Shop fit-out This is not included in the Stage 4 design information. HT understand this will be client direct. HT happy to assist with loose FFE specification and to support/ advise/ recommend Shop fit-out designer.				
	Guildhall				
	Penrose Plaque Retain in similar position, slightly lower down wall to avoid clash with gallery.				
	Proscenium borders/ legs Review with CLB & Tim stretched fabric flats v curtain legs (and additional head track) Finalise placement of access door/ flap for heritage tour access				
	Screen wall Add additional 'performer window' hatch below projector flap				
	Gallery rear balustrade Test/ review more open version - timber balusters and no infil boarding				
	Stage floor hatch to view medieval floor Client request at end of Stage 4 to add hatch in stage floor for heritage interpretation purposes				
	Seats on stage Decorative motif to row end panels (e.g. the Armin comics)? Agree brief and comission artist.				
	Condition repairs to retained external fire escape (south east) Ensure making good defects indentified in client stair survey incorporated into the main works.				
	Finish to oak structure, balustrades & joinery Review & rationalise mix of oiled & intumescent treatments. Confirm by samples.				
	West elevation crest placement Raise crest to higher position on wall so it is visible from main floor level. Add new decorative mesh facing to extract grille.				
	Floor void cavity barrier Add FR cavity barrier n-s in floor void, approx.7m from east elevation (to avoid ductwork penetrations).				
	Undercroft				
	Placement of electrical distribution boards These require a joinery housing - combine with Interpretation plinth joinery?				
	Open up blocked former window to Passageway and add new window. TBC archaeology/ client decision				
	Main entrance reception				
	Reception sideboard cabinet Staff side cabinet needed to conceal electrical distribution boards.				
	Altar floor motif Allow for carved motif in limestone floor paving. PLB to design to match other interpretation graphics.				
	Limestone flooring Potentially can be replaced with reclaimed quarry tiles from current No. 29 Link ground floor.				
	Platform lift Bespoke details for gates and finishes to be confirmed.				

1

Ref	Date: 01.04.25 Rev: 1 - STAGE 4	Client request	Coordination	Scope Gap/ Outstanding	Design Review/ sign-off/ brief reqd.
	Shakespeare Barn				
	New door at bottom of Stair 9, omit fire curtain in lobby area Simplification of fire strategy (protecting the means of escape from rooftop plant).				
	Access through plant acoustic screen to clean/ maintain standing seam roofing Provide access gate through screen.				
	Rooftop stair/ plant access clearances Review with MF and adjust stair enclosure/ plant placement accordingly.				
	Smoke vent flue placement Finalise placement with MF to suit architectural layout.				
	Red Barn				
	New windows to south elevation Revise frame detail to tapered with thinner beads, to match south elevation window more closely.				
	North Range				
	New windows (replacements) in existing openings Required to be FR30 due to being on Party Wall. Check this is captured correctly in window schedule				
	Cuoduroy' tactile internal entrance matting Required to all doorways with stepped entrances as an accessibility feature.				
	Linen Store				
	New servery opening Revise cill height and shutter detail so that opening is accessible. Develop counter design that is				
	Riverside restaurant				
	Staff WC provision Missing. New half flight stair and door opening so that staff can use 1 no. public WC cubicle				
	Old Warehouse				
	Party wall with KLODs building KLODs building has flat roof at interface with White Barn which does not drain and is causing damp issue to Old Warehouse Wall. Review options for cleaning/ improving drainage/ re-roofing.				
	White Barn				
	Evacuation route to Ferry Lane Make sure door and garden gate ironmongery works with this strategy. How does management of the doors work?				
	White Barn Garden				
	Compost area HT timber screen enclosure to be extended to match JCLA information				
	Bats (advice from Wild Frontier)				
	Roosts Add jacked up pantiles 2 per roof to White Barn Annexe, Riverside Restaurant & Old Warehouse near eaves. Add single crevice bat box to west elevation of Riverside Restaurant (install before roofing works				
	Works to existing				
	STGG-HTL-GH-RF-DR-A-02103 - should note rooftiles to be reused. Review other roof plans for similar.				
	STGG-HTL-N3-01-DR-A-02101 - should note floorboards to be reused when new WC access stair				
Building services					
	Lighting to key public areas including landscape areas Design has been progressed to RIBA 3 level of detail only.				

2

Ref	Date: 01.04.25 Rev: 1 - STAGE 4	Client request	Coordination	Scope Gap/ Outstanding	Design Review/ sign-off/ brief reqd.
	IT Racks Client to confirm IT requirements (e.g. racks, equipment etc). Specification includes a reasonable allowance for this type of building.				
	Cabling strategy National Trust to confirm acceptance by them / the insurers of the proposed cabling strategy.				
	Lightning Protection Proposed lightining protection scheme under review with client & NT. Case officer advises a new Planning Consent required to cover this. Design Team to test options on 3D views.				
	Access Control Review client preference for client supplied and installed hardware. Major coordination risk for hardware installed on door leaves/ frames where it needs to be routed into the door/ frame. Consider client supply option and free-issue to contractor for installation. Adress early in contract period.				
	NT/ BCKLWN ownership services delineation BCKLWN to confirm this is acceptable.				
	PA & VA Speaker systems Review can these be rationalised into single system to reduce the number of speakers. Would mean that VA speakers are higher spec for good music/ sound quality.				
	Sprinkler tank placement NT & Conservation Officer concern about partial demolition of 1740s vault to fit sprinkler tank. Review whether a compromise solution exists.				
	Sprinkler main pipe route in restaurant area Coordinate pipe route above restaurant basement WCs.				
Structure					
	Reinforced concrete detail drawings Reinforced concrete design intent drawings yet to be produced to allow contractor to carry out reinforcement detailing.				
	Truss tie mid-point coupler Visual design of the mid-point coupler is to be developed further.				
	Truss tie upper connection MOM member size does not fit in roof build-up. Revise to match lower connection size?				
	Below ground drainage additional surveys Further surveys of existing below ground drainage to clarify discrepancies between the utilities and CCTV surveys, and determine the outfall size and location of the primary drain in the Maltings Yard to the river.				
	Second phase timber condition survey Second timber condition survey by Hutton + Rostron to assess condition of Guildhall historic timbers, and development of any repair specifications and details to address required actions from the survey.				
	Stage structure Further coordination required around the front of the stage to allow for routing cable trays.				
	4-sided fire protection to structural beams supporting floors/ partition walls Review/ coordinate to ensure adequate fire protection is provided				
	Builderswork openings for services routing Detailed review of services routes, structural requirements and stopping details. Develop eary in contract period with services subcontractor.				
Civil Engineering/ External Works					
	Consultation with Lead Local Flood Authority and Local Water Authority To agree site run-off rates, and submission of Surface Water Drainage Strategy				
Theatre Technical					
	Stage 'gravedigger trap' Tech features to gravedigger trap – propose a cable pass route if there is space with ventilation				
	Houselighting location and control topology Develop proposals to ensuring correct control cable linking				
Fire Strategy					

Ref	Date: 01.04.25 Rev: 1 - STAGE 4	Client request	Coordination	Scope Gap/ Outstanding	Design Review/ sign-off/ brief reqd.
	Fire Alarm zoning & evacuation strategy Needs client review as there are many options for how to zone the buildings and the alarm notification (single knock/ double knock). The current design is a two stage evacuation for the whole site but there are alternatives which may be more suitable depending on how the site is managed with the different tenants/ uses.				
Heritage Interpretation					
	Coordination of Stage 3 Intrepretation proposals with main works Minor changes to main works info required, e.g. electrical outlet placement, and changes to interpretation layout to follow architectural lead (e.g. joinery displays in Undercroft). PLB to review HT design of Stage access stair.				
Landscape design					
	Riverside terrace/ access ramp SW corner Is a Party Wall notice required for landscaping works against the boundary wall? Party Wall surveyor to confirm.				
	Loose FFE proposal Client to confirm JCLA proposal for chairs & tables and agree colour.				
	Trellises & espalier fans Add to HT building elevations and confirm with client.				
	Courtyard gates Review design & operation with client.				
	Size of concrete foundations Momentum to review can this reduce to save money& embodied carbon.				
	Reuse of service covers (aka manhole covers) Momentum to advise items which can be reused/ repositioned.				
	Specialised planting maintenance Client to confirm that inclusion of planting requiring more specialised maintenance is acceptable, i.e. espalier fruit trees, knot gardens with hedges, infill planting and topiarised trees. Refer to Soft landscape and maintenance summary for more information.				
	Riverside Garden Client to confirm whether topiarised shrubs should be included.				
	Riverside Garden - existing Yew Inclusion of arbour foundation and brick wall into Yew root protection area to be checked with Arboriculturalist.				
	Surface water drainage, hardscape build-ups & foundation design JCLA & Momentum to review final stage 4 information to check all outstanding matters coordinated/ resolved.				
	Reinforced gravel surfacing outside substation UKPN/ Statutory Undertaker to confirm this is acceptable, when appointed to the project.				
Accessibility					
	Stage 4 Access Report tracker Close out remaining items (e.g. submit final finishes details).				

2.3 Design & Construction Risk Register

The latest design and construction risk register, coordinated by Pulse, is included below.

St Georges Guildhall & Creative Hubs, BCKLWN
Risk Register

Revision: 14
Revision Date: 02/04/2025

Status Summary		
Open	40	60%
Closed	27	40%

ID	Risk / Opportunity	Risk & Opportunity Category	Date raised	Risk Title	Risk Description	Current Status	Risk Impact		Combined Ranking	Cost Association	Weighted Cost	Cost comment	Mitigation Action			
							Likelihood	Impact					Mitigation Action	Action Lead	Commence Action Date	Target Close Date
3	Risk	Funding	Sep-23	Funding	If the project does not secure adequate funding from various funding streams (Towns Fund / NLHF / ACE etc.) the project will not be able to be delivered as per the current scope.	Open	5	5	25	£ -	£ -		TOWNS funding re-prioritised to provide £8.07m of capital funding. Following unsuccessful NLHF application for potential total ask of £3.3m (including the intended Stage 2 application ask). Some additional funding may come from other BCKLWN Towns Fund Projects to be reallocated to the Guildhall (amount TBC). Fundraising Consultant to be procured shortly. Estimated drawdown cashflow to be created by AMA for once the projects onsite. Reviewing options in respect of phasing without materially impacting project objectives and business plan (Core Scheme). 05/03 - reviewed - no change	Various	Sep-23	Ongoing
16	Risk	Financial	Sep-23	Tenders received exceed the budget cost allowance due to inflationary pressures	The project does not have the available budget to progress, major scope reduction of VE required. Recent NI increases could / will effect pricing.	Open	4	5	20	£ -	£ -		Regular cost reviews throughout the design development period - undertake market testing of key cost items - regular review of inflation allowances against the market trends. RIBA Stage 3 is currently being updated by AMA (Nov 24). 05/03 - reviewed - no change	AM	Sep-23	Mar-25
29	Risk	Design- Brief	Sep-23	BC/ CIO complex operator is not fully established to provide detail operational brief for Stage 4 (e.g. for theatre & catering operation)	Detail brief is not available to design team. Stage 3 design has to make assumptions. Risk of design changes at later stages (e.g. during Stage 4/ 5) leading to cost overruns and delays. AV and IT equipment are key items.	Open	4	4	16	£ -	£ -		Process being escalated at BCKLWN. Direction on IT, AV equipment and lighting required. Date of handover from BCKLWN to CIO has been moved back (a year or two post PC) to help mitigate. 05/03 - change trackers are being reviewed - possiable cost uplift noted	TFH	Sep-23	Ongoing
2	Risk	Capacity	Sep-23	Resources	As project activity increases, there is increased pressure on the project team in respect of balancing work loads.	Open	4	4	16	£ -	£ -		Project has increased in size (by 100%) and pressures felt. Additional resources being reviewed continually.	Pulse	Sep-23	Apr-25
4	Risk	Stakeholders	Sep-23	Continued political support and support of stakeholders and wider public	The project loses Political support and that of the Stakeholders and wider public and therefore is unable to meet the objectives of the project. Underwriting amount is now higher (£8m instead of £3m).	Open	4	4	16	£ -	£ -		Communications plan agreed with BC comms team and WE ARE DESTINATION procured to assist. Continue to have comms with political stakeholders to gauge support.	TFH	Sep-23	May-25
12	Risk	Design	Sep-23	Unforeseen building works	Building works to areas of project require greater amount of work than currently envisaged (i.e. when areas are opened up).	Open	4	4	16	£ -	£ -		Analysis of condition surveys completed. Further survey works to be commissioned (opening up works). Contingencies to be put in place until more intrusive works can be carried out.	AM	Sep-23	Ongoing
17	Risk	Financial	Sep-23	Budget Position Vs Cost Plan	The project does not have the available budget to complete at the end of RIBA stages.	Open	4	4	16	£ -	£ -		Budget reset at end of RIBA Stage 3 via governance process. Next gateway is RIBA Stage 4 / Tender. Change control process initiated. PTE due February 2025.	AM	Sep-23	May-25
18	Risk	Health & Safety	Sep-23	Asbestos	Asbestos and other hazardous substances present within areas being stripped back / refurbished. Impacts to additional cost for removal and programme implications, phasing may be impacted.	Open	4	4	16	£ 5,000.00	£ 4,000.00		Refurbishment and Demolition survey has been undertaken to areas that are to be worked on / disturbed. Enabling works package being undertaken prior to main works package to derisk. Void under seating has not been tested. £5k allowance for testing included but could have programme implications.	Pulse	Sep-23	May-25
45	Risk	Stakeholders	Jan-24	Archaeology	Potential Archaeological finds during the design stage or when onsite via the Main Contractor.	Open	4	4	16	£ -	£ -		Selection of opening up works and trial pits completed to assess the risk. A clear process will be in place should finds be uncovered.	Design Team / TFH	Sep-23	Project Completion
50	Risk	Strategic	Jul-24	King Street Works	Programme delays or additional design fees with inability to mutually agree with The Borough and County a solution for the changing pavement and road design to accommodate loading bay on King St.	Open	4	4	16	£ -	£ -		Initial meeting held. Plans being drafted. Further review to be held with the parties. S278 application to be submitted showing intent. JCLA appointed to complete design. 05/03 - design progressing & being presented on 13th to highways & project steering group on 18th	DM	Sep-23	Project Completion
13	Risk	Strategic	Sep-23	Change in personnel/ project fatigue	Change in Client / Design Team Personnel delaying phases of the project / Team wellbeing / resilience following ongoing stakeholder engagement.	Open	4	4	16	£ -	£ -		Regular communication with the Design Team to discuss progress and potential changes. The Design Team to provide a suitable handover to new members. Ensure all team members have general idea of ongoings.	Pulse	Sep-23	May-25
54	Risk	Fit Out	Jul-24	Interpretation Designer	Coordination and cost risk associated with two design streams. The main works are currently finalizing RIBA 4, where as PLB are completing RIBA 3. Therefore further coordination will be required after the ITT has been submitted	Open	5	3	15	£ -	£ -		Ensure BCKLWN and the Design Team continue to work closely with the interpretation team (PLB) to ensure no delays. Costs for different options still haven't been supplied by PLB.	DM	Sep-23	May-25
15	Risk	Performance	Sep-23	Procurement of main contractor	Lack of resource in main contractor market due to buoyant state of market. Contractors being strategic about projects at present. Geographical location of project is challenging.	Open	3	5	15	£ -	£ -		Early engagement of main contractors to prepare their tendering teams for the bid. Undertake an EoI of the market to understand appetite for the scheme. Market engagement day held with Shortlist agreed. Main Tender due out in February 25. 05/03 - contractors have been contacted and generally had positive feedback with a view to proceeding to the ITT	Pulse	Sep-23	Mar-25
9	Risk	Strategic	Sep-23	Failure to achieve business plan projections	The delivered project is not able to meet the aims and objectives set out in the Business plan.	Open	3	5	15	£ -	£ -		Continually review and monitor performance against business plan - adjust pricing policies if required - adequate marketing budget identified and target audiences. As part of cabinet report following RIBA Stage 3, report to set out phasing scenarios and impacts on Business Plan projections. Ongoing.	TFH	Sep-23	Project Completion
52	Risk	Environmental	Jul-24	Bats	Bats found to be roosting in buildings that are due for refurbishment	Open	3	5	15	£ -	£ -		Bat survey undertaken. Feedback from the design team / planning ongoing. Will action any items that are required to close out.	DM	Sep-23	Project Completion
53	Risk	Construction	Jul-24	Substation	Complications with the installation of issues with the timings leading to delays to the overall programme for the main contractor. Potential for CDP item to not agree with current design.	Open	3	5	15	£ -	£ -		Monitor development of design information. Agreed to itemise the substation as a CDP package within the main contract. Contractor to procure early in programme. Need to ensure this is prioritised by the contractor once appointed.	DM	Sep-23	Project Completion
22	Risk	Operations	Sep-23	Loss of support / demand for Shakespeare Experience Tour and activities	The project is not able to develop a suitable offer to create demand for the Shakespeare Experience Tour meaning the numbers forecast in the Business Plan are not met. Lack of interest from volunteers.	Open	3	5	15	£ -	£ -		As part of ongoing comms and project campaign work, look to develop marketing partnership with NT and other stakeholders to reach potential new audience. Identify proven expertise for establishing heritage visitor attraction market positioning. Work with National Trust and Norfolk Museum Service regarding visitor trends and understand how other recently opened centres have faired against projected visitor numbers post pandemic.	RL / TFH	Oct-23	Project Completion
60	Risk	Design	Jan-25	NT Cabling Specification	NT insist on MICC cabling throughout resulting in large cost uplift and coordination issues. Future repair costs for the BCKLWN are increased as well. Longer install times when onsite.	Open	3	4	12				Will supply a technical argument to NT. Will provide specific locations for when the NT spec of cable can be used. 05/02 - Meeting held with NT - following meeting principles agreed but final comments	Design Team	Now	Ongoing
5	Risk	Design	Sep-23	BCKLWN and NT Design Approval at End Stages	End User / Client / Stakeholder changes to design beyond scope, fail to sign off completed design or delayed decision making impacts the programme and increases costs. NT sign off also needs to be noted.	Open	3	4	12	£ -	£ -		Early, consistent and regular engagement with End User / Client. Clear governance process to be identified. Project Steering Committees for client to review at end of RIBA stages. Ongoing design review meetings are being held with NT.	Pulse	Oct-23	Ongoing
49	Risk	Statutory	Jul-24	Party Wall Issue	Neighbourly issues in relation to party wall requirements. Further information required from design team. Tight with finalisation of RIBA 4.	Open	3	4	12	£ -	£ -		Party Wall surveyor has been appointed and initial surveys etc undertaken with review from design team. Notices to be issued by 17th Jan 25 at latest. Potentially delay issue of some if design information is not ready. Can align this with the priority work locations.	DM	Oct-23	Ongoing
56	Risk	Cost	Oct-24	Consultant RIBA Stage 5 fee increases	The design team request a fee increase in RIBA stage 5 due to low allowance / increased work	Open	4	3	12	£ -	£ -		Track ongoing works against initial agreed resource and discuss with design team consultants regarding any concerns.	DM / HT / RL / TFH	Nov-23	Ongoing
61	Risk	Design-Structure	Jan-25	Poor Timber Condition Throughout Site	Guildhall site timber in roof structures are in poor condition resulting in additional repair / replacement works. Infestation risk on timber beam in undercroft.	Open	3	4	12				Pulse to contact H&R to review undercroft beam. High level visual inspections undertaken. Contingency / mitigation fund could potentially cover dependant on condition.	LB / RL	Now	May-25
57	Risk	Design	Dec-24	Sprinkler Inclusion	Discussions being held with insurers, National Trust and internally at the BC to review the approved position of not including Sprinklers in the Guildhall area.	Open	2	5	10	£ -	£ -		Review with relevant parties and understand inclusion. Then design team to include and understand routes etc. 05/05 - awaitng fsnl NT sign off - meetings held on site & design reviewed	TFH	Apr-24	May-25

Page 1 of 2

St Georges Guildhall & Creative Hubs, BCKLWN
Risk Register

Revision: 14
Revision Date: 02/04/2025

Status Summary		
Open	40	60%
Closed	27	40%

ID	Risk / Opportunity	Risk & Opportunity Category	Date raised	Risk Title	Risk Description	Current Status	Risk Impact		Combined Ranking	Cost Association	Weighted Cost	Cost comment	Mitigation Action			
							Likelihood	Impact					Mitigation Action	Action Lead	Commence Action Date	Target Close Date
59	Risk	Performance	Jan-25	Insolvency / Performance of Main Contractor	Main contractor goes bust during the contract or poor performance requires the council to find a new main contractor.	Open	2	5	10				BCKLWN to check finances of appointed contractor prior to appointment. BCKLWN have a scenario plan in place for if the project stops at certain points of the project in theory.	RL / DM	Jun-24	Project Completion
44	Risk	Stakeholders	Jan-24	Programme	Programme pressures due to Towns Fund Targets (funding etc). Project Team have ambitious timeframes to hit. Current 18 month programme may be tight.	Open	3	3	9	£ -	£ -		Ongoing review of programme in light of increased project scale. Tender returns will confirm if current programme is tight.	Pulse / TFH	Now	May-25
58	Risk	Statutory	Jan-25	Devolution	Likely that Norfolk and Suffolk Council will combine. If this is the case then there would be delays in signing contracts / signing off the project to continue. Time dependant on when / if the Devolution occurs.	Open	3	3	9				Ensure no delay in signing contract when main contractor appointed.	RL / DM / TFH	Now	Project Completion
36	Risk	Design-Structure	Sep-23	Unknown super structure and strengthening requirements	No intrusive surveys have been undertaken so little is known about the super-structure of the existing buildings on site except that which can be noticed via a visual survey. There is a potential for existing structure to be remediated or replaced to align with the proposals of the new scheme. There is a risk of increased cost and programme	Open	2	4	8	£ -	£ -		Opening up works have been undertaken to determine existing structure and conditions which will help inform the design team.	HT / Pulse	Now	Apr-25
62	Risk	Performance	Jan-25	Bill of Quants for Tender	BOQ production tight for tender issue in Feb 25.	Open	2	4	8				Prov quantities may be required for issue and then further detail issued to follow. AMA to discuss with Pulse.	AMA	Now	May-25
64	Risk	Statutory	Mar-25	Update to Listed building concent	Since the listed building concent was granted the design has been developed these design impacts could require an amended listed building concent application.	Open	4	2	8	£ -	£ -		HT to hold meeting with local authority and confirm if new listed building app required	HT	Now	Ongoing
65	Risk	Cost	Mar-25	BoQ & design pack coordination	BoQ have been on a tight time frame & complexity of project means there is a cost/ programme risk. Because of the time frames some design info has had to be finalised while the BoQ was developed causing discrepency between the BoQ and design pack	Open	4	2	8	£ -	£ -		Post ITT submission Martin/ James will review discrepancies and set out key items - possebly larger tender adendum/ or post tender pre-contractor update (would need to be non material)	AMA/ HT/ Pulse	Now	Ongoing
47	Risk	Construction	Jul-24	Enabling Works	Enabling works being progressed by team. Attentions will need to be diverted to manage process. Delays will impact the commencement of the main contract works. Tenders due back shortly. No buffer time.	Open	2	3	6	£ -	£ -		Monitor resources and ensure proposals progress as plan. 05/03 - NCL appointed & starting early - starting 17th March	DM	Now	Project Completion
55	Risk	Statutory	Aug-24	Biodiversity Net Gain (BNG)	Biodiversity Net Gain Credits are being brough off site. Unilateral Undertaking being put in place.	Open	2	3	6	£ -	£ -		Unilateral Undertaking to be progressed ASAP and payment made. Review planning conditions to understand when credits need to be secured by.	DM	Now	Feb-25
10	Risk	Performance	Sep-23	Satisfying differing requirements, objectives and timescales of potential funders ▯	The project is not able to deliver competing funding requirements in the timescales required for the various funders.	Open	2	3	6	£ -	£ -		Continued review of requirements, objectives and timescales of current funders. Potential funders to check for alignment with project aims and compatibility with project programme.	RL / TFH	Now	Ongoing
21	Risk	Operations	Sep-23	Inadequate resource to deliver the BC/ CIO operations prior to handover	The business function will be inadequately resourced, resulting in poor outcomes affecting ability to raise additional funding, preparedness for opening etc.	Open	2	3	6	£ -	£ -		Additional founder trustee added to bolster initial set up of CIO and help recruitment of permanent trustees. Consideration of advancing implementation of operational staff either via recruitment or secondment of council staff. Delaying handover to help mitigate.	RL / TFH	Now	Project Completion
63	Risk	Stakeholders	Jan-25	Poor Communication	Poor communication on the project going into the public domain unturn losing support.	Open	2	3	6				Communication plan is in place that needs to be adhered to prior to any public comms being released. Comms plan needs to be reissued to wider stakeholders / team.	TFH	Now	Feb-25
28	Risk	Design-Structure	Sep-23	Procurement of an operator for the restaurant	Risk that no restaurant operator cannot be found & operator cannot complete fit out to programme	Open	2	3	6	£ -	£ -		Early engagement with market required by BCKLWN	RL / TFH	Now	Ongoing
19	Risk	Performance	Sep-23	Project team's performance ▯	The project is not delivered to the desired quality, budget or programme.	Open	1	4	4	£ -	£ -		Ensure the project team briefs are robust - appoint suitably qualified and experienced professionals - monitoring performance during commissions.	Pulse / TFH	TBC	TBC
26	Risk	Design-Services	Sep-23	Unanticipated below ground & hidden services	Changes in design required to avoid disruption to existing services / overall cost increases to divert or adjust existing services. Some discrepancies have been noted between UGS & CCTV surveys CCTV has been used as it the worst case. In addition to Surface water discharge	Open	1	3	3	£ -	£ -		Desktop Utilities Survey, Below Ground Radar Scan, Drainage CCTV survey commissioned. Findings due at end of September. 05/03 - Site check to confirm surface water discharge required.	Max Fordham	TBC	TBC
27	Risk	Design-Structure	Sep-23	Guildhall existing structure is unable to take new theatre loads (e.g. loads from new galleries) unless substantial alterations are made to the historic fabric	Design changes required at Stage 4 to suit structural heritage/ capacity constraints.	Open	1	3	3	£ -	£ -		Incorporate measured survey findings into structural design as soon as possible. 05/03 - EW will uncover affected areas and allow team time to react/ redesign if required.	HT & Momentum	TBC	TBC
28	Risk	Design-Structure	Mar-25	Sub contractor lead in times	Lead in times for key / specific items products or subcontravtor packages such as plain roof tiles to main roof could cause delay to programme.	Open	3	2	6	£ -	0		Early engagement with main contractor post tender to identify any long lead in packages.	Pulse/ HT/ RL	TBC	TBC
											£0					

Impact	Rating	Definition
Insignificant	1	Minimal impact to project/slight delay
Minor	2	Minor impact to project/slight delay of 2 weeks
Moderate	3	Adverse impact on project / slippage of 2 weeks to 1 month
Major	4	Major impact upon project /most of expected benefits fail/ slippage of 1 -2 months
Extreme	5	Critical impact upon project/ impending failure of project / slippage of over 2 months

Likelihood	Rating	Definition
Rare	1	Unlikely to happen within the project duration
Unlikely	2	Likely to happen within next 1-2 years
Possible	3	Likely to happen within next 12 months
Likely	4	Likely to happen within next 6-12 months
Almost certain	5	Likely to happen within next 6 months

2.4 National Trust Design Reviews

Four design reviews have been held with the National Trust team during Stage 4 to present the detailed design proposals and to discuss developments since RIBA Stage 3. The National Trust team have also reviewed the physical samples of materials proposed for the project.

NT Design Review 1
- External envelope detailing
- Guildhall layout – gallery, screen, balustrades
- Building services routing
- Enabling Works for medieval floor archaeology

NT Design Review 2
- Internal finishes (physical samples)
- Guildhall details (seats, viewing hatches, screen, stair balustrade)
- Café bar & kitchen layout
- Foyer link roof interfaces
- External door details
- Sprinkler tank location and layout
- Service trench routing
- Lightning protection
- Landscape design

NT Design Review 3
- Roof upgrades
- No. 29 link roof & west elevation
- Conservation repairs
- Sprinkler tank location
- External windows

NT Design Review 4
- Minor changes since planning
- Stage 4 design refresh
- Internal finishes (including seat fabric)
- Guildhall floor hatch details
- Lighting design to key public areas
- Joinery design
- Removal/ reuse of existing materials
- Roof upgrades
- Lightning protection developments
- Interpretation design

2.5 Interpretation Design & Operational Impact

The Interpretation design was instructed to PLB by the client in September 2024 and has now progressed from Interpretive concept to RIBA Stage 3 proposals. Refer to the PLB Stage 3 Report for further detail.

The interpretation design proposals are not currently coordinated with the architectural & building services 'main works' proposals because the interpretation design was developed too late to be incorporated into the 'main works' Stage 4 information. The programme below sets-out the process moving forward to conclude the Interpretation design and coordinate this with the main works. The anticipated changes to the main works are minor, and are listed below:

- Adjustment/ addition of small power, data and lighting
- Additional joinery/ cabinetry details
- Coordinating final placement of Interpretive panels, artefacts & displays (impact on listed building, access/ egress/ fire load, structural/ environmental requirements etc.
- Coordinating interpretive elements with the landscape design

Heritage Interpretation & Theatre Operations

We have set-out below an initial list of activities required to transition the Guildhall between Heritage Interpretation & Theatre show modes.

Heritage Interpretation to Theatre (e.g. 15.00 hours onwards)
- Switch off interpretative A/V installations
- Clear stage of interpretive set/ props (if used)
- Open/ remove any auditorium drapes/ rope barriers in the auditorium used to direct heritage visitors
- Stow away mobile steps (stage access) in cupboard
- Close away interpretive display panels
- Close stage front viewing hatches. Reposition front 3 rows of stalls seats.
- Close floor viewing hatch at rear of auditorium.
- Reposition stalls side slip loose seats (12 each side, 24 no. total).
- Close pass door through proscenium frame and make good stage masking/ drapes (assuming these elements are deployed for the show)

- Close black-out curtains
- Check auditorium is clean (e.g. no dropped litter from heritage visitors)
- Check backstage areas, access and egress routes are clear
- Check any rigged production A/V equipment has not been disturbed by heritage visitors

Set-up for specific shows (e.g. positioning of set/ props on stage & backstage) is excluded from this list.

At this stage we estimate this is a 2hr activity for 1 technician or a 1hr activity for 2 technicians.

Theatre to Heritage Interpretation (e.g. 22.30 hrs post-show or 08.00 the next morning)

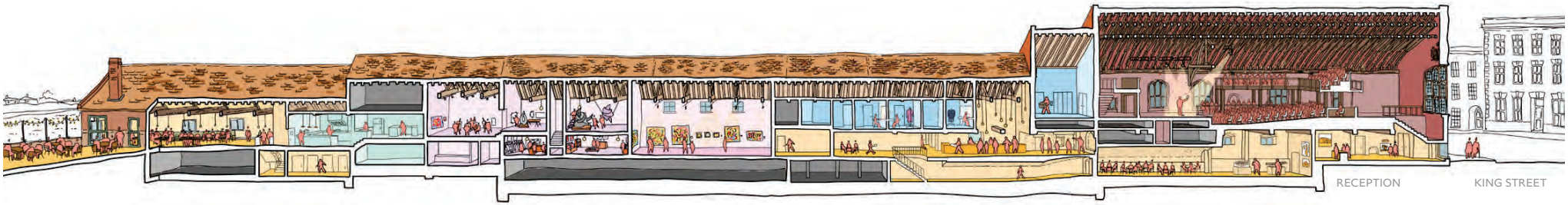
- Open black-out curtains
- Check auditorium is clean (e.g. no dropped litter from theatre audiences)
- Check backstage areas, access and egress routes are clear from loose show equipment
- Clear stage of theatre set/ props (if used)

- Switch on interpretative A/V installations
- Deploy any auditorium drapes/ rope barriers in the auditorium used to direct heritage visitors
- Deploy mobile steps (stage access) in cupboard
- Open interpretive display panels
- Open stage front viewing hatches. Move back front 3 rows of stalls seats.
- Open floor viewing hatch at rear of auditorium.
- Move back stalls side slip loose seats (12 each side, 24 no. total).
- Open pass door through proscenium frame and make good stage masking/ drapes (assuming these elements are deployed for the show)

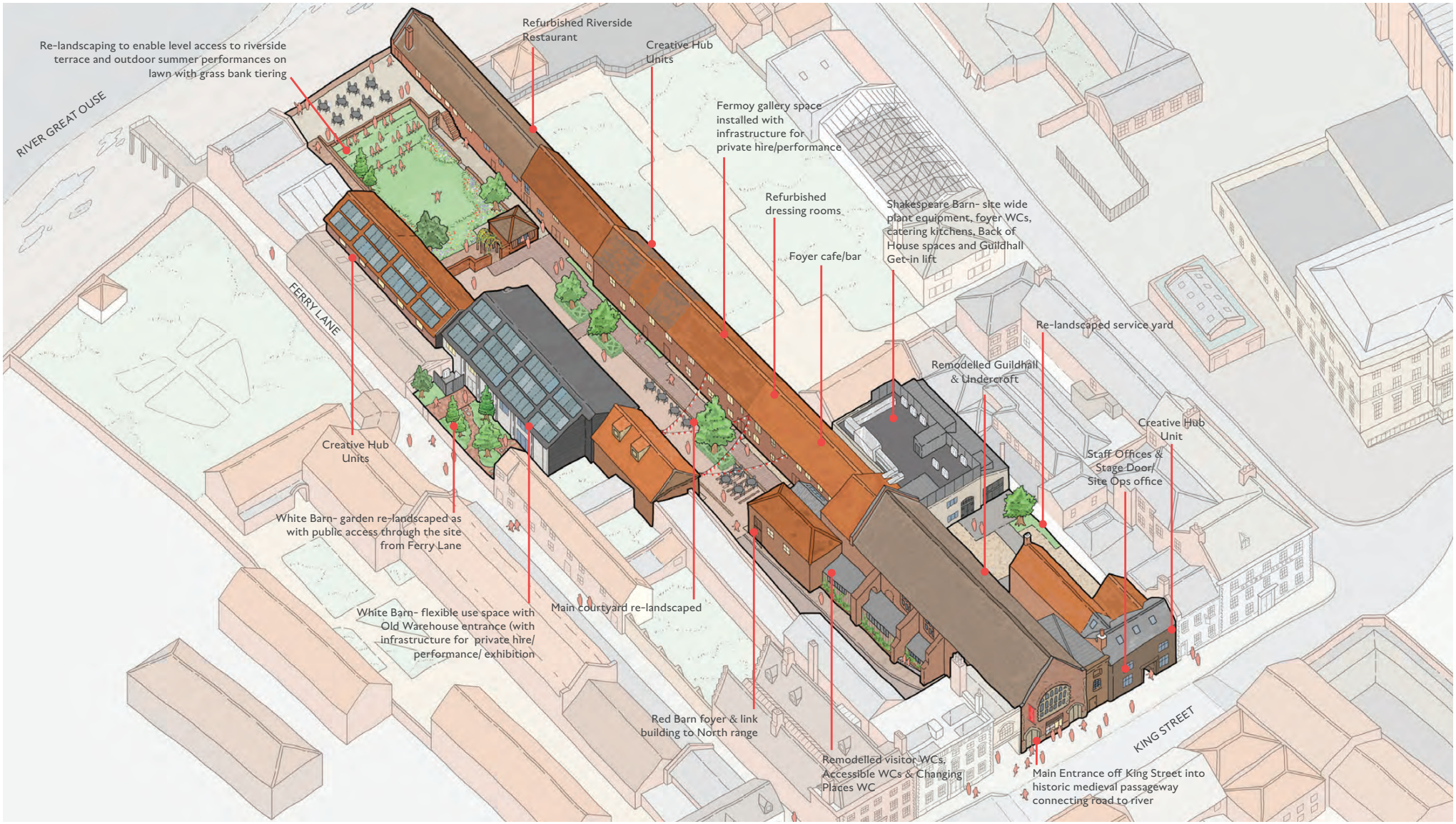
At this stage we estimate this is a 2hr activity for 1 technician or a 1hr activity for 2 technicians.

3.0 Design Imagery & Material Samples

3.1 Project Overview



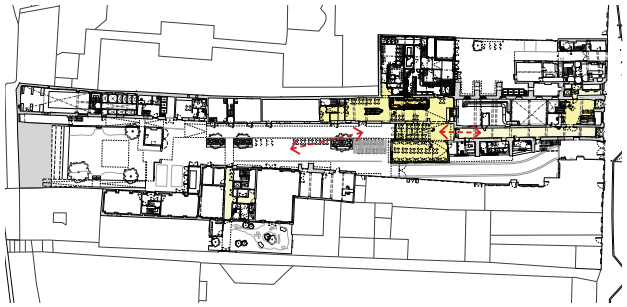
Sketch long section through the northern range from Guildhall to river



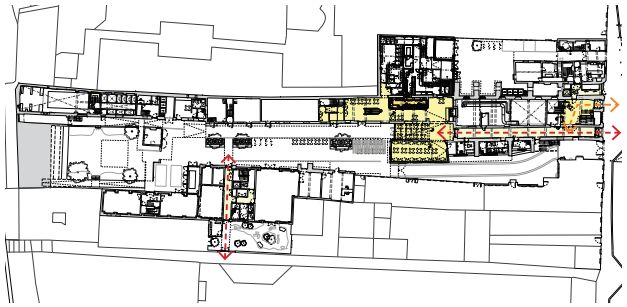
Axonometric sketch view of the Guildhall site proposals

3.2 Primary Design Moves

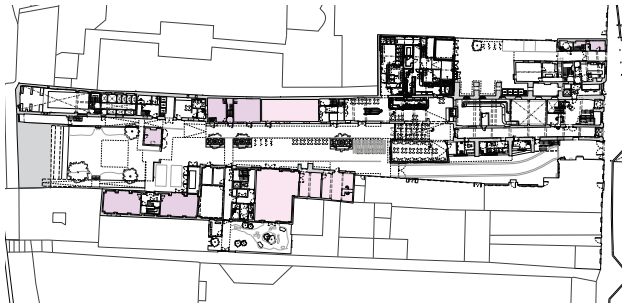
01 - Generally - To repair the historic building fabric across the site and upgrade the buildings where possible to improve thermal performance, climate change resilience, service installations, fire protection and accessibility.



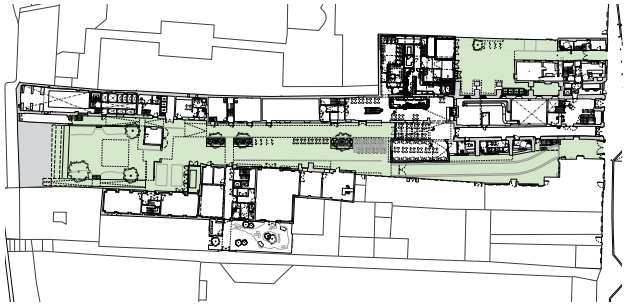
02 - Locate public foyer with cafe bar at the heart of the site to draw visitors through and open up to the courtyard and western portion of the site to visitors, culminating in a refurbished riverside restaurant.



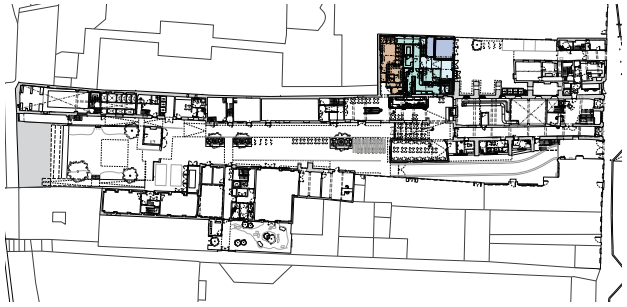
03 - Reinforce historic passageway as the primary access route into the site for visitors and creative hub tenants. Open up secondary access route from Ferry Lane. Improve connection with King Street and entrance reception area.



04 - Create a wide range of accessible, flexible use spaces across the site for performances, exhibitions, rehearsals, workshops, education and other events, alongside spaces for creative hub tenants (start-up businesses, craftspeople, creative industries etc.)



05 - Re-landscape the Main & Shakespeare Courtyards to enhance biodiversity and improve visitor experience. Introduce new planting and garden areas throughout the site.

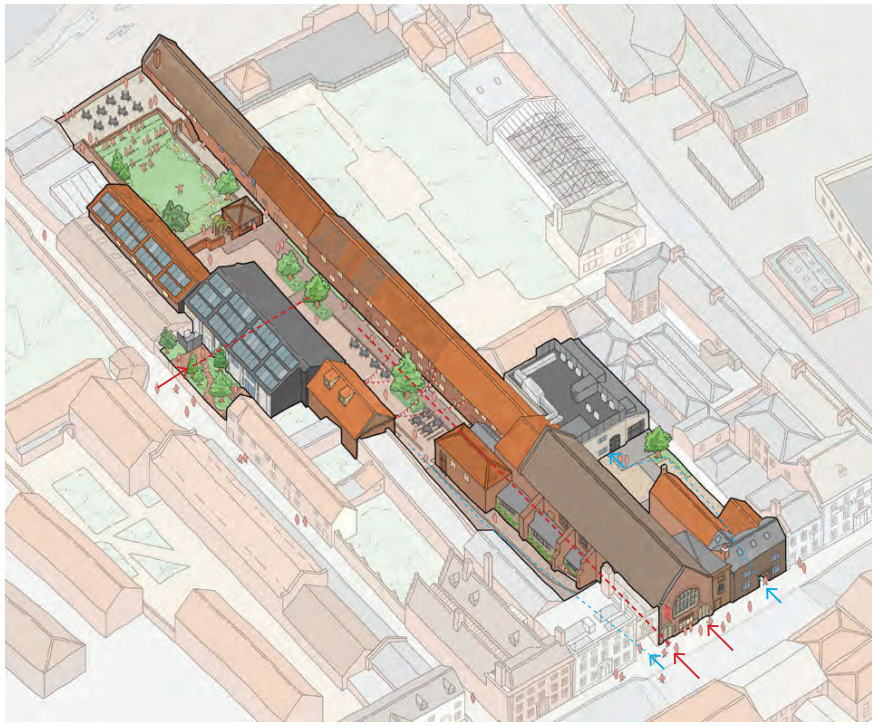


06 - Position new WCs, energy centre, catering equipment and theatre stores in Shakespeare Barn.

07- Refurbish the Guildhall with a new flexible theatre layout which references the theatrical heritage and original medieval format of the room, improving access & technical provision.

3.3 King Street Facade

Proposed Guildhall facade to King Street



Axonometric diagram showing proposed circulation routes through the site

Existing Guildhall facade to King Street

Facade of St Mary's Guildhall, Boston
Central doorway with two windows

Entrance passageway from street entrance & reception to main foyer at the centre of the site

Proposed King Street view looking north

3.4 Passageway WCs

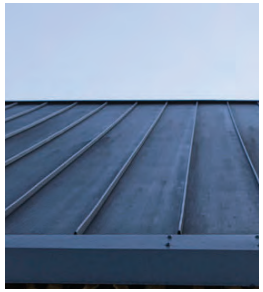
Facade bay elevation

Sketch view of proposed WC blocks

Site photo of existing WC blocks

Timber cladding

Expressed cover strips at board joints



Zinc standing seam roofing

Planting example

Passageway WCs - comparative elevations

Existing Guildhall south elevation showing Passageway WC 'infills' between buttresses

Existing Guildhall south elevation showing Passageway WC 'infills' between buttresses

Passageway WCs bay study elevation

3.5 Guildhall Reception

Proposed view from reception entrance looking west

Existing reception view towards auditorium stair

Seat upholstery

Timber slatted ceiling lining

Oak counter joinery

Existing retained beams

Clay quarry tile flooring

Limestone inlay indicating historic alter location

Painted plastered walls

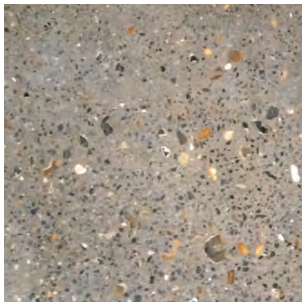
3.6 Foyer Bar

View of proposed North Range foyer cafe bar looking west

Timber slatted ceiling lining

Oak counter joinery

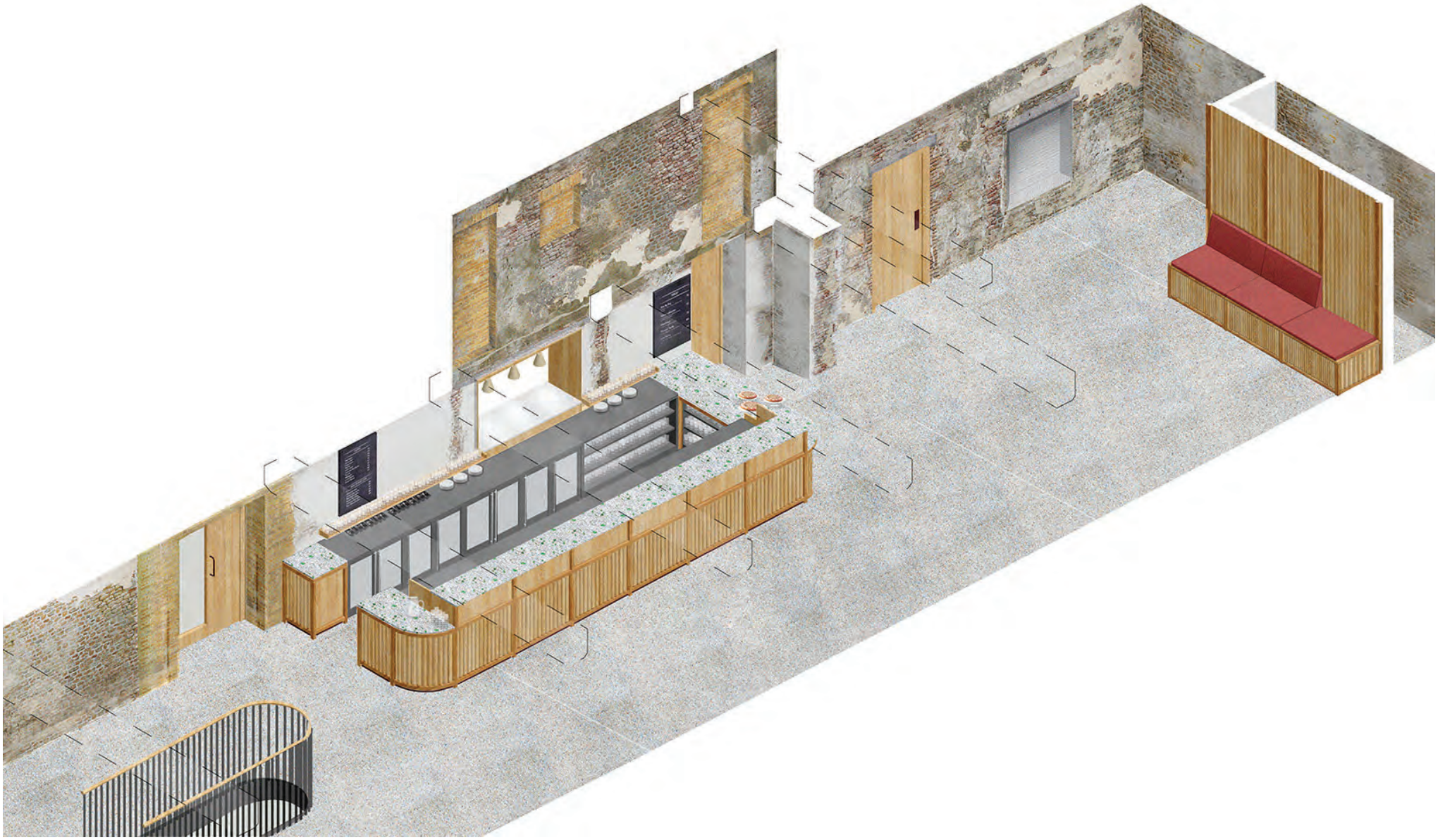
Existing retained beams



Polished concrete floor slab with exposed aggregate finish

Retained existing wall texture

Limewash finish brickwork



Axonometric view of foyer bar

3.7 Foyer Link

Internal view of foyer Link looking west (Red Barn facade to the left, North Range facade to the right)

Rendered sectional elevation cut through proposed foyer Link looking towards the North Range

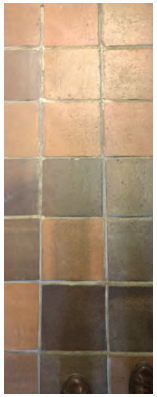
Proposed view of activated main courtyard looking east towards Red Barn and foyer Link with cafe tables and landscaping

Proposed west elevation of foyer Link and Red Barn, with Guildhall beyond

Proposed south elevation of the Red Barn

Proposed internal view of the Red Barn looking west

Woodwool roof lining



Clay quarry tile flooring

Blocked window with original surviving timber

Existing internal view

New Foyer ‘Link’ & Red Barn – proposed elevations

Proposed North Range south elevation (and section cut through proposed Foyer Link)

Proposed North Range south elevation (including Red Barn)

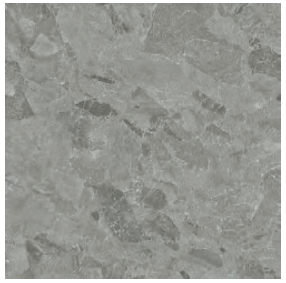
3.9 Foyer WCs (Shakespeare Barn)

Section view through Shakespeare Barn WC

Oak joinery to WC and basin shelf

Timber door panel

Vertical porcelain wall tile



Porcelain stone floor tile

Proposed view of Shakespeare Barn WC cubicle

3.10 Guildhall Auditorium

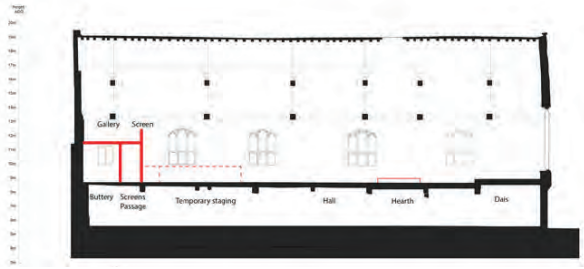
Sketch view of Guildhall courtyard theatre look towards stage from the gallery

Sketch view of Guildhall courtyard theatre (from north stalls side slip seated position looking west towards stage)

Sketch view of Guildhall courtyard theatre looking eastwards down the hall from stage

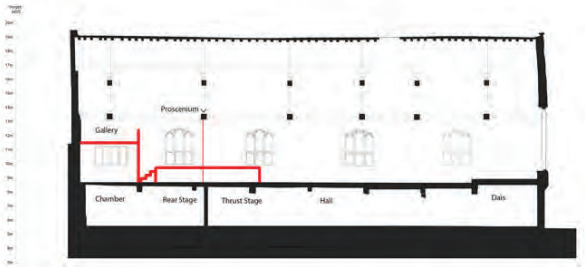
Guildhall room arrangement - historic context

The Guildhall section diagrams below illustrate the evolution of the Guildhall room arrangement throughout the life of the building to set the new proposal in context. Please refer to the Conservation Management Plan and Historic Building Analysis for further detail.



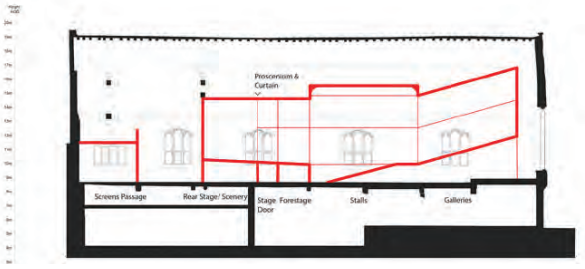
1420

Before the dissolution of the guilds in 1537, St George's Guildhall played host to players in mystery cycles or miracle plays, who would set up in front of the Screen at the west end of the hall after the members of the guild had finished their dinner at the east end. The Screen would act as a backdrop to the performance, the minstrel's gallery could be used to extend the action on the stage, and the Screens passage would act as a retiring house for the players. The officers of the Guild might sit on either side of the stage itself, for immediacy of effect.



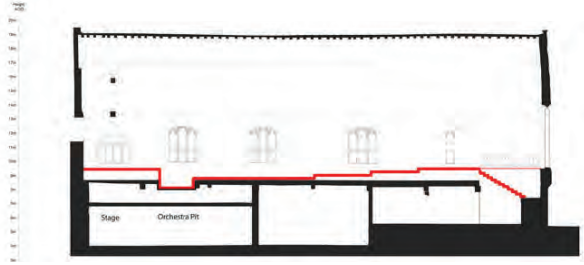
1593

When the remains of the Georgian theatre were recorded by Southern in the 1930s he measured three pairs of oak frame posts that relate to the fit-out of the Georgian theatre. Unusually, there are three lines of frames, relating to a subdivided stage area, a feature that is abnormal for 18th Century theatres. It has therefore been speculated that the frames may relate to an earlier, Elizabethan or Jacobean theatre fit-out, with a subdivided stage area. Documentary evidence demonstrates considerable sums of money being spent on theatrical activity at the Guildhall during this period which could suggest theatrical installations being built in the hall. Further research is needed, particularly the results of dendrochronology on the frame timbers, before any conclusions can be reached.



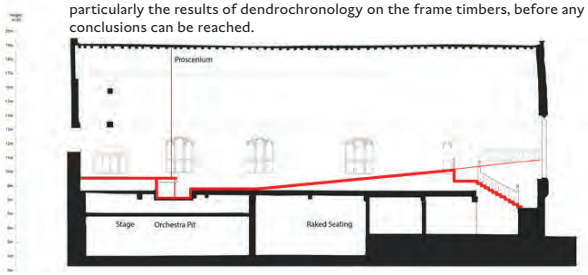
1766

Georgian theatre installation present in the room with galleried seating, as recorded by Richard Southern before the remains were stripped out in Marshall Sisson's 1950s restoration. Some of the timbers may have been reused from an earlier Elizabethan theatre installation. Southern also mentions a surviving rain machine over the stage canopy, though this was lost during the subsequent restoration.



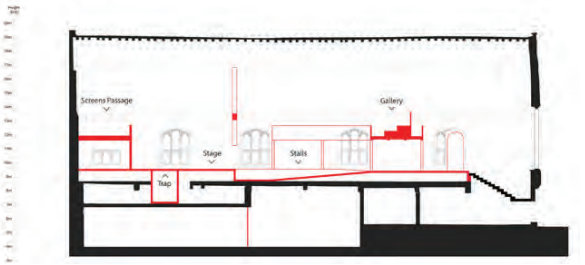
1953

Marshall Sisson restored the hall in 1953 as a multi-use hall, allowing for theatrical performances as well as for concerts and opera by the installation of a raised stage, a sunken orchestra pit, and a series of low tiers in the floor of the hall, stepping up towards the east window. Movable chairs were used rather than fixed seating to allow for flexibility of use. Unfortunately the low tiers were problematic for audience sightlines to the stage, and were built over with a steeper seating rake in the early 1960s.



1962 (current arrangement)

Theatrical use became the most popular use of the hall, despite the poor sightlines. In the 1960s Graham Beakley installed a steeper rake with fixed seating in an attempt to improve the sightlines,, at the expense of obscuring the lower part of the east window. He also installed a proscenium arch opening with hanging for curtains in order to create a more conventional theatre space. Its character was very much that of a cinema, for which purpose the hall was also regularly put following the installation of a projector in the space to the west of the Guildhall. Whilst sightlines were somewhat improved, they remain poor from the rear half of the seating rake.



Proposal

Current proposal for new theatre installation with shallow stalls pit, seating galleries around three sides, recreated Screens Passage, and reinstated Crown Post Truss.

Proposed Guildhall internal west elevation showing Screen materiality

Proposed Guildhall internal north elevation bay study showing materiality of gallery and balustrades

Existing roof timbers with red painted panelling

Slender oak slatted soffit lining below gallery with red felt backing

Warm putty grey colour painted plaster walls

Wool serge drapes - red and grey

Oiled oak gallery structure and balustrade joinery elements

Engineered oak floorboards

Dark grey painted steel theatre technical rigging bars

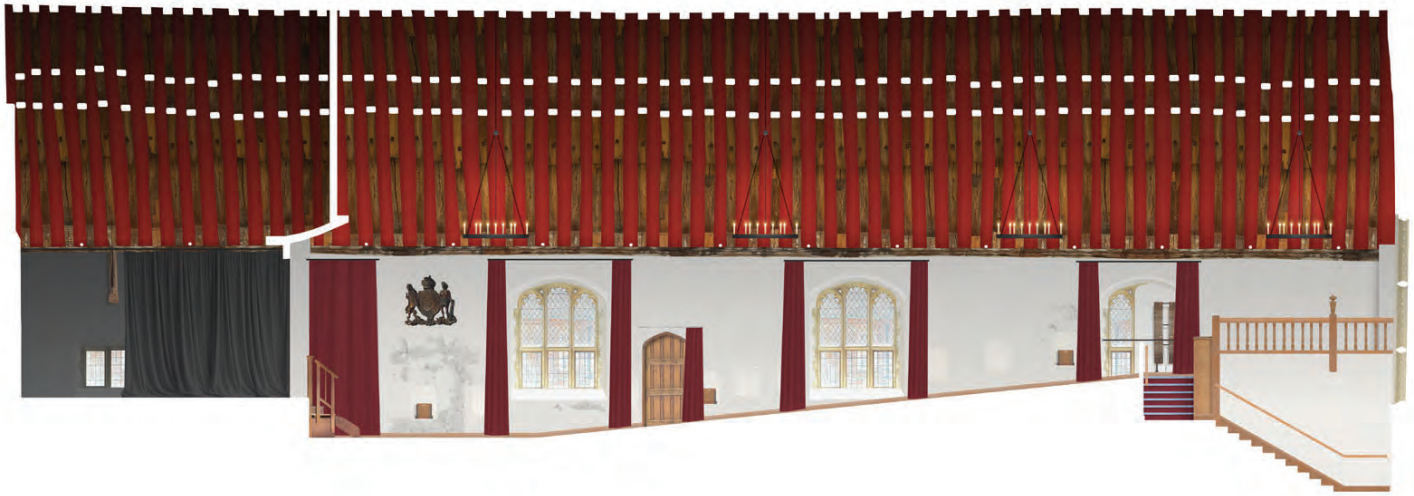
Internal elevations

Proposed south elevation

Existing south elevation

Internal elevations

Proposed north elevation



Existing north elevation

Internal elevations

Proposed west elevation

Proposed west elevational section cut forward of stage

Proposed north elevation

Existing west elevation

Existing west elevational section cut forward of stage

Existing north elevation

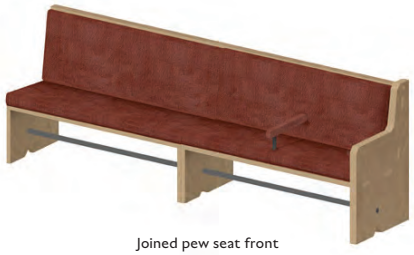
Existing site photograph looking west

Existing site photograph from stage looking east

Aisle pew seat back

Joined pew seat back

Aisle pew seat front



Joined pew seat front

Inner pew seat back

Tilting single pew seat

Inner pew seat front

Fixed single pew seat

Axonometric view of stage front and gallery

3.11 St George's Courtyard

Sketch view of Fermoy Gallery exterior

Proposed North Range elevation (facing Main Courtyard) showing Fermoy Gallery facade

Proposed South Range elevation (facing Main Courtyard) showing White Barn & Old Warehouse façades

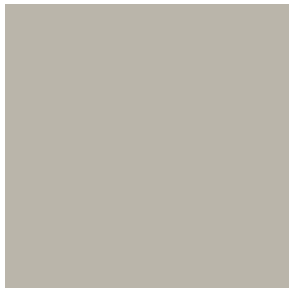
3.12 Shakespeare Barn East Elevation

Proposed Shakespeare Barn east elevation

Gault brickwork

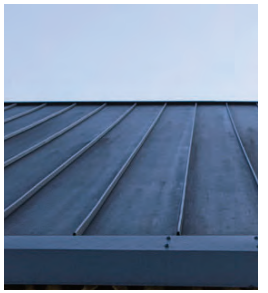
Example of Gault brickwork used for previous Guildhall buttress repairs

Pale window frame reference colour from North Range warehouse



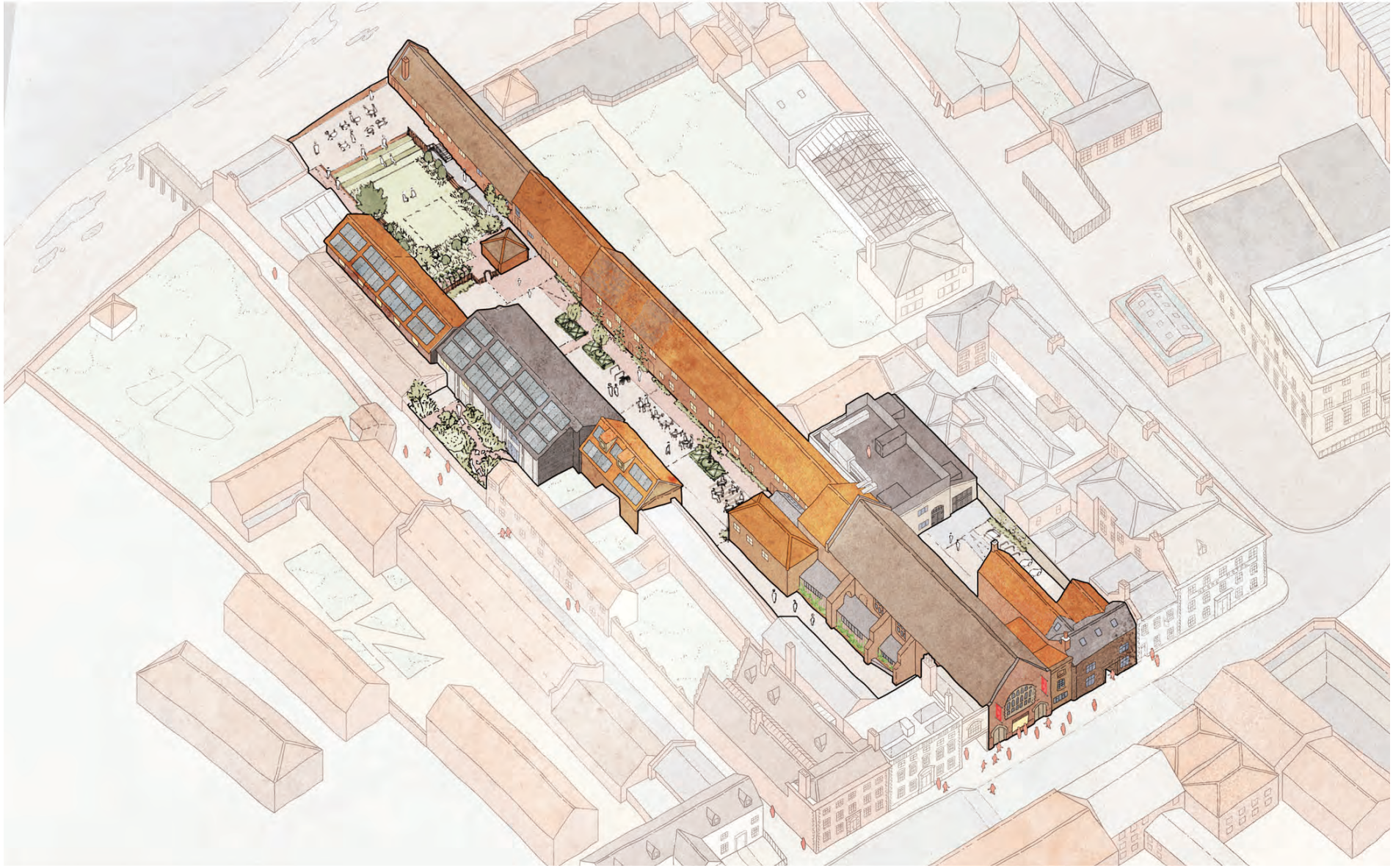
Pale grey door/ window frame colour for Shakespeare Barn

Dark coloured acoustic plant screen louvres

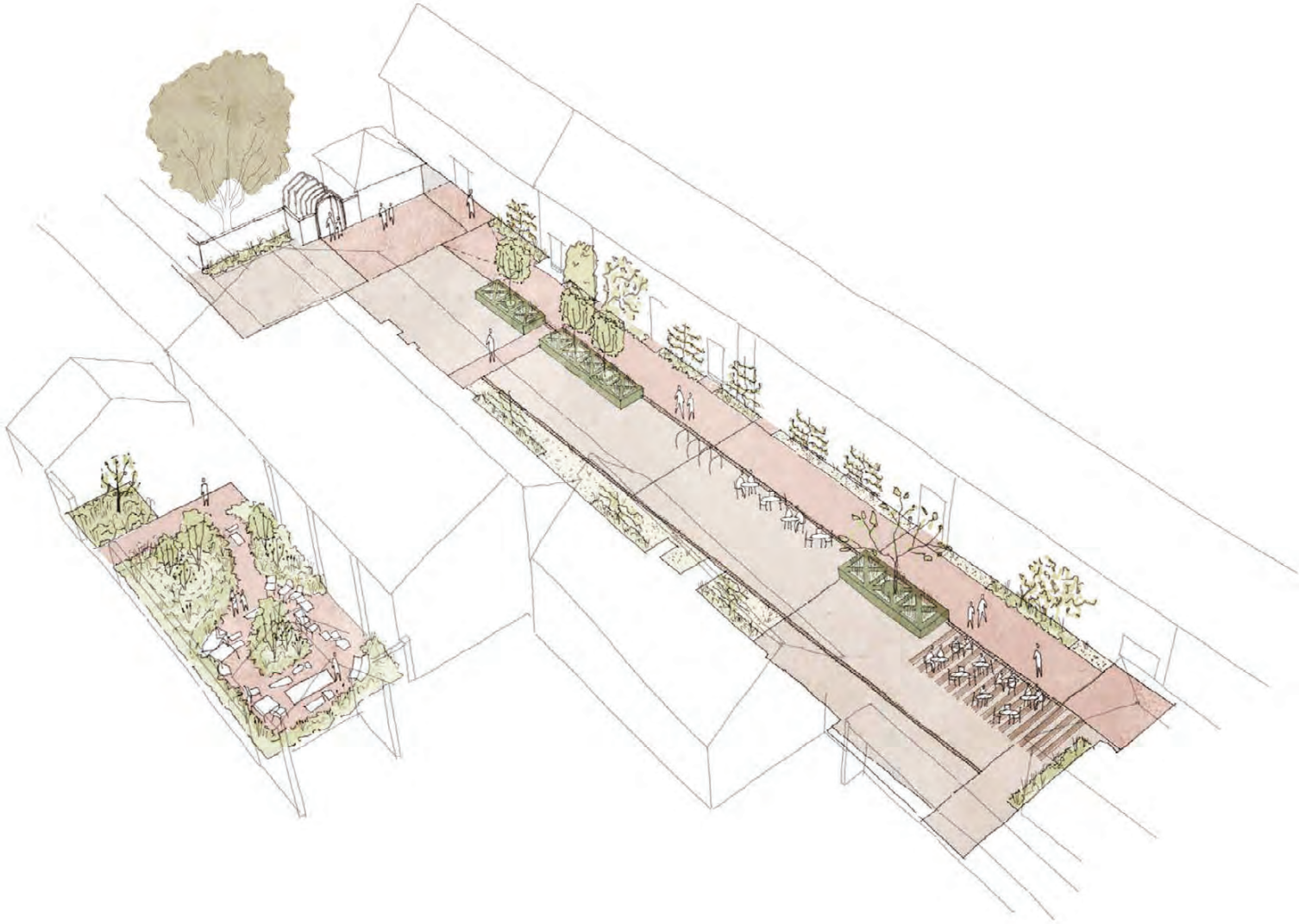


Zinc standing seam cladding to roof dormers

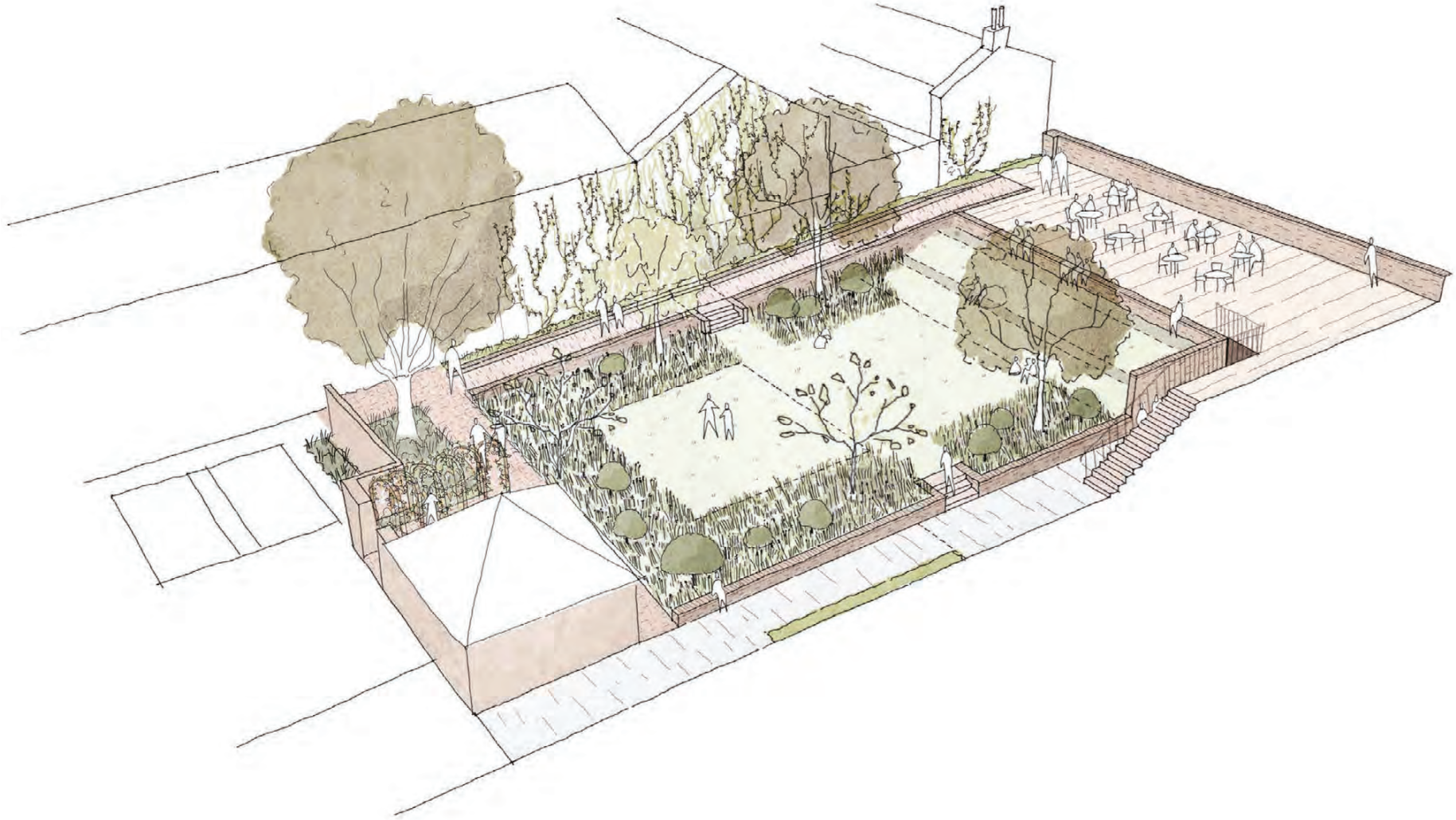
Axonometric Overview of Guildhall Landscape



Main Courtyard - Maltings Yard



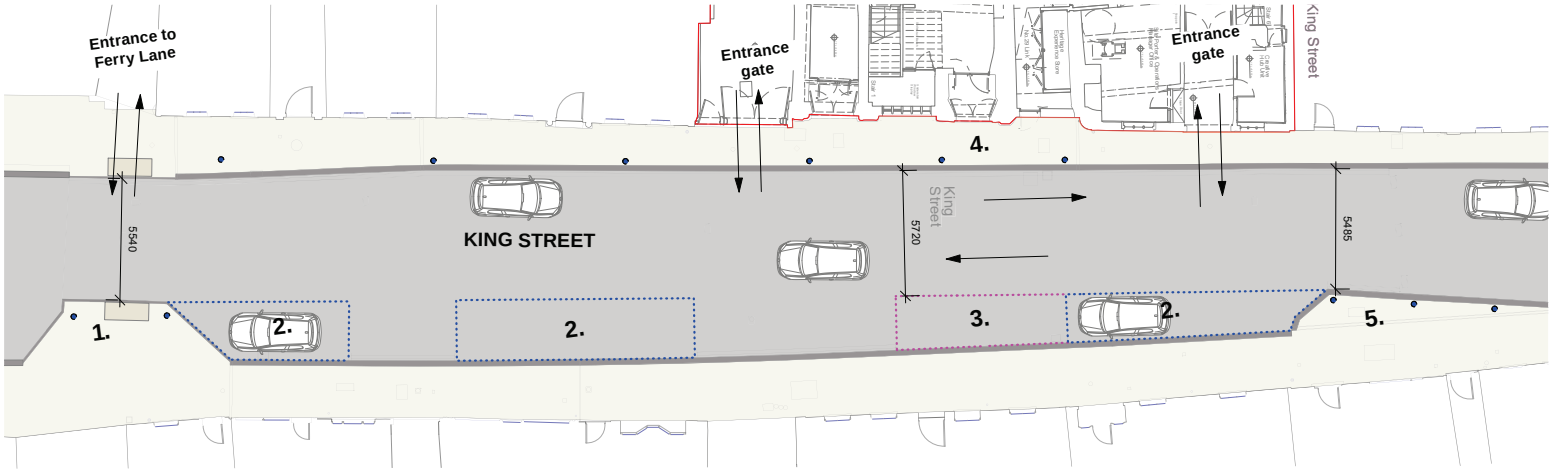
Riverside Garden & Terrace



King Street

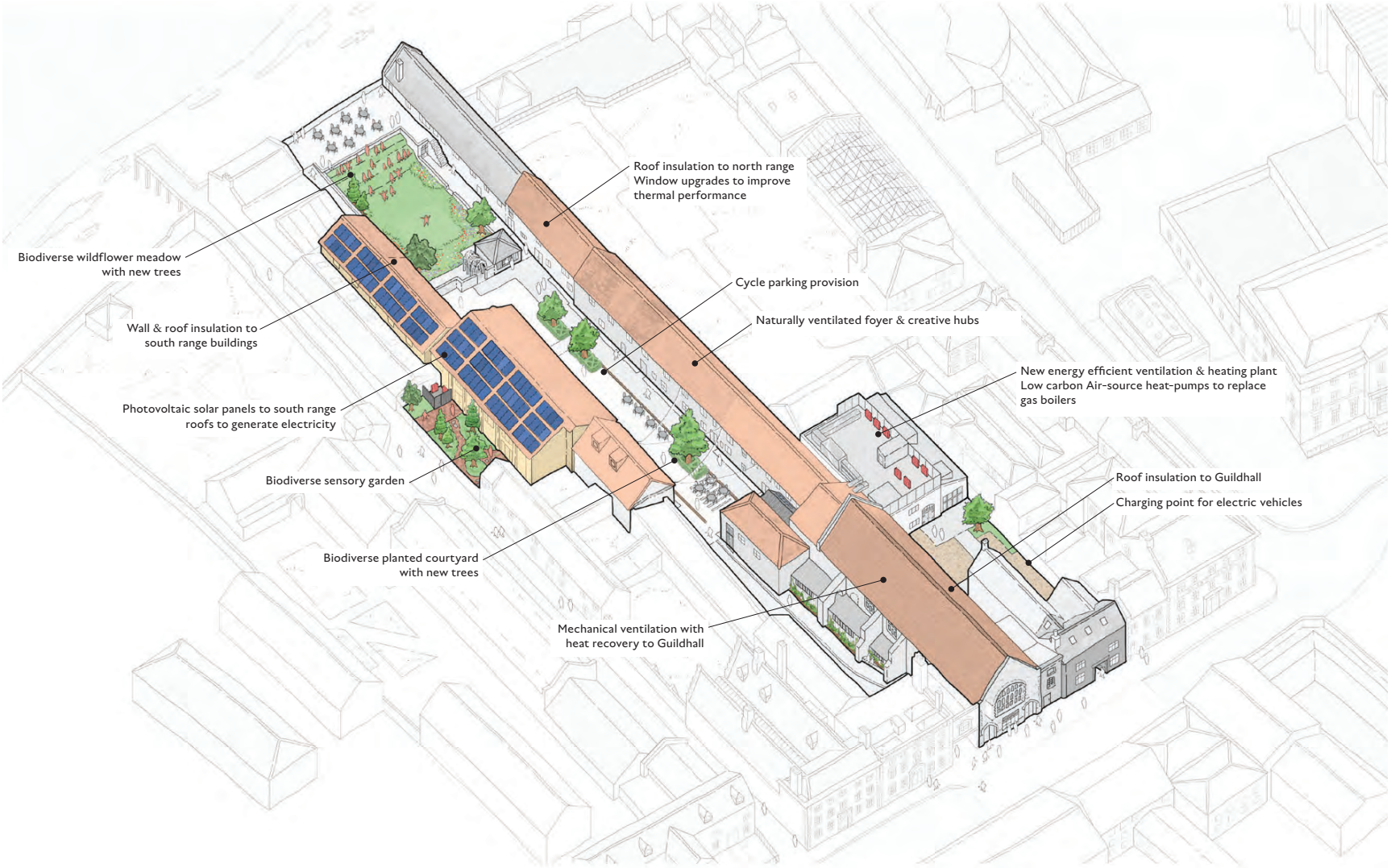
King Street

Proposed King Street layout



Existing King Street layout

Summary of Sustainability & Regenerative Design Proposals



4.0 Statutory Matters

4.1 Planning & Listed Building Consent

The project team have been working to produce detail information to discharge as many Planning and Listed Building consent conditions before the appointment of a main contractor. There are a number of pre-commencement conditions. Some conditions require input from the Main Contractor and/or specialist subcontractors.

The tracker below illustrates the current status of Condition discharge.

A meeting was held with the Conservation Officer on 20/03/2025 to page-turn through the draft Listed Building condition draft submission packs. We plan to submit these submissions before Easter.

As discussed in section 2.1, there have been a number of minor design changes during Stage 4. The Planning & Conservation Officers have advised that these are covered by a Non-Material Amendment to the Planning Consent along with a new Listed Building Application to cover the changes. They have also advised their preference for a new Planning Application to cover the Lightning Protection system. We will agree next steps with regard to these consents with the client and planning consultant team in the coming weeks.

St Georges Guildhall Conditions Tracker
Applicant: BCKLWN
Application no: 24/01189/LB
Updated: 01 April 2025 (by Haworth Tompkins)

No Action Required / Discharged
Performance / Compliance Condition
Pre-occupation Condition
Pre-commencement above ground condition
Pre-commencement of development condition

No	Summary Title	Condition	Type	Comments / Notes / Actions	Responsibility	Submitted?	Target Submission
1	Project Start	Development shall begin before the expiration of three years from the date of this permission (08/10/2027).	Note		Client	N/A	
2	Proposed Plans	The development hereby permitted shall be carried out in accordance with the proposed plans listed within the Document Issue Register dated 03/09/2024.	Note		Client	N/A	
3	Fabric or Decorative Damage	All works shall be carried out in such manner that no unnecessary damage is caused to the fabric or decorative features of the building, and any damage so caused shall be rectified to the satisfaction of the Local Planning Authority.	Note		Client / Contractor	N/A	
4	Roof Sections / Drawings	Prior to the raising of the relevant roofs, sections and drawings at a scale of 1:20, showing full details of all materials as well as a schedule of materials which can be re-used in the works, shall be submitted to and approved in writing by the Local Planning Authority. The development should then be undertaken in accordance with the approved plans.	Area Specific Pre-commencement		Design Team	No	Apr-25
5	Dormer Window Drawings	Prior to any changes to the dormer windows, 1:20 drawings showing the changes required following the raising of the roof on the Old Warehouse, shall be submitted to and approved in writing by the Local Planning Authority. The dormer windows shall be constructed in accordance with the approved details.	Area Specific Pre-commencement		Design Team	No	Apr-25
6	Above Ground Development - Mortar	Prior to above ground development taking place, a specification of the mortar to be used in all repair works and new works shall be submitted to and approved in writing by the local planning authority. The works should then be undertaken in accordance with the approved plans.	Area Specific Pre-commencement	Mortar testing/ analysis to be arranged to inform specification of replacement mortars.	Design Team	No	Sep-25
7	Above Ground Development - Materials	Prior to the commencement of any above ground works (excluding demolition), details of the external materials of all new elements including but not exclusive of the toilets, and all new walls, fences and gates attached to the Listed Building, shall be submitted to and approved by the local planning authority. The development should then take place in accordance with the approved details.	Area Specific Pre-commencement		Design Team	No	Apr-25
8	Link Building Drawings / Details	Prior to its erection, full drawings at a scale of 1:20 and full details of the link building between the Guildhall, Red Barn and Warehouse Range including its materials, construction and proposed method of joining to the existing buildings, shall be submitted to and approved in writing by the local planning authority. The development should then take place in accordance with the approved details.	Area Specific Pre-commencement		Design Team	No	Apr-25
9	Window & Door Replacement Details / Drawings	Prior to the relevant windows or doors being replaced or repaired, 1:20 drawings of the new and/or replacement windows or doors as well as a schedule of repair if required, for any relevant windows and doors, shall be submitted to and approved in writing by the Local Planning Authority. The works should then be carried out in accordance with the approved plans.	Area Specific Pre-commencement		Design Team	No	Apr-25
10	Extraction Design Details	Prior to their installation, full details of all extractor vents, heater flues and soil pipes including their design and location shall be submitted to and approved in writing by the Local Planning Authority. Installation shall be carried out in accordance with the approved details.	Area Specific Pre-commencement		Design Team	No	Apr-25
11	Solar Panel Details	Prior to their installation, full details of the proposed solar panels on the White Barn, White Barn Annexe and the Old Warehouse, shall be submitted to approved in writing by the local planning authority. The work shall then be carried out in accordance with the approved details.	Area Specific Pre-commencement	Requires subcontractor installation details.	Design Team	No	Jan-26
12	Guildhall Roof & Crown Post Details	Prior to its installation, full details and specifications of the works required to both the existing roof of the Guildhall and the Crown Post in order to erect it in the position shown on the approved plans, is to be submitted to and approved in writing by the local planning authority. The works should then be undertaken in accordance with the approved plans.	Area Specific Pre-commencement	Requires specialist timber subcontractor design details.	Design Team	No	Jan-26
13	Guildhall Gallery Seating Details	Prior to its installation, full details of the Guildhall gallery seating including its fixing to the walls and floor of the building and its final appearance shall be submitted to and approved in writing by the local planning authority. The works should then take place in accordance with the approved plans.	Area Specific Pre-commencement		Design Team	No	Apr-25
14	St Georges Passageway Details	Prior to the works being carried out, full details and a specification of works indicating how the ceiling of St George's Passageway shown on drawing number STGG-HTL-ZZ-ZZ-DR-A-00-00203-P P02, is to be raised, shall be submitted to and agreed in writing by the local planning authority. The works should then take place in accordance with the agreed details.	Area Specific Pre-commencement	Awaiting completion of Enabling Works so that existing construction can be fully understaood.	Design Team	No	Sep-25
15	29 King Street Extension Details	Prior to the works being undertaken, full details of the extension to 29 King Street and the method of joining it to the Guildhall, shall be submitted to and approved in writing by the local planning authority. The work should then be undertaken in accordance with the approved details.	Area Specific Pre-commencement		Design Team	No	Apr-25

St Georges Guildhall Conditions Tracker
Applicant: BCKLWN
Application no: 24/01188/F
Updated: 01 April 2025 (Haworth Tompkins)

No Action Required / Discharged
Performance / Compliance Condition
Pre-occupation Condition
Pre-commencement above ground condition
Pre-commencement of development condition

No	Summary Title	Condition	Type	Comments / Notes / Actions	Responsibility	Submitted?	Target Submission	Validation/ Determination	Target Determination	BCKLWN Reference	Post-submission Action	Responsibility
1	Project Start	Development shall begin before the expiration of three years from the date of this permission (08/10/2027).	Note		Client	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Proposed Plans	The development hereby permitted shall be carried out in accordance with the proposed plans listed within the Document Issue Register dated 03/09/2024.	Note		Client	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Surface Water Management Strategy	No development shall commence until a surface water management strategy has been submitted to and approved in writing by the Local Planning Authority. The management strategy shall include sufficient information to ensure that the surface water infrastructure is capable of accomodating the proposed discharge rates & any evidence of existing connections are required. No hardstanding areas shall be constructed until the works have been carried out in accordance with the strategy.	Pre-commencement	Momentum to collate information and submit to planning. Target stage 4 design initially and then move onto this immediately after. Usually 8 week review period for reviewing conditions.	Momentum	No	Apr-25					
4	Ecological Report	Prior to the commencement of any part of the development hereby permitted, an updated Ecological Report shall be submitted to and approved in writing by the Local Planning Authority. The Report should include any mitigation measures that are to be implemented, and those measures shall be completed in accordance with the agreed details prior to the first use of the development, or in 4 accordance with a timetable to be agreed in writing by the Local Planning Authority.	Pre-commencement	This is refering to the bat survey from wild frontier. Design team to review comments from Lichfields on the bat survey.	Pulse / Client	No	Apr-25					
5	Secure Cycle Parking Details	Prior to the first use of the development hereby permitted, full details of a scheme for secure cycle parking shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall provide for secure cycle parking within the Shakespeare Courtyard, or another appropriate part of the site, and shall be installed in accordance with the agreed details prior to prior to the first use of the development hereby permitted and retained and maintained as such thereafter.	Pre-Occupation Condition	Discussions with planning officer around what is classed as "secure" cycle parking and what isnt. Further discussions with planning officer to be held around secure cycling following locations / positions being finalised by design team.	Design Team / JCLA	No	Jan-26					
6	External Plant & Equipment Design Details	Prior to the installation of any new external plant and equipment, full details of each element (including noise data) and final design details of associated mitigation measures including all acoustic barriers and enclosures shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall be implemented as approved before the development is brought into use and thereafter maintained as such.	Area Specific Pre-commencement	Tender information will be fairly specific. Include in tender statement "any alternative product will be of same or better performance spec".	Design Team / Client	No	Jan-26					
7	Plant / Machinery Noise Level	Noise emitted from plant/machinery/internal performances will not exceed 37dBA at 1m from the façade of the nearest noise sensitive receiver between 19.00hrs to 23.00hrs and will not exceed 32dBA at 1m from the façade of the nearest noise sensitive receiver between 23.00hrs and 07.00hrs as per the details included in the St George's Guildhall Environmental Noise Impact Report dated September 2024.	Performance / Compliance	Tender information will be fairly specific. Include in tender statement "any alternative product will be of same or better performance spec".	Design Team / Client	No	Jan-27					
8	Restaurant Filtration Equipment	Prior to first occupation of the restaurant, full details of filtration equipment to be installed in the restaurant kitchen will be submitted to and approved in writing by the Local Planning Authority. The details shall be implemented as approved before the development is brought into use and thereafter maintained as such.	Pre-Occupation Condition	Catering consultant filtration spec has already been provided as per the planning condition. Riverside restraunt will be fitted out by the future tenant. Will need to be implimented in agreement by the council.	Design Team	No	Apr-26					
9	Outdoor Lighting Scheme	Prior to first occupation a detailed outdoor lighting scheme shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall include details of the type of lights, the orientation/angle of the luminaries, the spacing and height of the lighting columns, the extent/levels of illumination over the site and on adjacent land and the measures to contain light within the curtilage of the site. The scheme shall be implemented in accordance with the approved scheme and thereafter maintained and retained as agreed.	Pre-Occupation Condition	Tender information will be fairly specific. Include in tender statement "any alternative product will be of same or better performance spec".	Design Team	No	Sep-25					
10	Landscaping	All hard and soft landscape works shall be carried out in accordance with the approved details shown on the JCLA Drawing Issue Sheet, KG214_St George's Guildhall Kings Lynn, received via email 26/09/2024. The works shall be carried out prior to the occupation or use of any part of the development or in accordance with a programme to be agreed in writing with the Local Planning Authority. Any trees or plants that within a period of 5 years from the completion of the development die, are removed or become seriously damaged or diseased, shall be replaced in the next planting season with others of similar size and species as those originally planted, unless the Local Planning Authority gives written approval to any variation.	Pre-Occupation Condition	If not going to be fully complete prior to occupation, then a programme of works to finish this can be agreed with the council.	Pulse / Contractor / Design Team	No	Sep-25					
11	New Gate Installations	Notwithstanding the details which accompanied this application, prior to the installation of any new gates associated with the development hereby permitted, full details of their design, materials, size and construction shall be submitted to and approved by the Local Planning Authority. The development shall be carried out in accordance with the approved details.	Area Specific Pre-commencement	Full details to be issued and agreed. Details to be issued at tender.	Design Team	No	Apr-25					
12	Working Hours	Demolition, construction or development work, along with collections and deliveries of waste products, material and equipment, shall only be carried out between 0800hrs and 1800hrs weekdays, and 0900hrs and 1300hrs on Saturdays, with no work allowed on Sundays and Bank/Public Holidays.	Performance / Compliance		Contractor	N/A	N/A					
13	Detailed Construction Management Plan	Prior to commencement development a detailed construction management scheme must be submitted to and approved by the Local Planning Authority. This must include the following information: - Proposed timescales of the demolition and construction phases, and any piling. full details of the techniques, noise and vibration data, and location of any piling which is due to take place. - A description and location of any fixed machinery and the sound power levels. the location and layout of any contractor compound, the location of contractor parking the location and layout of the materials storage area, machinery storage area and waste & - recycling storage area. - Full details of the proposed attenuation and mitigation methods to protect residents from noise and vibration, dust and litter (including proactive monitoring to identify issues) - Details of how complaints from members of the public will be investigated and resolved communication methods to the wider community regarding the construction phases and likely disruptions. The scheme shall be implemented as approved for the duration of works.	Pre-commencement	Draft construction management plans to be requested during the tender process.	Pulse / Contractor	No	May-25					
14	Operational Management Plan	Prior to the first use of any part of the development hereby approved, an Operational Management Plan shall be submitted to and agreed in writing by the Local Planning Authority. The management plan should include: - The measures to be put in place to protect residential amenity - Timings of use for the exit to Ferry Lane, and a mechanism for controlling and monitoring this - The proposed opening hours and hours of operation for each area of the site - An identified process to manage and address complaints about the site's operation, should they arise - Details of a process for the review of the Operational Management Plan. The development shall be operated in full accordance with the management plan approved.	Pre-Occupation Condition	Look at informative number 2 from planning application for more detail. Discuss with Tim regarding team.	Pulse / Client / Operational Team	No	Sep-26					
15	Archaeological Written Scheme of Investigation	No development shall take place until an archaeological written scheme of investigation has been submitted to and approved by the local planning authority in writing. The scheme shall include an assessment of significance and research questions; and 1) The programme and methodology of site investigation and recording, 2) The programme for post investigation assessment, 3) Provision to be made for analysis of the site investigation and recording, 4) Provision to be made for publication and dissemination of the analysis and records of the site investigation, 5) Provision to be made for archive deposition of the analysis and records of the site investigation and 6) Nomination of a competent person or persons/organization to undertake the works set out within the written scheme of investigation.	Pre-commencement	FAS to quote for creating. Will be needed prior to any enabling works taking place so needs to be completed asap.	Client / FAS	Yes	n/a	21/01/2025		24/01188/DISC_A	None	
16	Written Scheme of Investigation	No development shall take place other than in accordance with the written scheme of investigation approved under condition 15.	Performance / Compliance	As above.	Client / FAS / Contractor	N/A	N/A					
17	Site and Post Investigation Assessment	The development shall not be put into operation until the site investigation and post investigation assessment has been completed in accordance with the programme set out in the archaeological written scheme of investigation approved under condition 15 and the provision to be made for analysis, publication and dissemination of results and archive deposition has been secured.	Pre-Occupation Condition	As above.	Client / FAS / Contractor	No	TBC					
18	Biodiversity Gain Plan	The Biodiversity Gain Plan shall be prepared in accordance with the Statutory Metric dated 20 June 2024 and prepared by Ryan Clarke.	Pre-commencement	Final landscaping layout required to help inform gain plan. Needs to come from JCLA asap and sent seperatly from the King Street information. Issue when ready. King Street should fall under exemption as no biodiversity onsite.	Pulse / Brown Co	N/A	Apr-25					

4.2 Party Wall

Party Wall interfaces have been identified during Stage 4. These are outlined below. The design team have produced design information setting-out the work required at each Party Wall location. Colmor, led by Luke Baxter, are appointed by the client as Party Wall surveyor to raise the Party Wall notices. Design information was issued to Colmor on 6th March 2025.

Line of junction works

Line of junction works arise where you are proposing to construct a new wall along or astride a boundary which has not previously been built upon (or only to the extent of a boundary wall). From a review of your proposals, we anticipate line of junction notices are likely to be required upon the following properties:

- St George's Guildhall, 29 King Street, King's Lynn, PE30 1HA; and,
- The Globe, King Street, King's Lynn, PE30 1EZ.

Party structure works

Party structure works relate to any adaptions proposed to shared structures and can also include limited proposals to an adjoining owner's property (for example cutting in for a flashing to weather the junction between two properties). From a review of your proposals, we anticipate party structure notices are likely to be required upon the following properties:

- Ouse Amateur Sailing Club, Ferry Lane, King's Lynn, PE30 1HN;
- 3 Ferry Lane, King's Lynn, PE30 1HN;
- King's Lynn Operatic & Dramatic Society, 6-8 St Georges Courtyard, King's Lynn PE30 1EU;
- St George's Guildhall, 29 King Street, King's Lynn, PE30 1HA; and,
- The Globe, King Street, King's Lynn, PE30 1EZ.

Adjacent excavation works

Works which involve excavation within notifiable distances (3m or 6m depending on the depth of any proposed excavation) will attract the need for notice upon adjoining properties. From a review of your proposals, we anticipate adjacent excavation notices are likely to be required upon the following properties:

- St George's Guildhall, 29 King Street, King's Lynn, PE30 1HA; and,
- The Globe, King Street, King's Lynn, PE30 1EZ.

Adjoining owner

Any adjoining owner or occupant will require notice under the Act if they have an interest in the property of 1 year or more. Based on the brief assessment above and making a quick check with Land Registry indicates that the following number of interests will require service of notice:

Adjoining Properties	Adjoining Interests
Ouse Amateur Sailing Club, Ferry Lane, King's Lynn, PE30 1HN	1 no. freehold owner
3 Ferry Lane, King's Lynn, PE30 1HN	1 no. freehold owner
King's Lynn Operatic & Dramatic Society, 6-8 St Georges Courtyard, King's Lynn PE30 1EU	1 no. freehold owner 1 no. leasehold owner (assumed)
St George's Guildhall, 29 King Street, King's Lynn, PE30 1HA	1 no. freehold owner
The Globe, King Street, King's Lynn, PE30 1EZ	1 no. freehold owner

It should be noted that it is only a requirement to record an interest with Land Registry if this is greater than 7 years, it is possible that further owners could be identified, or that a number may be discounted following further research.

Upon receipt of notice an adjoining owner has the option to consent to the works, at which point no further input is required by party wall surveyors, or to dissent. Upon dissenting, the adjoining owner can either agree to the appointment of a single 'agreed surveyor', to act impartially between the parties, or alternatively appoint a separate surveyor to act on their behalf.

Once a dispute has arisen and a surveyor, or surveyors, are appointed they will produce an award governing the timing, manner, and execution of the notifiable works.

Other neighbourly matters

Access/scaffold/oversail licences

In limited circumstances the Party Wall etc. Act 1996 can allow access over neighbouring land in respect of notifiable works. However, in most circumstances you will not have a right to enter neighbouring land for the purpose of erecting scaffold, or on larger projects a crane, for which a licence agreement would be required. From our review of your proposals, we anticipate access/scaffold licence agreements being required with the owners of the following properties:

- Ouse Amateur Sailing Club, Ferry Lane, King's Lynn, PE30 1HN;
- 3 Ferry Lane, King's Lynn, PE30 1HN;
- King's Lynn Operatic & Dramatic Society, 6-8 St Georges Courtyard, King's Lynn PE30 1EU; and,
- The Globe, King Street, King's Lynn, PE30 1EZ.

Delivery programme and conclusion

The Act has certain statutory timescales which must be adhered to and have been put in place to safeguard the interests of both the building owner and adjoining owners. Adjacent Excavation and Line of Junction notices are required a minimum of one month before works commence on site, whilst party structure notices have a two month period. To this end, and given the notifiable works set out above, a minimum of two months' notice to each adjoining owner will be required in this instance.

Notwithstanding, we would recommend that you allow at least three months to agree awards for a scheme of this size and complexity.

I trust the above summary and associated recommendations in respect of the Building Owner's obligations are understandable and I look forward to discussing further with you in due course.

Please do let me know if you have any questions or queries.

4.3 Building Regulations

Haworth Tompkins are appointed as Building Regulations Principal Designer. Sweco have replaced AIS as Building Control Approver (AIS went into administration part-way through Stage 3).

Haworth Tompkins have coordinated a Building Regulations Compliance Tracker to demonstrate and reference the design information which demonstrates compliance with each applicable Building Regulation and notes the guidance used to justify design responses. This is included in Appendix B.

The Building Regulations Tracker will be submitted to Sweco and the supporting design information uploaded to Sweco's assessment portal by the end of April 2025.

The following documents are also being prepared to complete the RIBA Stage 4 Principal Designer Information:

- Designer Competency Statements – to be prepared by each of the designers involved
- Statement from client on steps taken to determine whether the person has a serious sanction, and the detailed consideration of their previous conduct which might call into question their competence in relation to the work in question. (included in all ITTs and SQs)
- Building Regulations Compliance Statement signed by client and all designers
- Building Regulations Compliance Tracker with links to supporting information
- RIBA Fire Compliance Tracker
- Schedule of Construction Materials
- Fire and Emergency File to be prepared by the Fire Engineer.
- Fire Strategy Plans
- Emergency Vehicle Access and Water Supplies Strategy.

4.4 CDM

Haworth Tompkins are appointed as CDM Principal Designer. The technical design consultants are Designers under the CDM regulations.

Access & Maintenance Strategy – RIBA Stage 4
We have produced the Access & Maintenance Strategy for the project. This is included in Appendix A. The client team should review this and confirm they understand the proposed procedures. Access & Maintenance Strategies related to services installations are included in the Max Fordham Stage 4 Report, landscaping in the JCLA Stage 4 Report and Theatre Technical systems in the Charcoalblue report.

Hazard Elimination & Management Schedule
We have produced a Hazard Elimination & Management Schedule for the project to record residual Health & Safety risks to contractors and building users which have not been resolved through the design process to date. This is included in Appendix A. The schedule has been issued to the tendering contractors for the construction works. Additional detailed risk registers relating to each technical discipline are included in the technical consultant reports in the appendices.

Pre-Construction Health & Safety Information
Haworth Tompkins have produced Pre-Construction Health & Safety Information Packs for both the Enabling Works and Main Works. This includes the following information:

Project Description
Site Constraints Plans
Hazard Elimination & Management Schedule
Health & Safety File Requirements

Appendices:
- Asbestos Survey Information
- Building Services Record Information
- Fire Alarm Record Information
- Intruder Alarm Record Information
- Utilities Record Information
- No. 29 King Street Existing Services Record Information
- ASHP Installation Record Information
- Enabling Works Record Information (Tender Information)
- Measured Survey
- Topographical Survey
- Planning And Listed Building Consents
- External Fire Escape Condition Survey
- Archaeological Report
- Timber & Damp Survey
- Access & Maintenance Strategy (RIBA Stage 4)

5.0 Project Delivery & Next Steps

5.1 Key next steps & decisions required

The project is currently out to tender to four contractors. The tenders are due to be returned on 02/05/2025.

The tender returns will be analysed by the project team during May 2025 and a recommendation made to the client team at the end of May 2025. This recommendation will be reviewed by the client team and taken to BCKLWN cabinet for decision in mid-July 2025.

Main works construction is currently planned to commence on site 25/08/2025 and complete on 05/03/2027. Client-direct fit-out, including heritage interpretation, follows-on and is planned to conclude by 11/06/2027.

A final Stage 4 design review is being planned with the client team to close out review of technical elements and confirm the outstanding design matters so that these can be resolved and instructed accordingly to the main contractor early in Stage 5.

5.2 Project programme

Job	**Kings Lynn Guildhall**
Job No	**/2302**
Programme	**Master Programme**
Prog. Ref	**/2302.Prog/MP/01**
Rev	07
Date	**/03/03/2023**
Date	01/04/2025

HaworthTompkins

Note: Programme aligned with Pulse Master programme Rev 15

	Year	Duration	/2023/												/2024												/2025												/2026												/2027												/2028		
			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
	ACTIVITIES																																																																					
	Design Team Appointment																																																																					
	RIBA Stage 2	4m/ 18w																																																																				
	Costing Review	2w																																																																			
	Client Review	4w																																																																			
	Stage 2 extension (medieval floor+gateway)																																																																				
	Client Review																																																																			
	Sign off Stage 2																																																																		
	RIBA Stage 3	4m/ 17w																																																																		
	Soft start (update to survey etc)	2m																																																																	
	Costing Review	2w																																																																
	Client Review	2w																																																																
	Sign off Stage 3																																																																	
	Prepare Planning Permisson	2m/ 8w																																																																
	Submit Planning Application	14/06/2024																																																																
	Planning Determination	4m/ 18w																																																															
	Planning Condition Discharge	4m/ 18w																																																														
	Standdown Period/ Council Review	2m/ 9w																																																													
Stage 4 period extended	**RIBA Stage 4 Design to Tender**	7 m																																																												
	Prepare Bill of Quantities	14w																																																											
	Stage 4 Report	1m/ 4w																																																										
	Client design sign-off																																																												
	Stage 4 Cost Plan & Tender Docs	1m/ 4w																																																										
	Stage 4 Client approval to tender	3w																																																									
	Finalise/ Issue Contractors Tender	07/03/2025																																																									
Reduced by 2 weeks	**Tender Period**	8w																																																								
Tender revoew period extended	**Tender Review**	7w																																																						
	BCKLWN review and decision period	8w																																																						
	Tender Award	25/07/2025																																																					
	RIBA Stage 5 Mobilisation	1m/ 4w																																																				
Pushed back 1 month	**RIBA Stage 5 Construction** 25/08/25-05/03	18m/ 76w																																																			
	Completion	05/03/2027																																																				
Reduced by 4 weeks	**Client handover/ fit-out (incl. interpre**	2m/ 8w																																																			
	Opening to public	30/04/2027																																																			
	RIBA Stage 6 Defects Liability Period	12m																																																		

Strategic Project Programme

APPENDICES

A. CDM Information
RIBA Stage 4

HaworthTompkins 110 Golden Lane, London, EC1Y 0TL
+44 (0) 20 7250 3225, info@haworthtompkins.com

HAZARD ELIMINATION AND MANAGEMENT STRATEGY

Job No:	Project:		Date of Issue:	Revision:
2302	St George's Guildhall, King's Lynn		28/02/2025	B
REFERENCE CONSTRAINT/ ACTIVITY OR ELEMENT	**HAZARD**	**MEASURES TO ELIMINATE/ RELEVANT GUIDANCE**	**MANAGER**	**ELIMINATED**
		DEMOLITION/ SITE CLEARANCE		
D1	Asbestos removal	Asbestos	has been completed and is available to the Contractor. Some asbestos will be removed/ made safe as part of the Guildhall Enabling Works. Refer to record information.	Project Manager/ Client	Y
D2	Decommissioning of live services	Live services- electrocution, disruption to occupied areas, asbestos (see D1 above)	Investigative survey of existing services. All decommsisioning, demolition, and removal of services to comply with BS 6187: 2011 Code of Practice for Full and Partial Demolition	MF/ Client/ Contractor	N
D3	Demolition	Structural/ building fabric collapse, Working at height, Removal of demolished materials, risk of flooding	Refer to Structural Engineers information for sequencing diagrams and load capacity of existing structure. All demolition work to comply with BS 6187:2011 Code of Practice for Full and Partial Demolition. Opening up works and timber decay survey will help reduce the risk associated with this item.	Project Team/Momentum	N
D4	Removal of Other Hazadous Materials	Guano and other animal detritus; anthrax; mould	Pre-Construction removal, using specialist contractor. Sampling of relevant parts of building fabric. Prevention measures required to mitigate further guano build up before Main Contractor site posession.	Client	N
D5	Landscape excavation work	There is s suspected underground vault/ chamber within the main courtyard. The Council have explained that a traction engine and excavator fell into this vault previously.	See detailed report below. Contractor to be aware of subsidence risk when working in this area. February 2004. Field Observation. Mechanical excavator fell through courtyard at TF 6158 2022 just to west of detached outbuilding. Hole examined by E. Rose (NLA). Barrel vaulted chamber, proved to be that into which a traction engine fell c.1977 and resulting hole filled with cement, before that it extended up to end of above described building. Remaining section 3.69m east to west, width north to south 1.60m. Former rectangular hole in vault 1.19m long infilled carefully with brick vaulting around manhole. Height min. 600mm but rubble obscures base. Inner surface cemented. Original bricks seem 18th to early 19th century. Probably a cesspit formerly under a building.	Contractor	N
		MAIN CONTRACT WORKS		
C1	Site access and construction traffic- Site constraint	Restricted site and occupied adjacent buildings. Access to site restricted to two entrance points of King St that do not allow lorries to enter due to size (2x2.5m, slightly larger to southern opening). Cranage, site traffic, heavy handling/ trolleying	Define site boundaries. Partial blocking of road required for loading and unloading, and suspension of parking spaces required on King St. Logistics/Construction Traffic Management. Strategy to be developed taking into account public safety issues. Develop Cranage Strategy / possible locations. Develop structural design to enable Contractor to use structural member sizes that can be delivered via available access points. Refer to Site Constraints Plan.	Contractor	N
C2	Site services/ drainage- Site constraint	Provision of suitable temporary services	Information regarding availiability of existing/temporary services (elec, water, drainage) to be fully established. A sitewide utilities survey has been commissioned and circulated. A number of services missing from the survey have been established, which needs further anazlysis in Stage 4.	MF	N

REFERENCE	CONSTRAINT/ ACTIVITY OR ELEMENT	HAZARD	MEASURES TO ELIMINATE/ RELEVANT GUIDANCE	MANAGER	ELIMINATED
C3	Temporary vertical access- restricted site. Temporary works minimisation	Operatives / working at height / manual handling	Vertical access ideally to be designed as new permanent staircases and retained existing staircases	HT/ Momentum	N
C4	Roof level works/ installation of roof level plant	Operatives / working at height. Size/ weight- lifting/ crane operations	Locate main plant rooms at ground or basement where possible. Minimise plant at roof level. Where at roof level, plant to be on stable flat area and accessible by stairs. Stage 4: Where plant located above ground, access stairs have been provided as part of the design proposals.	HT/ MF	N
C5	Occupied premises- Site constraint	Pedestrian/ vehicular access, maintaining fire escape routes, maintaining utility services	Phasing to be developed to maintain access / escape routes and also utilities/ services. Principal Contractor to draw site constraint drawing once phasing strategy has been decided and following discussions with council/ client.	Project Team/ Principal Contractor/ Client	Y
C6	Existing Building Structure- site surveys	Maintaining stability during structural alterations. Dust/ noise/ vibration. Risk of falling	PD and SE to review temporary works and communicate building sequence in pre-constrcution information to reduce risk of structural damage. Sequencing diagrams to show phasing of build, eg structural ties to be altered once structural load of roof finishes have been removed (see C8). Consider requirements for temporary support structure. Provide effective edge protection to all openings in floors.	HT/ Momentum/ Principal Contractor	N
C7	Damage to Existing Building Features	Damage to existing building features	Maintain suitable temporary protection to the key building features generally. Take particular care working inside Guildhall with regard to medieval timber floor, historic windows & roof timbers.	Principal Contractor	N
C8	Insulation of Existing Roof Structures and changes to roof structures	Risk of building collapse. Provision of suitable temporary works eg propping	Minimise risk of building collapse by changing roof structure while load of roof is removed. Full temporary roofs (category 2) required before and during roof works. Sequence of construction to Structural Engineer's construction sequence. Main contractor to submit method statrements for approval confirming proposed sequencing and details of temporary works. Monitor movement of external walls throughout, with frequent measurements taken during structural alteration work.	Momentum/ Principal Contractor	N
C9	Work Adjacent to River Great Ouse	Risk of damage from floodwater during construction. Risk of electrocution	Constraint of working next to tidal river. Flood risks have been identified. Construction phasing and site access to avoid works near river where possible.	HT/ Momentum/ Principal Contractor	N
C10	Flood risk	Risk of damage from floodwater, risk to operatives. Risk of electrocution	Flood risk (rainwater and particularly fluvial) have been identified. Design site power and temporary works so as to reduce risk of electrocution and other hazards should the area be flooded.	HT/ Momentum/ Principal Contractor	N
C11	Erection of new structure	Access restrictions. Lifting operations	Design the structural frame to minimise the lowest practicable level lifting requirements within the site constraints. Note in particular constrained access for structural delivery & assembly into the Guildhall.	Principal Contractor	N
C12	Installation of lifts	Access restrictions. Lifting operations	Design the lift works to minimise lifting requirements within existing site contraints. Supplier to advise on best practice installation methods	Principal Contractor	N
C13	Working in/ arround risers and lift shafts	Risk of falling through openings	Provide sufficient edge protection to opening in floors during works	Principal Contractor	N
C14	Live services	Working in proximitly to retained live services	Ensure any live services required to be retained are clearly identified, protected and notified to operatives.	Principal Contractor	N
C15	Specialist contractor designing detail of technical theatre systems	Design failing to meet required standards of safety or use	Specialist contractor tender returns evaluated by theatre consultant against the relevant performance specification and advice shared with main contractor/client as to whether the tender return is compliant. Contractor drawings reviewed and evaluated on an A/B/C approval system before going into production.Concerns around suitability or compliance reviewed at the earliest opportunity	Specialist Contractor	N
C16	Installing technical equipment from strong points, truss or bars, exceeding load	Structural collapse of part of the building	Performance specification is coordinated with structural engineer to ensure structure and strong points are suitable to carry required loads.	Structural Engineer/ Principal Contractor/ SE Contractor	N

REFERENCE CONSTRAINT/ ACTIVITY OR ELEMENT		HAZARD	MEASURES TO ELIMINATE/ RELEVANT GUIDANCE	MANAGER	ELIMINATED
		MAINTENANCE/CLEANING/ REPLACEMENT			
M1	Roof maintenance	Operatives / working at height / roof access/ protection from falling.	Long life low maintenance materials are specified to minimize access frequency. For areas of roof regularly accessed, permanent edge protection is provided. Some areas of existing roof cannot be accessed with permanent edge protection or via cherry picker, and a combination of solutions must be adopted. See Access and Maintenance Strategy for details of these areas.	PD (HT)/ Client	N
M2	Plant maintenance/ replacement	Operational/ Live services. Work at height. Lifting operations.	Design fittings to be accessed from low level where possible. Develop Maintenance Strategy based on: (i) BS7543 · Durability of Building Components. (ii) Workplace (Health, Safety and Welfare) Regulations (iii) CIRIA Safe Access for maintenance and repair (iv)Space Requirements for Plant Access, Operation and Maintenance	MF/ PD (HT)/ PC	N
M3	Maintenance and relamping of high level light fittings, speakers, blinds, pulleys etc	Access / work at height / protection from falling.	Design fittings to be accessed from low level where possible. Develop Maintenance Strategy based on: (i) BS7543 · Durability of Building Components (ii) Workplace (Health, Safety and Welfare) Regulations (iii) Building Regulations · Part N (+ Part K). (iv) HSE Guidance · MISC 611.612.612.61A (Window cleaning) (v) CIRIA Safe Access for maintenance and repair (vi) Work at Height Regulations	MF/ PD (HT)	N
M4	Fire precautions/testing Maintenance: smoke/heat detectors/fire dampers	Access/ work at height- risk of falling from height	Design fittings to be accessed for maintenance from low level where possible. Develop Maintenance Strategy based on: (i) BS7543 · Durability of Building Components (ii) Workplace (Health, Safety and Welfare) Regulations (iii) Building Regulations · Part N (+ Part K). (iv) HSE Guidance · MISC 611.612.612.61A (Window cleaning) (v) CIRIA Safe Access for maintenance and repair (vi) Work at Height Regulations	PD (HT)	N
M5	Services in basement level below expected level of high floods	Risk of drowning/ electrocution	All basement electrical services designed where possible to be mounted and supplied above expected level of high floods.	PD (HT) /MF	N
M6	Rooflights	Access/ work at height- risk of falling from height	All roof glazing / rooflights to be designed/ specified to be non-fragile minimum Class 2 rating / preferably Class 1 rating, in accordance with TN66/ TN67 Specification and CWCT guidance. Test evidence required	PD (HT) / Specialist Contractor	N
M7	Façade cleaning & maintenance	Access/ work at height- risk of falling from height	Develop Maintenance Strategy based on: (i) BS7543 - Durability of Building Components (ii) Workplace (Health, Safety and Welfare) Regulations (iii) Building Regulations - Part K (iv) HSE Guidance - window cleaning (v) CIRIA Safe Access for Maintenance and Repair (vi) Work at Height regulations Refer to design team strategy for window cleaning		
		STRUCTURAL WORKS DESIGNER RISK REGISTER			

REFERENCE	CONSTRAINT/ ACTIVITY OR ELEMENT	HAZARD	MEASURES TO ELIMINATE/ RELEVANT GUIDANCE	MANAGER	ELIMINATED
	Groundworks - Deep excavations	Unstable excavations during construction and potential influence on adjacent structures with shallow foundations	Proposed new foundations are shallow strip and raft foundations. Some excavations are expected be <1m deep. Existing foundations must not be damaged or undermined. Design has been developed to avoid underpinning where possible. Deep drainage chambers may bee required, but have been kept to a minimum depth where possible. Contractor to prepare method statement for working in deep excavations and allow for suitable temporary works to prop sides of excavations where necessary.		
	Groundworks - Deep excavations	Working in confined spaces	Contractor to review works and confirm if working in confined spaces is necessary, and if so to prepare a relevant method statement and risk assessment.		
(D2)	Groundworks - below ground services (inc. high voltage cables)	Risk of striking live services.	New foundations and drainage runs have been routed to avoid more congested areas of site where possible. Utilities and CCTV surveys have been carried out and will be supplied to Main Contractor.		
	Groundworks - underpinning	Temporary instability of structures above and potentially unstable excavation walls.	Trial pits have been carried out where possible to identify levels of existing footings and locations where underpinning may be required. Where underpinning is required, a recommended hit-and-miss sequencing will be provided to Contractor. Contractor to follow recommended sequencing unless agreed otherwise, and allow for temporary sacrificial propping. Contractor to prepare job-specific method statement and risk assessment for underpinning works.		
(D5)	Groundworks - vault/ chamber and sink holes	Risk of unstable ground due to suspected underground vault/ chamber. There have been instances of sinkholes appearing near to the site.	Contractor to be aware of subsidence risk due to ground conditions sand below ground water flows. The surface water drainage strategy has mitigateed the risk of sink holes on the site where possible.		
(C9)	Working near watercourses	Risk of falling into watercourse and risk of drowning	All works are expected to be able to be carried out within the site boundary and within a safe distance of the watercourse. Contractor to ensure adequate site hoarding or guard railing is placed along all access routes or boundaries adjacent to the watercourse.		
(C10)	Flooding	Partial or site-wide flooding during construction.	Contractor to be vigilant of weather forecast and any potential flood warnings. Temporary flood defences should be provided during flood warning events where appropriate. No work should be carried out within areas of flooded site, with access to those areas suitably closed off to site personnel and the public.		
(D3/C3)	Working at height	Working at height required for all works to roofs and floors not ono the ground floor.	Designs have considered member sizes and sequencing to allow for ground assembly and lifting into place, limiting the amount of time spent working at height. Contractor to follow best practice to mitigate risks.		
(D3)	Loading onto existing structure during construction	Temporary construction loading may exceed capacity of existing floors.	Design loading plans have been provided for all areas of the building. Contractor to ensure temporary construction loading does not exceed capacity of any existing or new floors taking into account sequencing, temporary loading, and any strengthening works required to facilitate the permanent works design.		
(C6)	Temporary instability	- Temporary instability of Guildhall roof during repair works due to removal of any braces, sarking boards, tie bars or other items that may be providing stability. - Temporary instability of existing floor joists - Damage to external masonry walls whilst raising existing beam in old warehouse - Crack stitching/ repair works to maosnry walls - Openings made to Guildhall wall	The contractor should note the recommended construction sequence and follow repair works/ temporary works specifications provided by Momentum. The Contractor to prepare method statement and risk assessment. The Contractor may propose alternative sequence, including providing temporary works designs. The must be submitted to Momentum for review.		
	Fire risk	Risk of fire during during construction due to the amount of historic, dry timber and ignition from potential construction works.	Hot works such as site welding have not been included as part of the permanent design works. Contractor is expected to follow typical site safety guidelines to avoid potential ignition of timber structures or stored materials.		
	Works to existing foyer/box office floor.	Suspected void below floor. Risk of partial collapse or falling into void. Contractor must excersise caution when carrying out works around existing floor.	Opening up works are to be carried out to confirm presence and extent of any void as well as establish how the existing floor structure is supported.		

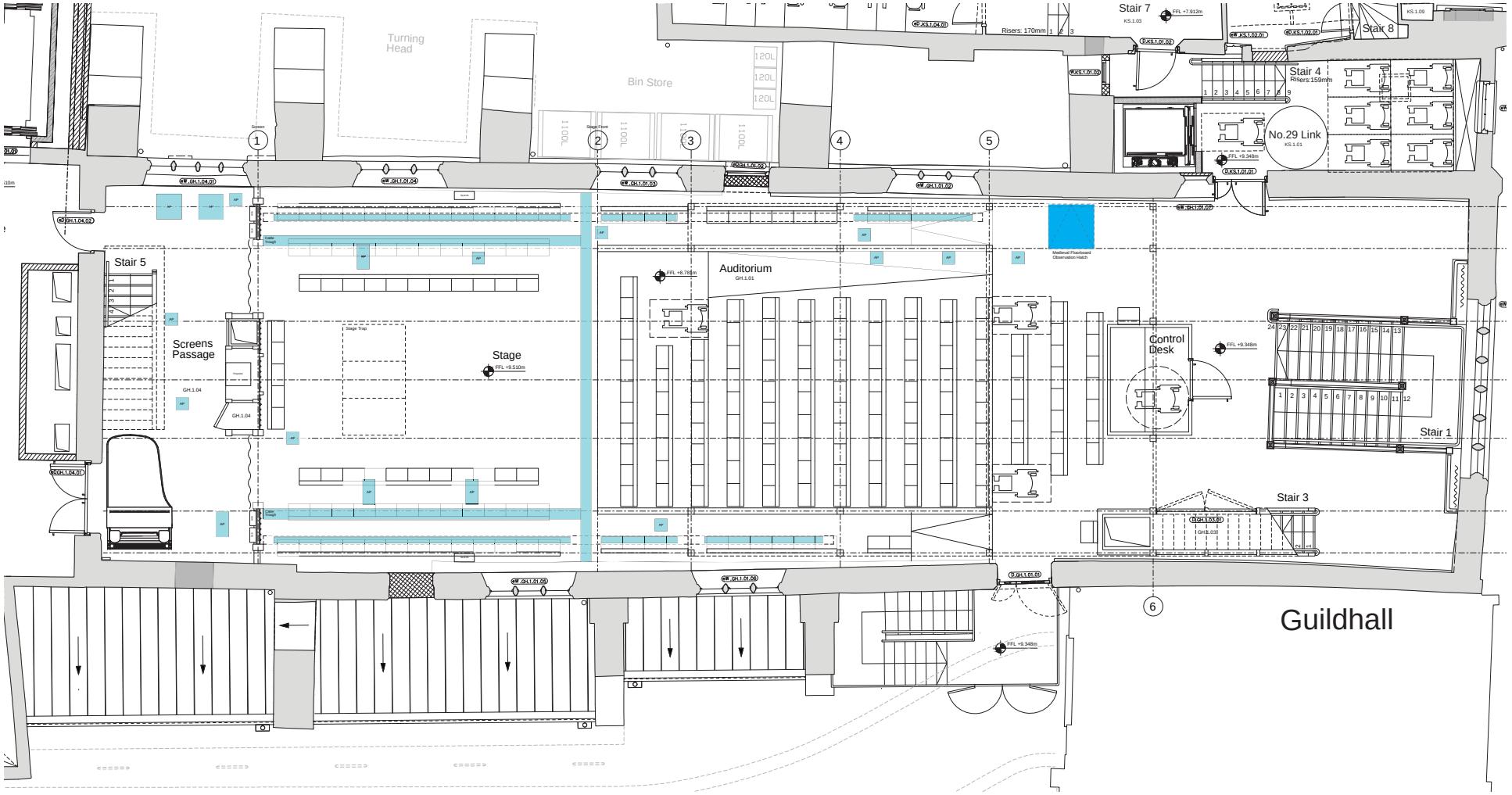
St George's Guildhall King's Lynn

Access and Maintenance Strategy (RIBA Stage 4)

Doc. Ref: 2302-St George's Guildhall Access and Maintenance Strategy
Revision: T01 - 09/03/2025
Author: Haworth Tompkins
Status: TENDER (Main Works)

CONTENTS

01. GUILDHALL THEATRE MAINTENANCE ACCESS PLAN



TYP-01: Gallery front lighting bar accessed through portable step ladder placed over bench seating

TYP-02: High level lighting bar accessed by bespoke step ladder. Refer to Charcoalblue information

TYP-03: Floor hatch access through ring pull key for service maintenance/ cable trough

TYP-04: Motorised lighting bar

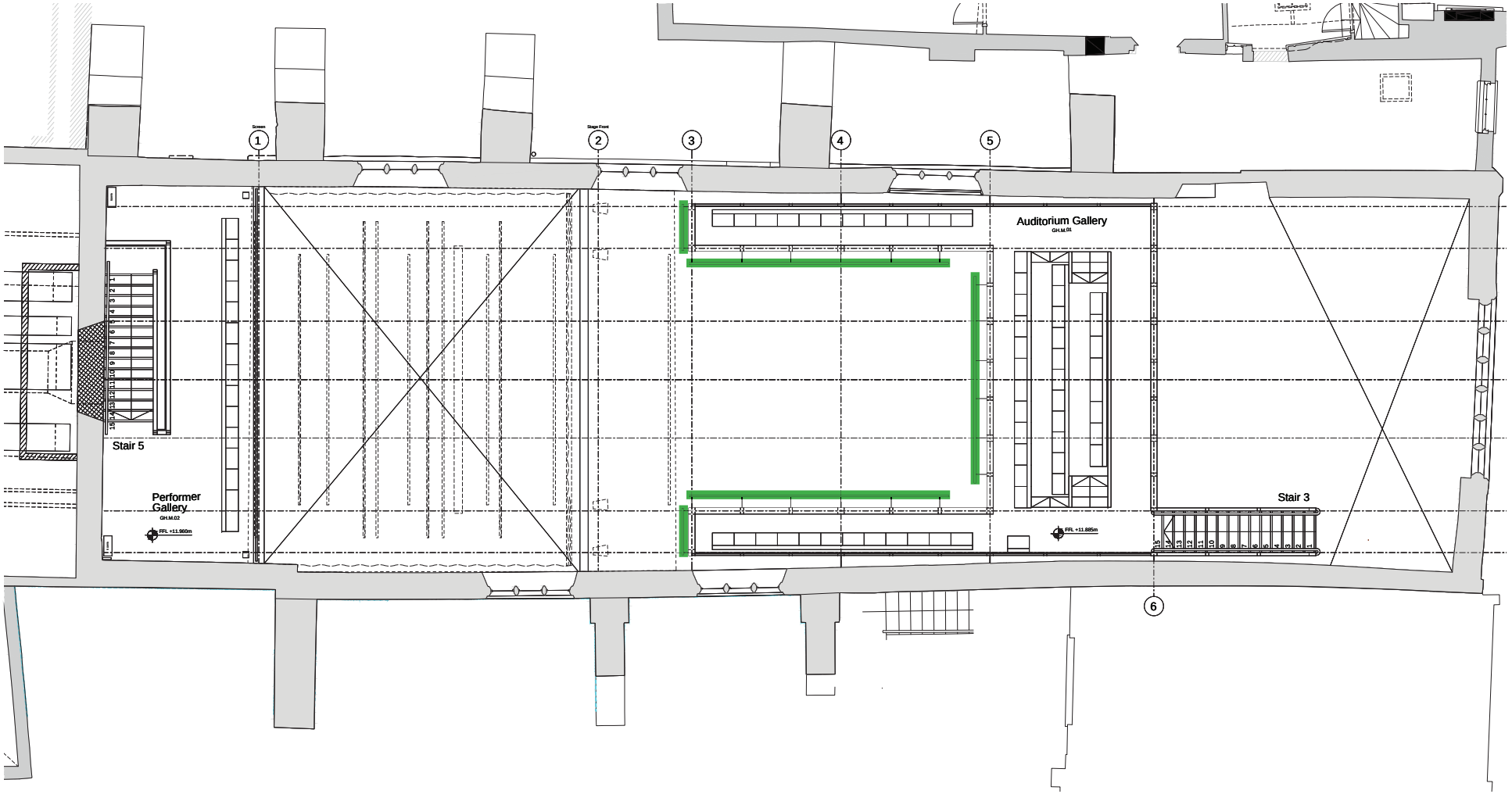
TYP-05: Fixed lighting bar accessed by stepladder or tower scaffold

TYP-06: Access to sub-stage through front hatch to clean ventilations grille

TYP-07: Floor hatch to view medieval floorboards. Glazed panel is hinged for cleaning access

TYP-08: High level service zone accessed through hatch

01. GUILDHALL THEATRE MAINTENANCE ACCESS PLAN (GALLERY LEVEL)



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TYP-02: High level lighting bar accessed by bespoke step ladder. Refer to Charcoalblue information

TYP-03: Floor hatch access through ring pull key

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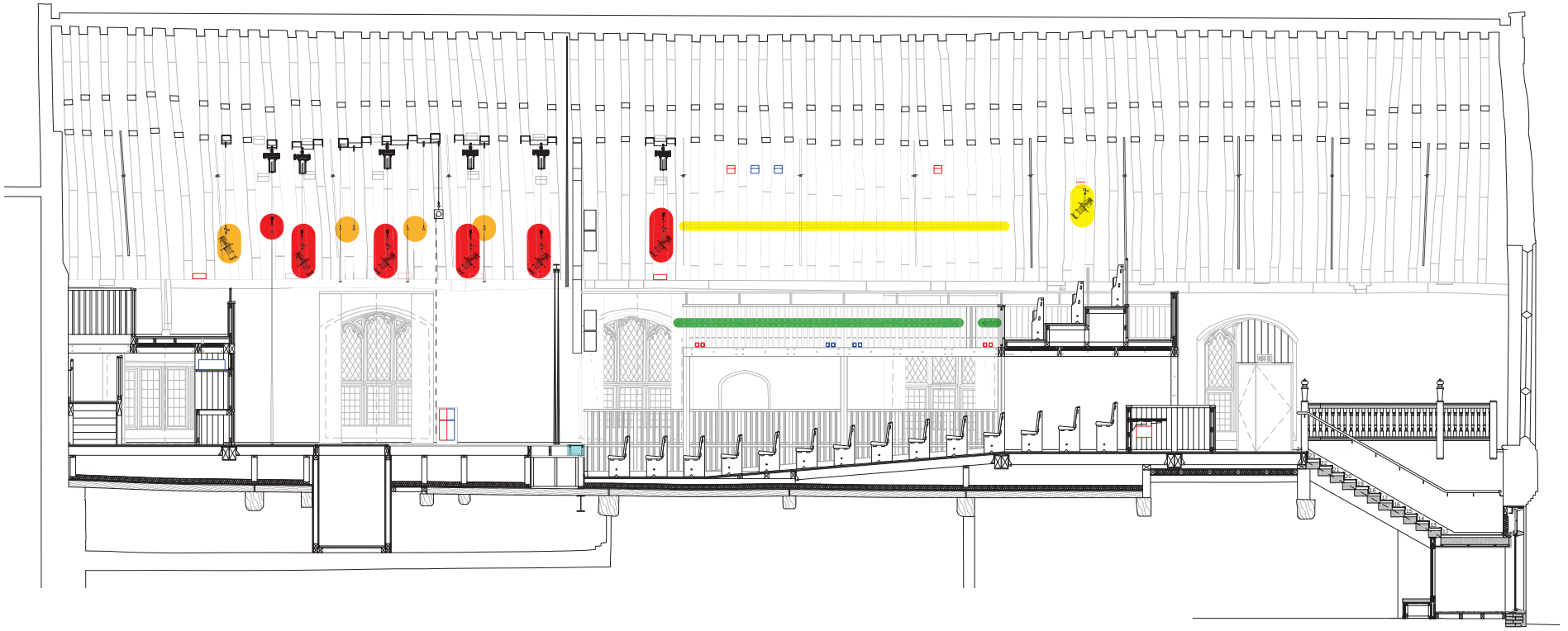
TYP-05: Fixed lighting bar accessed by stepladder or tower scaffold

TYP-06: Access to sub-stage through front hatch to clean ventilations grille

TYP-07: Floor hatch to view medieval floorboards. Glazed panel is hinged for cleaning access

TYP-08: High level service zone accessed through hatch

01. GUILDHALL THEATRE MAINTENANCE ACCESS LONG SECTION



TYP-01: Gallery front lighting bar accessed through portable step ladder placed over bench seating

TYP-02: High level lighting bar accessed by bespoke step ladder. Refer to Charcoalblue information

TYP-03: Floor hatch access through ring pull key

TYP-04: Motorised lighting bar accessed from stage level

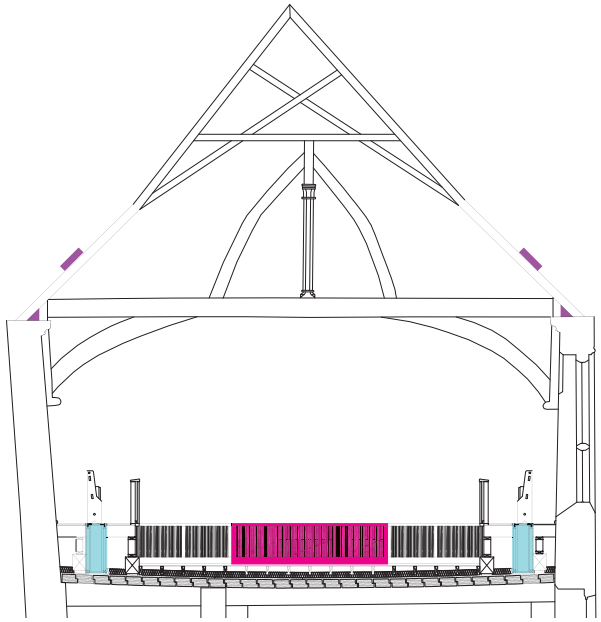
TYP-05: Fixed lighting bar accessed by stepladder or tower scaffold

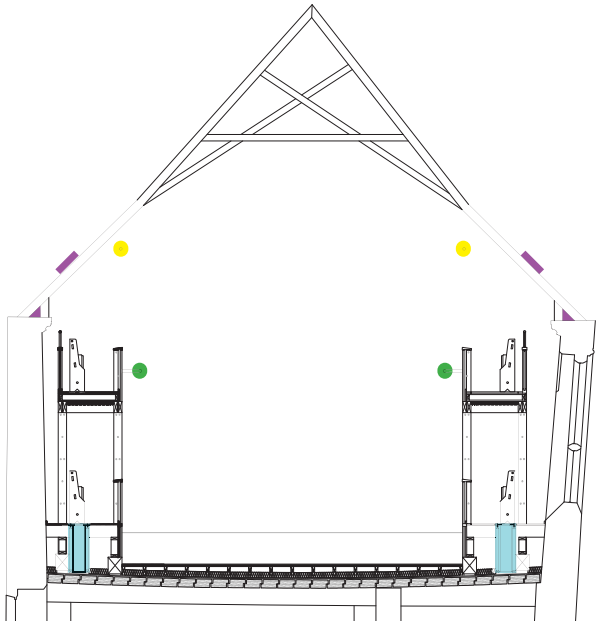
TYP-06: Access to sub-stage through front hatch to clean ventilations grille

TYP-07: Floor hatch to view medieval floorboards. Glazed panel is hinged for cleaning access

TYP-08: High level service zone accessed through hatch

01. GUILDHALL THEATRE MAINTENANCE ACCESS CROSS SECTIONS





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TYP-02: High level lighting bar accessed by bespoke step ladder. Refer to Charcoalblue information

TYP-03: Floor hatch access through ring pull key

TYP-04: Motorised lighting bar

TYP-05: Fixed lighting bar accessed by stepladder or tower scaffold

TYP-06: Access to sub-stage through front hatch to clean ventilations grille

TYP-07: Floor hatch to view medieval floorboards. Glazed panel is hinged for cleaning access

TYP-08: High level service zone accessed through hatch

02. WINDOW & PV CLEANING STRATEGY

1 / PROPOSED KING STREET EAST ELEVATION
1:100

0 1m 2m 3m 4m 5m

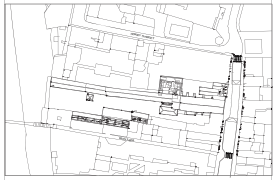
DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.



Key

- WASH FROM GROUND OR VIA 'REACH AND WASH POLE'
- CLEANED FROM INSIDE
- CLEANED FROM ROOF VIA 'REACH AND WASH POLE'
- ACCESSED FROM NEIGHBOURING PROPERTY GARDEN WITH GRANTED PERMISSION VIA 'REACH AND WASH POLE'
- CLEANED FROM RIVER TERRACE VIA 'REACH AND WASH POLE'
- SOLAR PVS CLEANED USING TOWER SCAFFOLD AND 'REACH AND WASH POLE' OR CLEANING DRONE
- INTERNAL SECONDARY GLAZING

REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
+44 (0) 20 7250 3225 | www.haworthtompkins.com

JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP KING STREET EAST ELEVATION
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32300
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4

1 / PROPOSED SGC SOUTH ELEVATION (ZONE 2)
1:100

2 / PROPOSED SGC SOUTH SOUTH ELEVATION (ZONE 2)
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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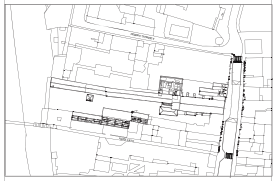

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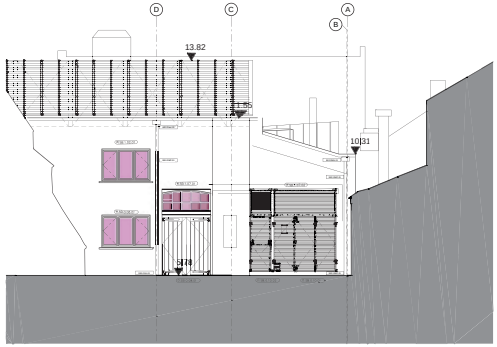
- INTERNAL SECONDARY GLAZING

REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
+44 (0) 20 7250 3225 | www.haworthtompkins.com

JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP ST GEORGES COURTYARD SOUTH ELEV
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00301
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4



1 / PROPOSED SHAKESPEARE BARN EAST ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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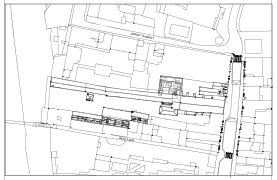

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REV	DATE	DESCRIPTION
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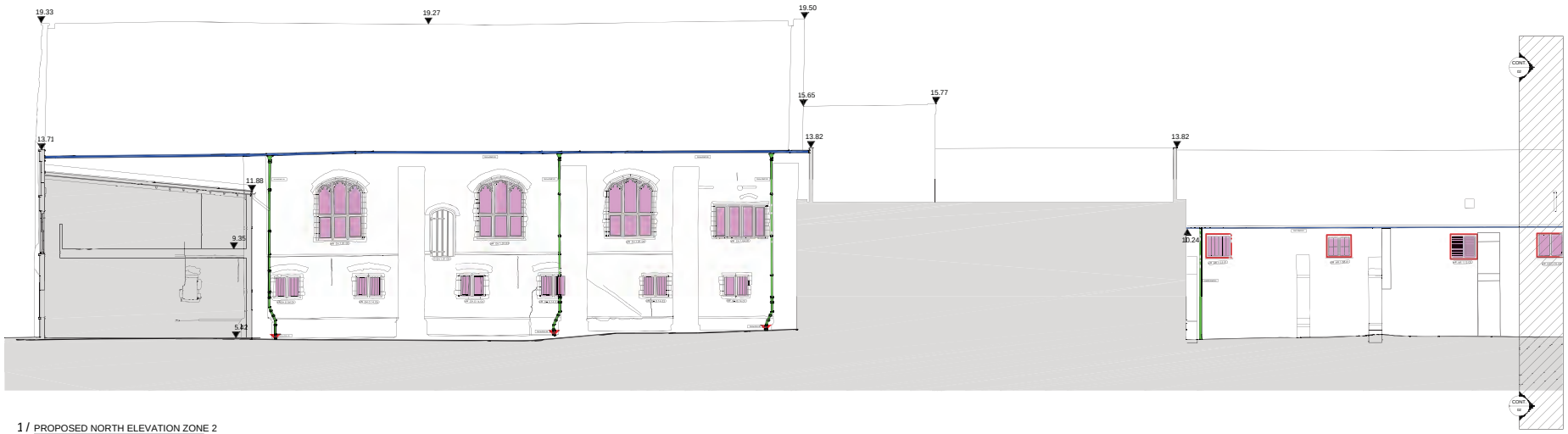
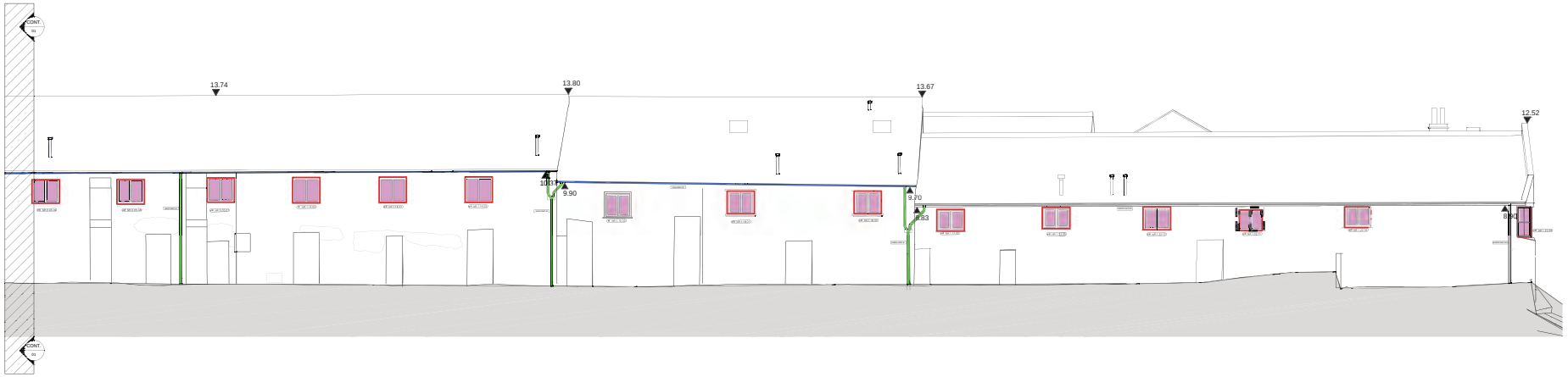
JOB	2302:ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP SHAKESPEARE BARN ELEVATION
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32302
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/2025
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4



1 / PROPOSED NORTH ELEVATION ZONE 2
1:100



2 / PROPOSED NORTH ELEVATION ZONE 1
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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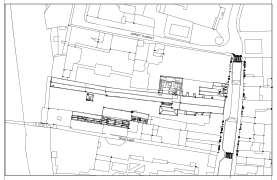
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.



Key

- WASH FROM GROUND OR VIA 'REACH AND WASH POLE'
- CLEANED FROM INSIDE
- CLEANED FROM ROOF VIA 'REACH AND WASH POLE'
- ACCESSED FROM NEIGHBOURING PROPERTY GARDEN WITH GRANTED PERMISSION VIA 'REACH AND WASH POLE'
- CLEANED FROM RIVER TERRACE VIA 'REACH AND WASH POLE'
- SOLAR PVS CLEANED USING TOWER SCAFFOLD AND 'REACH AND WASH POLE' OR CLEANING DRONE
- INTERNAL SECONDARY GLAZING

REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
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JOB	2302:ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP GUILDHALL / NORTH ELEVATION
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32303
REV	01
SCALE	1:100@A1 1:200@A3
DATE	16/04/24
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4

1 / PROPOSED SGC NORTH ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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NOTES

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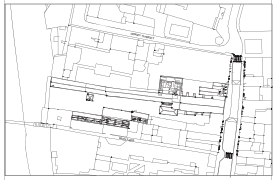

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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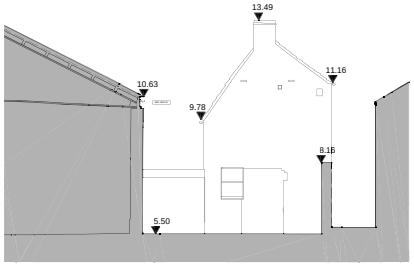
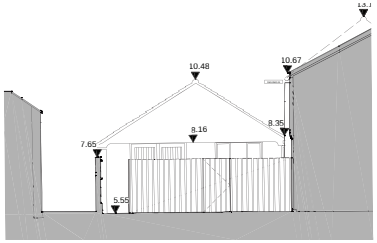
JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP ST GEORGES COURTYARD NORTH ELE
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00304-P
REV	09
SCALE	1:100@A1 1:200@A3
DATE	16/04/24
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4

1 / SCULPTURAL GARDEN NORTH ELEVATION
1:100



2 / SCULPTURAL GARDEN WEST ELEVATION
1:100



3 / SCULPTURAL GARDEN EAST ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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NOTES

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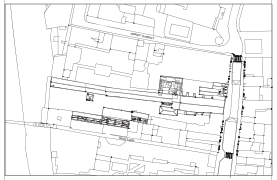

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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JOB: 2302 : ST GEORGES GUILDHALL

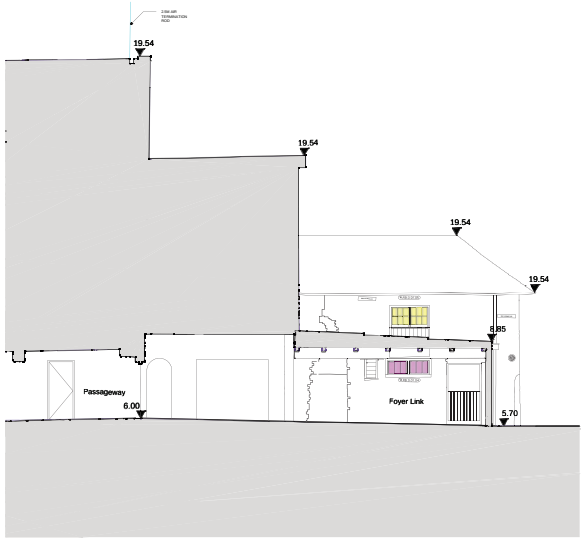
DRG: WINDOW UPKEEP WHITE BARN GARDEN ELEVATIONS

DRG No: STGG-HTL-ZZ-ZZ-DR-A-32305 REV: 01

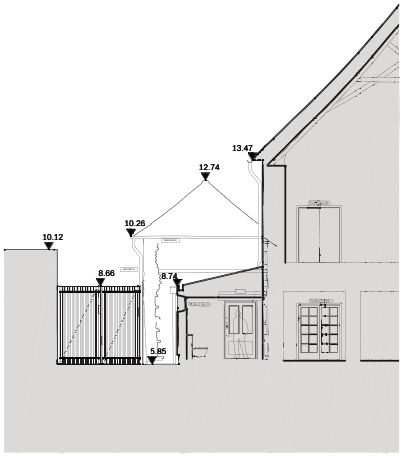
SCALE: 1:100@A1 1:200@A3 DATE: 12/02/2025

DRAWN: HT TEAM INSPECTED BY: ML

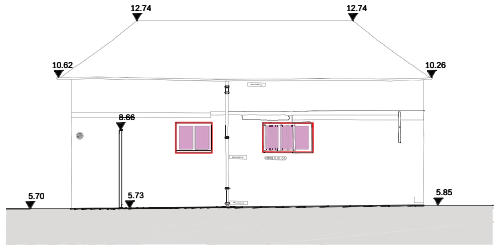
STATUS: STAGE 4



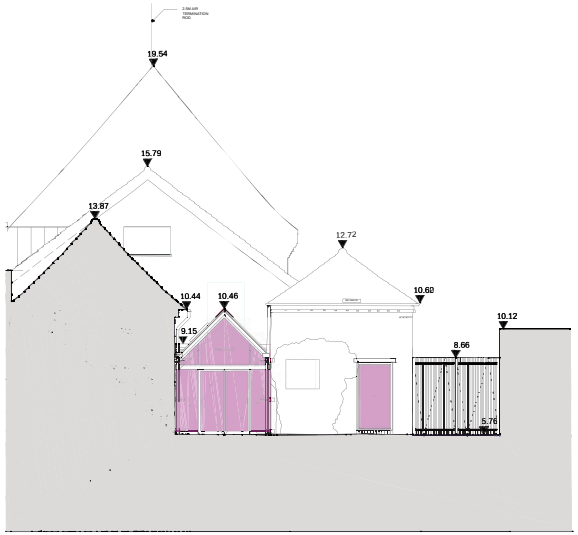
1 / PROPOSED RED BARN NORTH ELEVATION
1:100



2 / PROPOSED RED BARN WEST ELEVATION
1:100



3 / PROPOSED RED BARN SOUTH ELEVATION
1:100



4 / PROPOSED RED BARN EAST ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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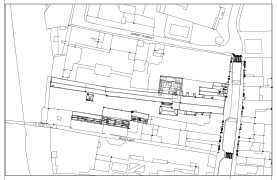

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
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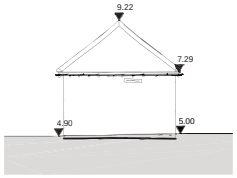
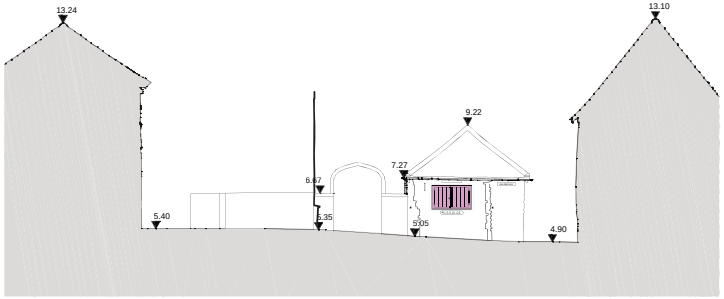
JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP RED BARN ELEVATIONS
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32306
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/2025
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4

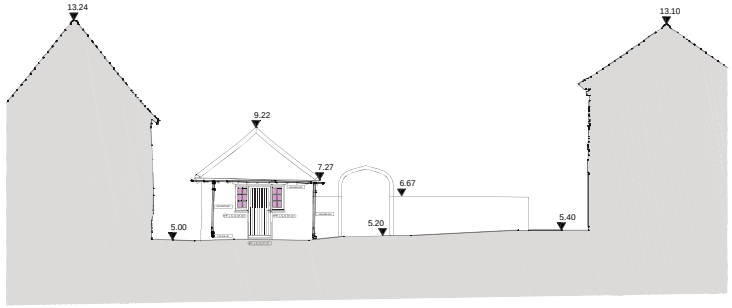


1 / PROPOSED LINEN STORE NORTH ELEVATION
1:100

2 / PROPOSED LINE STORE SOUTH ELEVATION
1:100



3 / PROPOSED LINEN STORE EAST ELEVATION
1:100



4 / PROPOSED LINE STORE WEST ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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NOTES

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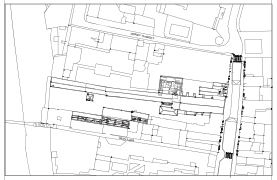

Key

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- INTERNAL SECONDARY GLAZING

REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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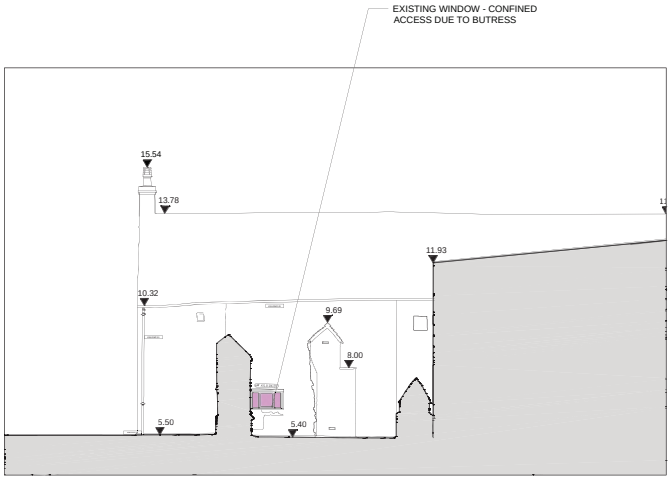
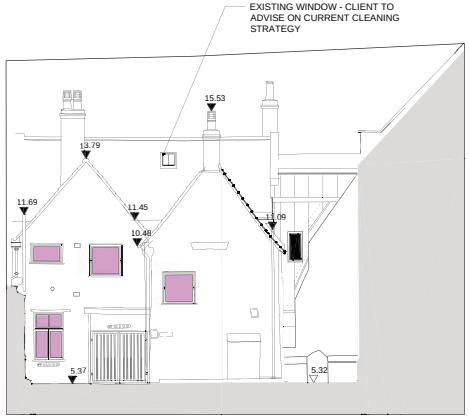
JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP LINEN STORE ELEVATIONS
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32307
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4



1 / PROPOSED NO. 29 EXTERNAL ELEVATION SOUTH
1:100

2 / PROPOSED NO. 29 EXTERNAL ELEVATION NORTH
1:100



3 / PROPOSED NO. 29 EXTERNAL ELEVATION WEST
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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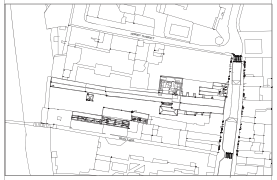

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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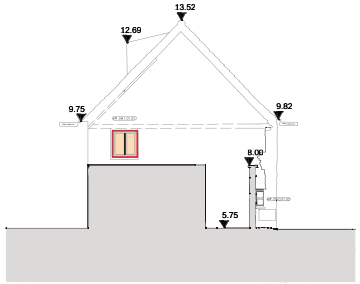
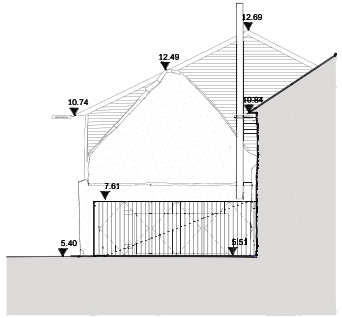
JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UPKEEP NO.29 KING STREET ELEVATIONS
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32308
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4



1 / PROPOSED OLD WAREHOUSE WEST ELEVATION
1:100



2 / PROPOSED OLD WAREHOUSE EAST ELEVATION
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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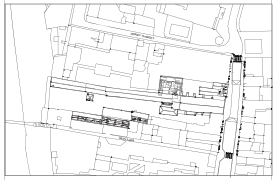

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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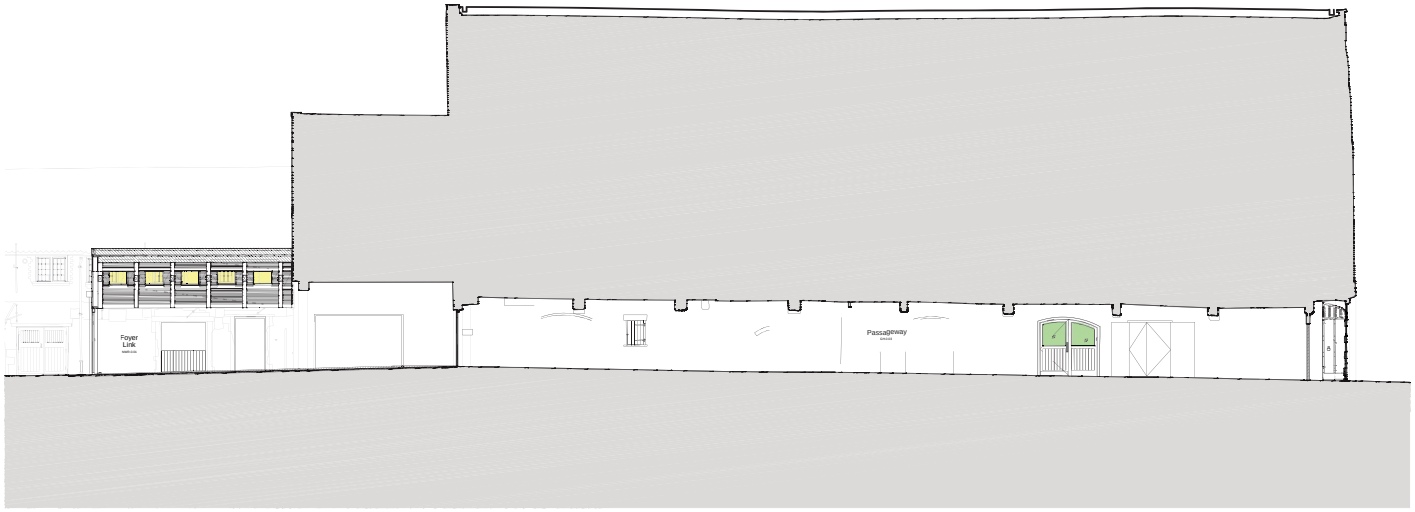
JOB	2302 : ST GEORGES GUILDHALL
DRG	WINDOW UP KEEP OLD WAREHOUSE ELEVATIONS
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32309
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4



1 / PROPOSED SECTION BB
1:100

0 1m 2m 3m 4m 5m

DO NOT SCALE

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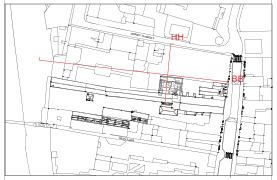

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REV	DATE	DESCRIPTION
01	09/02/25	TENDER

HaworthTompkins
110 Golden Lane, London, EC1Y 0TL
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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS HH + BB
DRG No	STGG-HTL-ZZ-ZZ-DR-A-32203
REV	01
SCALE	1:100@A1 1:200@A3
DATE	12/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	STAGE 4

03. ACCESS AND MAINTENANCE SCHEDULE (STAGE 4)

2302 St George's Guildhall King's Lynn
Access and Maintenance Schedule

HaworthTompkins 110 Golden Lane, London, EC1Y 0TL
+44 (0) 20 7250 3225, info@haworthtompkins.com

Date: 21.05.24	Rev: 2	Tender

HT Guide:
This Access and Maintenance Strategy was prepared by Haworth Tompkins in consultation with PFB and following briefing with St George's Guildhall. The general strategy is based on initial briefing received throughout Stage 4, and varies only where building locations prevent more straightforward means of access. Lifespans are based on product information and warranties provided by manufacturers, with the expectation that many products or systems will outlast these expected lifespans. Where no product information is available, lifespans are shown in grey text

Area	Item	Location	Maintenance Required (Cleaning / Service / Inspection / Repacement)	Frequency	Access Required	Expected Lifespan	Note
Roof	Natural slate roofs	29 King St	Periodic inspection of roof surface on annual basis; replace slates where broken or damaged	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	Slates: 80 years	
	Clay pantile roofs	Generally	Periodic inspection of roof surface on annual basis; replace tiles where broken or damaged	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	Tiles: 50 years	
	Lead flashings and gutters	Generally	Upkeep required: Periodic inspection of gutters and valleys on seasonal basis, removal of leaves and debris	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing. Consider permanent installation of platform in lightwell between Guildhall and No29 to access valley gutters and gutters.	Leadwork: 60 years	
	Galvanised corrugated steel roof	White Barn	Upkeep required: Periodic inspection of gutters on seasonal basis, removal of leaves and debris	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	Galvanised steel panels: 30 years	
	Zinc roofs	Foyer/ No. 29 Link/ WC buttress infills	Periodic inspection of gutters and valleys on seasonal basis, removal of leaves and debris	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold with telescopic brush for repair/ reroofing. Foyer Link - Access and periodic inspection to be via a Tower scaffold within the Main Courtyard and cleaning via telescopic brush hose attachment; Dormer to backstage area: Access from plant area on Shakespeare Barn; Buttress Infill WCs: Access via stepladder for inspection from Courtyard; 29 Link: Access via ladder or tower scaffold for inspection from lightwell between buttresses, entry to lightwell from new external door from No. 29 corridor. Pitched roof of Shakespeare Barn: Access for inspection via tower scaffold from Shakespeare Courtyard or with drones. Cleaning via gate in louvred plant screen and mansafe system	Zinc: 80 years	
	Bitumen roofing with pedestals and cement pavers	Shakespeares Barn	Bitumen roofs should be maintained by an appropriate workforce at least twice per year.	Twice a year	Shakespeare Barn plant area roof maintenance access: Accessed via door from stair onto roof.	Membrane: In excess of 35 years.	
Rainwater Goods	New cast iron gutters and hoppers	Guildhall, Red Barn, North Range, South Range, Shakespeare Barn	Periodic inspection of gutters and hoppers on seasonal basis, removal of leaves and debris.Recoat every 10 years minimum.	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	Aluminium rainwater goods: 50 years	Downpipes, gutters and hoppers in cast iron. Hoppers to bespoke design to include overflow and leafguard. Downpipes to include rodding eye where over 2 storeys in height at convenient point for rodding. Downpipes terminate at ground level into kerbed gulley, with leafguard to gulley and sufficient gap for leaf removal.
	Existing gutters and hoppers	29 King St	Periodic inspection of gutters and hoppers on seasonal basis, removal of leaves and debris.	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	Unknown	
	Landsape drainage, drains and silt boxes	Courtyard Garden	Periodic inspection of gullies and drains on seasonal basis, removal of leaves and debris.	Twice a year	By foot		Ground floor visual survey.
	New zinc gutters and hoppers	Foyer/ No. 29 Link/ WC buttress infills	Periodic inspection of gullies and drains on seasonal basis, removal of leaves and debris.	Twice a year	Drones or camera on telescopic pole for periodic inspection. Tower scaffold or scaffold for repair/ reroofing.	80 years	
External Finishes	New brickwork	Shakespeare Barn	Repoint when necessary; inspect on annual basis	Once a year	Tower scaffold for repair/ repointing	Lime mortar: may vary but expected to last 100 years	
	New timber façade	Buttress infill WCs	Inspect annually. Replace damaged boards when necessary	Once a year	By foot	Larch: 40 years	
	Curtain walling	White Barn Foyer Link	Clean periodically. Replace glazing units when required from outside.	Twice a year	Tower scaffold or scaffold for replacement of glazing units. Reach and wash for cleaning	Long-term performance according to EN 12400: Class 2	
	Existing stonework	Generally	Repoint when necessary; inspect on annual basis	Once a year	Tower scaffold	Unknown	
	Existing brickwork	Generally	Repoint when necessary; inspect on annual basis	Once a year	Tower scaffold	Unknown	
	External painted metalwork	Generally	Periodic cleaning. Retouch when necessary. Recoat every 10 years minimum.	Once a decade	By foot or tower scaffold	10 years	Access via ground.
	Landscaping finishes	Main Courtyard, lawn & riversideterrace, sShakespeare Courtyard, White Barn Garden	Periodic cleaning as recommended by Landscape Architects. Repair and repointing where necessary.	TBC	By foot	TBC	

External Apertures	Ventilation grilles, within existing buildings	Generally	Maintenance & Cleaning required: Hoover on annual basis with soft haired brush attachment Repairs and servicing: No upkeep envisaged.	Once a year	Cleaning and replacement: external ground floor access.	100+ years	
	Timber framed windows	Generally	Maintenance and cleaning required: Clean when window becomes visibly dirty. Replace panes when damaged or seals broken. Recoat paint to frames if peeling or flaking occurs.	Clean: Twice a year. Recoat: Every five years	Cleaning and maintenance: external (externally beaded windows). Reach and wash. Where possible, timber windows to open inwards for ease of cleaning. Replacement: external, tower scaffold access required.	100 years	
	Timber framed doors	Generally	Maintenance and cleaning required: Clean when glass becomes visibly dirty. Replace panes when damaged or seals broken. Recoat clear coating when necessary, typically after five years.	Clean: Twice a year. Recoat: Every five years	Cleaning and replacement: Ground level	Glazing units: 12 years Timber seal: Recoat every 5 years	
	New timber framed windows within existing openings	Generally	Maintenance and cleaning required: Clean when window becomes visibly dirty. Replace panes when damaged or seals broken.	Clean: twice a year	Cleaning: Internally beaded windows, clean or replace on window level internally.	Glazing units: 12 years Frames: Recoat every 5 years	
	Composite aluminium and timber windows	Shakespeare Barn	Maintenance and cleaning required: Clean when window becomes visibly dirty. Replace panes when damaged or seals broken. PPC or anodised coating should not need recoating	Clean: Twice a year.	Cleaning: Internally beaded windows, clean or replace on window level internally.	Glazing units: 12 years Frames: 70 years	
	Metal framed windows	White Barn and White barn annexe	Maintenance and cleaning required: Clean when window becomes visibly dirty. Replace panes when damaged or seals broken. PPC or galvanised coating should not need recoating	Clean: Twice a year.	Cleaning: Internally beaded windows, clean or replace on window level or by tower scaffold to double height spaces.	Glazing units: 12 years Frames: 70 years	
	Secondary glazing	Generally	Maintenance and cleaning required: Clean when window becomes visibly dirty. Replace panes when damaged or seals broken.	Clean: Twice a year.	Cleaning and Maintenance: Internal cherry picker for periodic cleaning. Internal access only. Replacement: Internal cherry picker.	70 years	
Rooflights	Foyer Rooflights	Foyer	Periodic cleaning of glass. No recoating of frame required.	Clean: Twice a year.	Cleaning: External access via accessible gutter with mansafe system. Initial access via cherry picker to the rear of the School House. Internal cleaning via remote access platform. Replacement: External scaffold required.	Glazing units: 12 years. Frames: 70 years	
	No29 existing rooflights	No29	Periodic cleaning of glass	Clean: Twice a year.	Cleaning: Initial access via tower scaffold to the rear of the building valley gutters. Internal cleaning from ground floor. Replacement: External scaffold required.	Unknown	

04. THEATRE DESIGNERS TECHNICAL MAINTENANCE

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Assumptions:
1 The following assessment provides information about the inherent risks, design risk mitigation/reduction, and residual risks from systems in our intended design. The inherent, mitigated/reduced, and residual risks are present in the use and maintenance of the specified equipment and systems. While some systems' design is able to mitigate/reduce risks for installation, the installation process and risks involved are subject to subcontractor final design, Principal Contractor workflow sequencing, and subcontractor competency/responsibility, including subcontractor risk assessment and method statement for their intended installation. All risks to be reviewed by the specialist subcontractor prior to fabrication and installation, and residual risks included in the subcontractor's risk assessments provided to the Principal Designer and Principal Contractor.
2. Information on the residual risks must also be passed on to the contractors, managers or end users identified.
3. Subcontractors' risk assessments to be included in the O&M manuals, including any residual risks, to allow the Client/End User to manage those risks.
4. All specialist operations to be carried out by competent persons (i.e. those with sufficient training, experience or knowledge), and where necessary, under appropriate supervision.
5. Risk factors identified within are qualitative, not quantitative. The numbers and colour coding are provided as guidance identifying the residual risks for the Client/End User in anticipation of their own Risk Assessment and Method Statements (RAMS).
6. Under CDM 2015 the designer must:
   a. make the client aware of their responsibilites under CDM before construction work starts.
   b. account for pre-construction information provided by the Client and Principal Designer in their design.
   c. eliminate risks to anyone affected by the project, and where necessary, include risk reduction and the control of residual risks.
   d. provide design information to the Principal Designer for inclusion in pre-construction information and their H&S file, and to the Client and Principal Contractor to allow them to comply with their duties.
   e. to communicate, cooperate and coordinate with the design team and contractors.
7. The specialist subcontractor has a 'Designer' role under CDM and, as such, must comply with the above.
8. Post award of contract, the subcontractor must comply with the requirements of the Principal Designer and Main Contractor, and ensure that the Main Contractor is fully informed regarding installation, operation and maintenance risks.

Consider: risks inherent in use and maintenance; how installation and removal may be impacted by Principal Contractor sequencing and final design; safe access for routine maintenance; maintenance and use according to instructions by equipment supplier. Report as part of omissions in the tender process any measures not covered in the specification that are required for safe use.

Risk Factor		Severity				
		1	2	3	4	5
Likelihood	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

Hierarchy of controls	
Elimination	Remove the hazard
Substitution	Replace the hazard
Engineering Controls	Isolate people from the hazard
Administrative Controls	Change or control the way people work
PPE	Protect individuals with equipment

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Risk Factors:		Risk Rating
Likelihood	Severity:	1-4 = Low - Accept or monitor
1= Rare	1= Delay to work/near miss	5-12 = Moderate - Further action required
2 = Unlikely	2 = Minor injury (First Aid administered)	15-25 = High Risk - Mitigation action is required
3 = Possible	3 = Moderate Injury (Recorded 3 day absence)	
4 = Likely	4 = Serious Injury (RIDDOR reportable)	
5 = Certain	5 = Fatality	

Ref	Activity	Hazard	Measures taken in design to eliminate or reduce the hazard		Residual Risk			Manager	Information on the residual risk
				Control	Likelihood	Severity	Rating		
Installation works									
GEN-01	Specialist contractor designing detail of technical theatre systems	Design failing to meet required standards of safety or use	Specialist contractor tender returns evaluated by theatre consultant against the relevant performance specification and advice shared with main contractor/client as to whether the tender return is compliant. Contractor drawings reviewed and evaluated on an A/B/C approval system before going into production. Concerns around suitability or compliance reviewed at the earliest opportunity	Elimination	1	5	5	Specialist Contractor	End user to receive instruction on the safe and appropriate use of systems by the specialist contractor before practical completion Witness testing to be carried out during commissioning of specialist systems
GEN-02	Installing performance equipment in an elevated work location (e.g. on high level roof elements)	Falls from height	None - we expect Main Contractor to design and install temporary scaffolding and platforms whilst the building is a construction site	Administrative Controls	3	5	15	Main Contractor SE Contractor SLAV Contractor	Elevated work platforms, handrails and guarding to be installed by Main Contractor for installation period, where necessary, to be in line with method statements and risk assessments.
GEN-03	Installing performance equipment in an elevated work location (e.g. on high level roof elements)	Falling tools / equipment	None - during construction, we expect all Contractors to secure loose tools and equipment in ine with their RAMS	Administrative Controls	3	5	15	Main Contractor SE Contractor SLAV Contractor	Main Contractor to ensure all sub-contractors have taken this into account in their RAMs
GEN-04	Installing technical equipment from strong points, truss or bars, exceeding load	Structural collapse of part of the building	Performance specification is coordinated with structural engineer to ensure structure and strong points are suitable to carry required loads.	Elimination	1	5	5	Structural Engineer Main Contractor SE Contractor	Specialist contractors to confirm loads of all installed equipment are within design limits. ELL to be shared with End-user before use.
TD-01	Setting out and installing seating	Personal injury from manual handling or crushing	Seating specification includes requirement for seating to be within manual handling tolerances. Seating developed using components that are assembled on site to limit weight	Engineering Controls	2	2	4	Specialist Seating Contractor	Specialist subcontractor to provide sufficient resource, training and time on site to ensure operatives are aware of handling guidelines and have adequate time for installation without 'cutting corners'
TD-02	Setting out and installing seating	Personal injury from use of tools to install seating	Seating specified to use components that are assembled on site, using basic site equipment and power tools.	Administrative Controls	3	2	6	Specialist Seating Contractor	Specialist subcontractor to provide sufficient resource, training and time on site to ensure that staff are provided with appropriate training in use of tools and PPE suitable for the task, in line with their method statements and risk assessments
TD-03	Setting out and installing seating	Falls from height, slips and trips - seating set out over slope / tiered levels / balcony with some uneven surfaces.	Tier risers limited in height throughout.	Administrative Controls	2	4	8	Specialist Seating Contractor	Specialist subcontractor to conduct site assessment and provide sufficient resource, training and time on site to ensure balustrades/temporary handrail systems are in place where necessary.

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Risk Factors:		Risk Rating
Likelihood	Severity:	1-4 = Low - Accept or monitor
1 = Rare	1 = Delay to work/near miss	5-12 = Moderate - Further action required
2 = Unlikely	2 = Minor injury (First Aid administered)	15-25 = High Risk - Mitigation action is required
3 = Possible	3 = Moderate Injury (Recorded 3 day absence)	
4 = Likely	4 = Serious Injury (RIDDOR reportable)	
5 = Certain	5 = Fatality	

Ref	Activity	Hazard	Measures taken in design to eliminate or reduce the hazard	Residual Risk				Manager	Information on the residual risk
				Control	Likelihood	Severity	Rating		
Completed building operations / maintenance									
SE-01	Use of all systems	Limbs, hair or clothes getting caught in machinery / crushed by moving parts, trapped or crushed by lift edges	Performance specification includes provision of guards on moving machinery (chain hoist chassis). A residual risk occurs where the hoisting chain ingests into the unit. Hoists are positioned at high level and are not normally accessible unless personnel are positioned close by in the MEWP. Control of chain hoists is via a hold-to-run system on a pendent with line of sight to the room.	Engineering Controls	2	5	10	SE Contractor End User	
SLAV-01	Installing, maintaining, focusing or removing equipment in an elevated work location	Falling tools	None - tools and equipment are not included in the specification	Engineering Controls	3	5	15	End User	End-user to ensure that all hand tools used at height are attached with lanyards, and suitable exclusion zones are managed below high-level working.
SLAV-02	Installing, maintaining, focusing or removing equipment in an elevated work location	Falling equipment	All loose equipment supplied with rated sfety bonds	Engineering Controls	3	5	15	End User	End-user to ensure that all equipment is supplied with safety bonds and that they are used. Suitable exclusion zones to be managed below high-level working.
SLAV-03	Rigging, installation and maintenance of fixtures on hoist bars and fixed bars	Falls from height	System design allows flying bars / trusses to be lowered in to allow rigging, installation and maintenance of equipment at floor level. Performance specification requires ELL to to be identified on each lifting device	Administrative Controls	1	5	5	End User	End-user to ensure their method statements and risk assessments avoid working at height wherever possible
SLAV-04	Rigging, focusing and maintenance of fixtures on hoist bars or fixed bars - where work has to be carried out at high level	Falls from height	Design reduces the need to access equipment at height as much as reasonably practicable. Where access at height is unavoidable, a MEWP is included in the specification for access at height above stage. A set of folding access steps with integrated guardrail is included in the specification for access to rigging bars above the balcony seating.	Administrative Controls	3	5	15	End User	End-user to include use of suitable MEWPs or other access equipment into their method statements and risk assessments
SLAV-05	Connecting fixtures to a power supply, testing fixtures	Electric shock due to faulty equipment	Performance specification requires that all power supplies, dimmers and relays be fitted with RCD devices	Engineering Controls	3	5	15	Specialist SL/AV contractor / End-user	End-user to receive instruction on management and regular testing of RCDs and RCBOs.
SLAV-06	Connection and disconnection of temporary performance equipment from large power panels	Electric shock	All large power panels for connection of temporary equipment to be designed with integral RCDs / RCBOs or variable earth leakage devices.	Engineering Controls	3	5	15	Specialist SL/AV contractor / End-user	End-user to receive instruction on management of RCDs and RCBOs, including variable earth leakage trips on larger panels. End-user to have
SLAV-07	Use of high brightness video projector	Damage to the eye	Projector and lens selection to be compliant with 'Risk Group 2' - safe to use except direct prolonged exposure to lens. Projector placed in controlled area (stage) and operated by competent staff. Projector positioned above head height.	Engineering Controls	3	4	12	Specialist SL/AV contractor / End-user	Projector switching via staff control - information on risk group 2 to be provided within O&M manual
SLV-08	Use of sound reinforcement system	Hearing loss/tinnitus	Sound system positioned away from head height and direct exposure to source. High quality components used to minimise listneign fatigue, audio processor to include for signal limiting.	Administrative Controls	3	4	12	Specialist SL/AV contractor / End-user	End user to monitor staff exposure and provide additional protection if required as part of the operational risk assesment
TD-04	Removing and reinstating removable seating	Personal injury from manual handling or crushing	Seating specification includes requirement for seating to be within manual handling tolerances for one or two person lift. Trolleys to be provided for moving seats	Engineering Controls	3	2	6	Specialist seating contractor / End-user	End-user to receive instruction on the safe and appropriate use of trolley system by the specialist contractor before practical completion
TD-05	Operating seat tip-up or transfer arm catch	Personal injury from finger trap or seat tipping	Seating specification outlines requirement for seating to limit potential for finger trap of moving parts. Seat specification outlines a requirement for seats to be securely fixed and/or to resist weight distributed on the leading edge of the seat pan. Regular maintenance required. Seats to go through thorough prototyping activity to test and mitigate	Engineering Controls	2	2	4	Specialist seating contractor / End-user	End-user to receive instruction on how to maintain seating. Seating manufacturer on hand to offer long term maintenance contracts/warranties where required

05. LANDSCAPE MAINTENANCE

Maltings Yard - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

Inspired by Elizabethan era gardens, a series of knot gardens are inserted into the central yard: low clipped hedges giving a frame to infill plants and trees. Three lime trees are proposed as ‘box head’ specimens, acting as a formal centre piece in the middle of the space. One free-growing cherry give a wider canopy to seating areas. Along the façades espalier fruit trees and climbers provide greening, flower and fruit. The species selected will mainly be ones familiar to the Elizabethans, with the design being a contemporary take on historic planting styles.

Note: The design incorporates a number of planting types that require regular pruning to maintain their shape. These are key to achieve the design goals as agreed with the Client. Careful selection of species and forms aims to ensure this will be as straight froward and easy a procedure as possible, to minimise maintenance requirements as far as possible. Suitably trained personnel should nonetheless be carrying out all pruning works.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of knot garden hedges to maintain specified height and width, allow for 2-3 times a year. Remove and compost arisings.
- Pruning of box head trees to maintain specified dimensions and shape, allow for 2-3 times a year. Remove and compost arisings.
- Annual pruning of espalier trees to maintain fan-trained shape, pruning time to suit species. Remove and compost arisings. Tie branches to trellis system as required.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Annual pruning of herbs, time to suit species. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch if required, to specified depth.
- Allow for watering in periods of prolonged extreme drought, to ensure survival of planting.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Removal of excess amounts of fallen leaves within knot gardens in autumn.

Fan trained fruit trees will green the facades, giving flowering, fruit and a strong architectural value through the year. Fan trained specimens have been selected over more formal types of espalier form, as they are a comparatively easy type of espalier to maintain. Note that trained persons should be carrying out the pruning to ensure no damage to the trees and that desired shape is maintained over time.

Three of the knot garden trees are proposed to be box head specimens, a form of topiary that is relatively easy to maintain. The trees will need to be pruned a few times a year to maintain the original shape and desired dimensions. Trained persons should be carrying out the pruning to ensure the best results.

Example of pruned gerimander hedges in knot garden, giving a formal frame to looser infill planting. Pruning 2-3 times a year will be required to ensure the size and shape of the hedging is retained over time.

Riverside Garden - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

The planting design reflects orchards, meadows and the medieval ‘mille fleur’ - the flowering mead. A central lawn (maintained as a spring meadow) is given a ‘bejewelled’ meadow fringe - a native meadow mix studded with ornamental plants suited to a meadow management regime. This gives further interest and seasonality, and relate to the Elizabethan’s love for the showy and unusual within the natural world. Historically common fruit trees will form features within the space: quince, medlar, mulberry etc. Scented flowering climbers will grow over an arbour.

Note: There is potential to incorporate topiarised shrubs giving an interesting contrast to the meadow, a more structured feature maintaining its form through the year, also when the meadow is cut. They would also act as a link to the planting within Maltings Yard. These would be of different height and shapes, distributed in a playful way within the meadow to form a set of theatrical ‘characters’ surrounding the outdoor stage. Refer to the Haddon Hall precedents for example images. **Inclusion of topiarised shrubs to be agreed with Client.**

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of fruit trees as required, to maximise fruiting (if desired) and to maintain crownlifted height to ensure no conflict with sightlines/movement within the garden. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis/arbour if required.
- Annual cutting back of meadow in late summer/early autumn. Leave arisings for 1 week to drop seed before removing and composting. If required cut back one more time in autumn. Note autumn flowering bulbs must not be cut.
- Lawn to be maintained as spring meadow: leave unmown in spring, to allow herbs and bulbs to flower. Prune regularly from early May. Note: Agreed paths to be maintained mown through the year. Remove and compost arisings.
- Annual cutting back of herbaceous perennials in planting beds, in late autumn/early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch, to specified depth.

Example of meadow fringe to mown lawn. Topiarised shrubs of varied height act as a playful reference to historic topiary, creating an interesting contrast to the looseness of the meadow planting while retaining structure through the year, also after the meadow is cut back in autumn. Haddon Hall.

Example of structural interest provided by topiarised shrubs in winter, when meadow is cut low. Haddon Hall.

Unusual fruit trees with historical relevance will form feature trees, such as Quince and Medlar, pictured above.

The meadow will contain ‘jewel’ plants, ornamental herbaceous perennials that are capable of being maintained as part of the meadow, i.e. being cut back annually in late summer/early autumn. These plants maximise the ornamental qualities of the meadow, providing more flamboyant flowering within a naturalistic context, a reference to the Elizabethans’ interest in exotic and special plants.

The lawn will be a flowering lawn species mix that can grow tall in spring to allow for flowering, to then be regularly mown for the rest of the year. The flowering lawn, along with the meadow, references the medieval ‘mille-fleur’.

Roses and other scented flowering climbers will grow up a arbour, forming an entrance into the Riverside Garden from Maltings Yard. The climbers may require occasional pruning to maintain their shape. Branches may need to be tied to the support structure.

- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Removal of excess amounts of fallen leaves within meadow.
- IF INCLUDED: Pruning of topiarised shrubs to maintain original shape and size, allow for 2-3 times a year. Remove and compost arisings. To be confirmed with client.

Note: Detailed maintenance instructions to be developed.

White Barn Garden - Soft landscape and maintenance summary

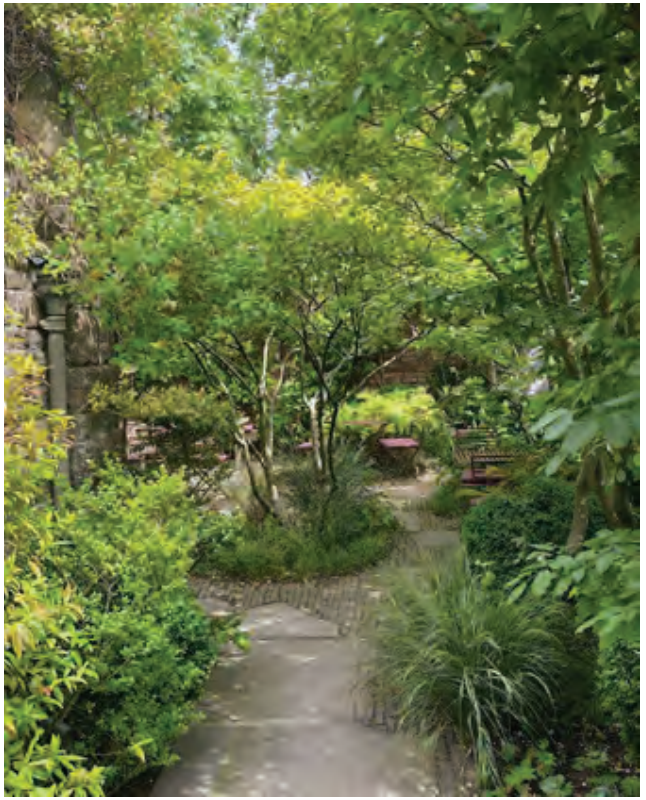
Summary of key soft landscape design principles:

The planting design within the White Barn Garden aims to capture the romance of Shakespeare and the Elizabethan gardens, with a focus on the floral, scented and lush. The overall character will be naturalistic, sensory, rich and generous, providing interest through the year. The species selected will predominantly be ones that were available in the Elizabethan era. A series of small multistem trees and shrubs will give canopy, structure and shelter; and climbers will be used to frame and green the space. A robust shade tolerant understorey will give further interest and seasonality. Some existing planting will be retained, a cherry, a Japanese maple and a group of well established shrubs.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of trees as required, maintaining crownlifted height to ensure no conflict with sightlines and/or movement within the garden. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Pruning of shrubs, timing and method to suit species, to maximise flowering. Remove and compost arisings.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch annually, to specified depth.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Allow for watering in periods of prolonged extreme drought, to ensure survival of planting.

Note: Detailed maintenance instructions to be developed.



Crownlifted multistem trees / large shrubs will give structure and canopy to the space. The crownlifted height should be maintained to allow for a rich understorey and to ensure no conflict with sightlines and movement within the garden.

Roses and other flowering climbers will green the walls around the garden. The climbers may require occasional pruning to maintain their shape. Branches may need to be tied to the trellis structure.

Mixed beds of flowering shrubs and ground-cover herbaceous perennials will create a relaxed, romantic and lush character.

Shakespeare Courtyard - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

The planting within the Shakespeare Courtyard will give a green frame to the space, creating a relaxing environment for the staff seating area. A fig tree gives canopy and shelter, accompanied by climbers and a robust understorey of ground-cover perennials. The fig and grape vines offer fruit that can be picked by the staff.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of fig trees as required, to maintain crownlifted height and ensure no conflict with vehicular movement. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers. Grape vines should be pruned annually to maximise fruiting. If this is not a priority, they can be left to grow more freely, only pruned if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch if required, to specified depth.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.

Note: Detailed maintenance instructions to be developed.

A fig tree will give canopy, shelter and light shade within the courtyard, as well as fruit. The tree will be crownlifted to allow for vehicular movement within the space, and to give clear sightlines throughout.

Grapevines form a calm green backdrop to the space, with ornamental leaves as well as fruit. To maximise fruiting pruning should be carried out annually, but the vines can also be allowed to grow freely.

Robust ground-cover perennials, such as lady's Mantle and hardy geraniums will provide additional greening and seasonality, while suppressing weeds in the planting beds.

06. BUILDING SERVICES MAINTENANCE

3.0 CDM, BUILDING SAFETY & BUILDING REGULATIONS

3.1 Residual Risk Register

See attached schedule: "STGG-MXF-XX-XX-SH-J-00000 - Residual Risks Schedule"

3.2 Designer competency statement

See attached statement: "MaxFordhamLLP-DesignerCompetencyStatement"

3.3 Access and Maintenance Strategy

There are major items of plant located at all levels of the building.

Floor	Plant
Basement	Sprinkler Tank and Sprinkler Pumps
Ground	Substation Sitewide Main Electrical Plant White Barn Ventilation Plant White Barn Heating Plant NWR Hot Water Plant
First	NWR Performance Space Ventilation Plant NWR Kitchen Ventilation Plant Sitewide Heating Plant
Roof	Guildhall Ventilation and Smoke Ventilation Plant Sitewide Heating and Cooling Plant SB Kitchen Ventilation Plant SB Hot Water Plant

Plant access routes to all locations have been developed considering the size, weight and access frequency of the plant and are shown on the following pages.

Generally, large items of plant (Air Handling Units, Sprinkler Tanks) will need to be broken down into their constituent parts for delivery to site and assembled in situ. Smaller items of plant may be delivered to access points on ground floor whole and transported around the building as required.

Lift access to first floor is available in some but not all locations. In the Shakespeare Barn, a lifting beam is to be provided between first floor and roof for lifting of heavier items of plant, such as motors.

Shakespeare Barn Roof Plant
For plant located on the Shakespeare Barn roof, there a couple of options for initial installation. Plant could be delivered through the passageway into the Shakespeare Courtyard and lifted from the ground using a temporary lifting platform. However, the route through this passageway is particularly constrained (approx. 2000W x 2500H at its smallest extent), limiting vehicular access.

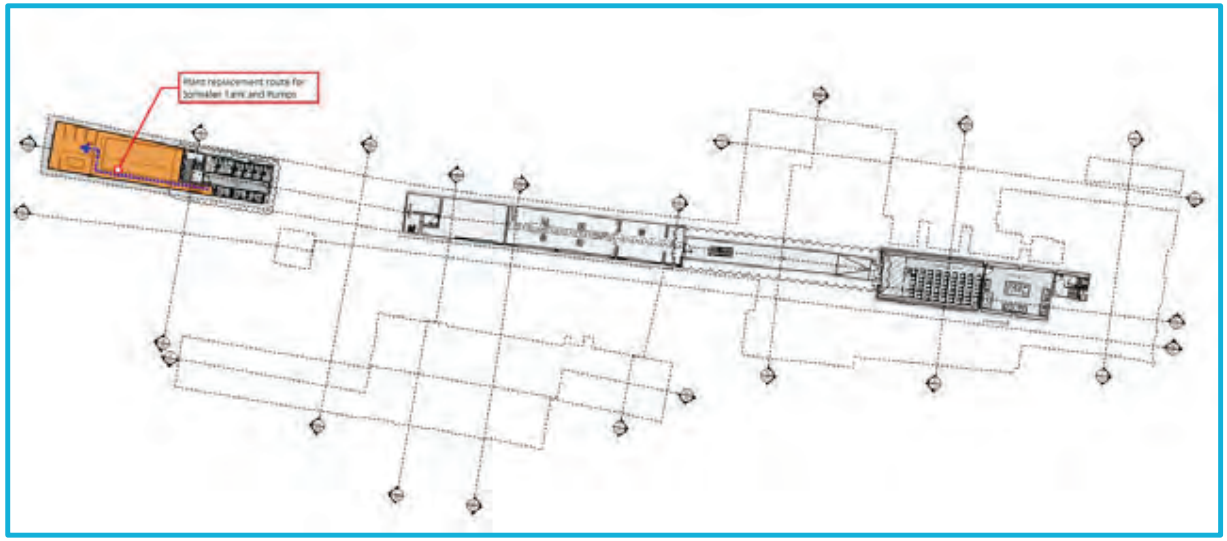
An alternative would be for plant to be delivered into the Main Courtyard via the alternative passageway (approx. 2500W x 3500H at its smallest extent) and lifted into position on the Shakespeare Barn roof over the North Warehouse Range. This could allow for the larger items of plant to be delivered to site whole.

Ongoing Maintenance and Replacement
Once plant is installed, it will need to be cleaned and maintained, with consumable components, such as filters, replaced at regular intervals. Generally speaking, components which will require replacement will be considerably smaller and lighter than the whole unit assembly from which they are taken.

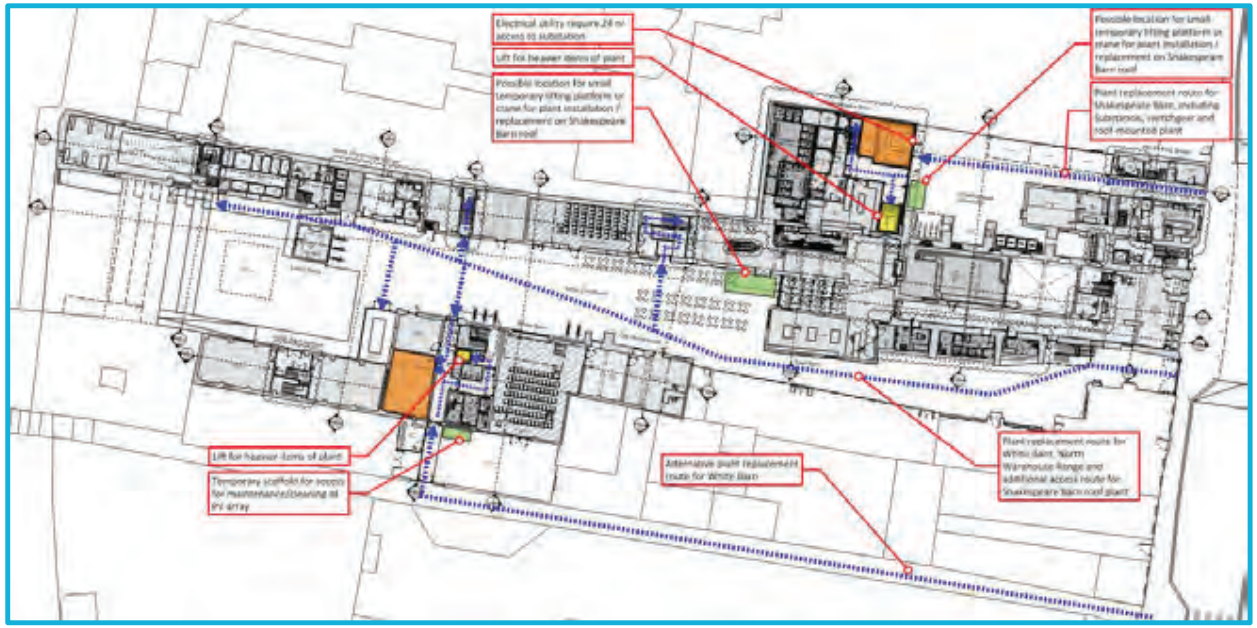
Life Safety Systems
Life safety systems will require regular testing. For fire alarms, emergency lighting and lifts, this is relatively straightforward and should not have a significant impact on day-to-day operations.

However, testing of the Generator, Smoke Extract Fans and Sprinkler Pumps will incur significant noise generation so this will need to be scheduled appropriately. Below is an *indicative* testing regime – a suitably qualified maintenance contractor will need to be employed following completion to develop and undertake procedures appropriate to the site. Note, the below only refers to active testing of equipment, in addition inspection will be required on a more regular basis.

Fire Safety System	Weekly	Monthly	3-Monthly	6-Monthly	12-Monthly	10-Yearly	References
Smoke Extract Fans	Test each fan at 20% duty for 15 minutes			Test each fan at 100% duty for 15 minutes			Smoke Control Association BS 9999:2017
Sprinkler Pumps	Automatic pump starting on reduction of water pressure		Secondary electrical supply (generator) operated		Pumps tested at full load condition	Tank drain down for inspection	BS 9999:2017 BS 12485:2015 + A1:2019
Generator		Failure of primary supply to be simulated once per month for 1 hour					BS 9999:2017
Evacuation Lifts	Lift operation and operation of firefighter switches	Failure of primary supply to be simulated once per month for 1 hour					BS 9999:2017
Emergency Lighting		Functional test of every emergency light for 60 seconds			Duration test of whole system for 3 hours		BS 5266-1:2016 BS EN 50172:2004
Fire Alarm / Voice Alarm	Manual call point activated (different each week) for 5-60 seconds				Control and Indicating Equipment, Detector, Beacon, Sounder, Loudspeaker operation checked		BS 5939-1:2017 BS 5839-8:2023

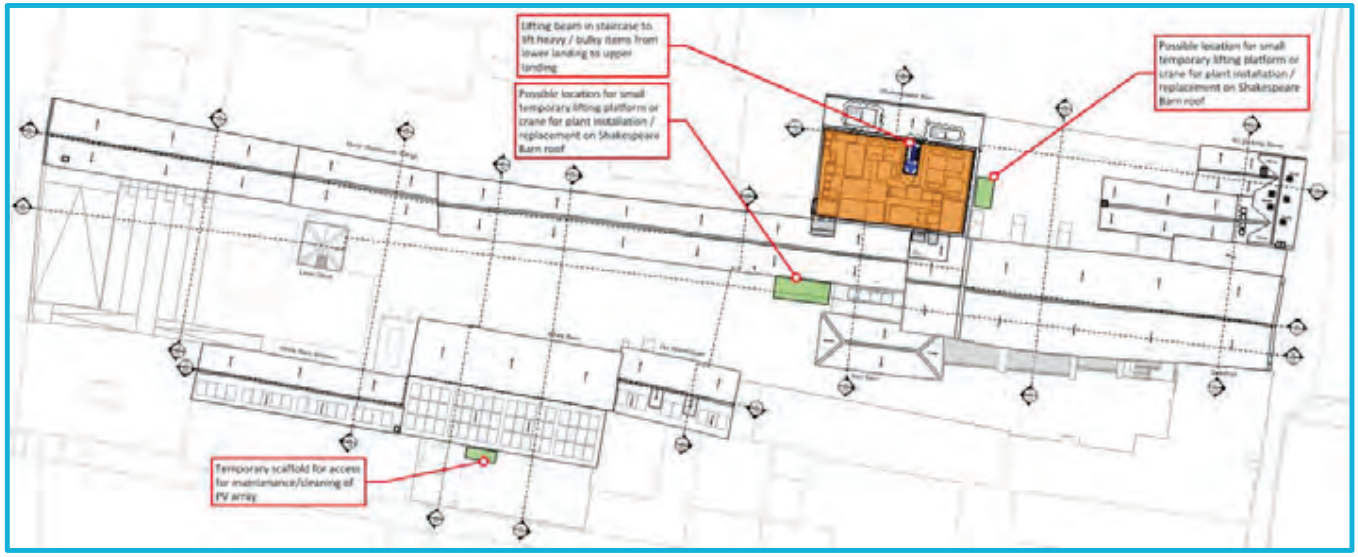


Access Strategy - Basement



Access Strategy – Ground Floor

Access Strategy – First Floor



Access Strategy - Roof

B. Building Regulations Tracker
RIBA Stage 4

PROJECT TITLE	Kings Lynn Guildhall
PROJECT NO.	2302
DATE	02/04/2025
REVISION	B
FILE REF.	2302‖KingsLynnGuildhall‖Building Control Tracker
PROJECT DESCRIPTION	

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
				STAGE 1	STAGE 2	STAGE 3	STAGE 4		Approved Documents unless noted otherwise below				
APPROVED DOCUMENT A STRUCTURE													
Approved Document A Structure- General		Design Criteria Report	Structural Engineer							5605-MOM-XX-XX-RP-S-11011-P02 Stage 3 Design Report			To be included in the Structural Calculation Report
		Movement & tolerances Report								N/A			To be included in the Structural Calculation Report
		Concrete Specification								5605-MOM-ZZ-ZZ-SP-S-11001 Structural Specification			
A1 Loading	Piling	Pile plans								N/A			
		Pile load table								N/A			
		Calculations including Take-down loads								N/A			
	Ground Slab	Plans, Sections, Details								GAs: 5605-MOM-GH-00-DR-S-00100 5605-MOM-GH-01-DR-S-00101 5605-MOM-GH-01-DR-S-55010 5605-MOM-GH-B1-DR-S-00099 5605-MOM-GH-M1-DR-S-00102 5605-MOM-GH-RF-DR-S-00103 5605-MOM-KS-00-DR-S-00100 5605-MOM-KS-01-DR-S-00101 5605-MOM-KS-RF-DR-S-00102			
		Calculations including Take-down loads								5605-MOM-N1-00-DR-S-00100 5605-MOM-N1-B1-DR-S-00099 5605-MOM-N1-01-DR-S-00101 5605-MOM-N1-RF-DR-S-00103 5605-MOM-N2-00-DR-S-00100 5605-MOM-N2-B1-DR-S-00099 5605-MOM-N2-01-DR-S-00101 5605-MOM-N2-RF-DR-S-00103 5605-MOM-N3-00-DR-S-00100 5605-MOM-N3-B1-DR-S-00099 5605-MOM-N3-01-DR-S-00101 5605-MOM-N3-M1-DR-S-00102 5605-MOM-N3-RF-DR-S-00103 5605-MOM-SB-00-DR-S-00100 5605-MOM-SB-01-DR-S-00101 5605-MOM-SB-RF-DR-S-00103 5605-MOM-W1-00-DR-S-00100 5605-MOM-W1-01-DR-S-00101 5605-MOM-W1-RF-DR-S-00103			
	Superstructure	General arrangement drawings, Sections & Details								5605-MOM-W2-00-DR-S-00100 5605-MOM-W2-01-DR-S-00101 5605-MOM-W2-RF-DR-S-00103 Sections: 5605-MOM-ZZ-ZZ-DR-S-23000 5605-MOM-ZZ-ZZ-DR-S-23001 5605-MOM-ZZ-ZZ-DR-S-23002 5605-MOM-ZZ-ZZ-DR-S-23003 5605-MOM-ZZ-ZZ-DR-S-23004 5605-MOM-ZZ-ZZ-DR-S-23005 5605-MOM-ZZ-ZZ-DR-S-23006 5605-MOM-ZZ-ZZ-DR-S-23007 5605-MOM-GH-RF-DR-S-23020 5605-MOM-N1-RF-DR-S-23021 5605-MOM-N1-RF-DR-S-23022 5605-MOM-GH-ZZ-DR-S-23023 Details: 5605-MOM-GH-00-DR-S-31000 5605-MOM-GH-01-DR-S-31010 5605-MOM-GH-01-DR-S-31011 5605-MOM-GH-1M-DR-S-31020 5605-MOM-GH-RF-DR-S-31030 5605-MOM-N1-00-DR-S-33000 5605-MOM-N1-01-DR-S-33010 5605-MOM-N2-01-DR-S-34010 5605-MOM-N3-B1-DR-S-34099 5605-MOM-N3-00-DR-S-35001 5605-MOM-SB-00-DR-S-36000 5605-MOM-SB-00-DR-S-36001 5605-MOM-SB-01-DR-S-36010 5605-MOM-SB-01-DR-S-36011 5605-MOM-SB-RF-DR-S-36020 5605-MOM-SB-RF-DR-S-36021 5605-MOM-W1-01-DR-S-37010			
		Calculations including Take-down loads											To be included in Structural Calculation Report
		Reinforcing schedules											To be done by Others, or Momentum TBC.
	Balconies	Details, sections & specification. Calculations and commentary on compliance with BS, loading assumptions.											
A2 Ground movement		Settlement Report	NA										
A3 Disproportionate collapse		Information listed in General, above											To be included in Structural Calculation Report
APPROVED DOCUMENT B FIRE SAFETY													

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
Approved Document B Fire Safety - General	General	1:200 General Arrangement drawings								Please refer to Stage 4 Fire Strategy Report "Appendix B - Fire strategy drawings Rev 7"			
		Site wide fire strategy								Please refer to Stage 4 Fire Strategy Report 250124R0D0 – P23-041			
		D12 Fire strategy											
B1 Means of warning and escape	Escape	Including in General above							All escape routes and accommodation are provided with artificial lighting to BS 5266-1 2016. Lift installations (4no) to be provided such that they are suitable for evacuation to BS 9999: 2017, BS EN 81-20: 2020 and BS EN 81-70: 2021+A1:2022. The lifts are provided with a secondary power supply from a standby diesel generator.	See Max Fordham E-30XXX series drawings and section Ss_70_80_33_12 Emergency Lighting of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details. See schedules STGG-MXF-XX-XX-SH-E-90000 - Lift Schedule & STGG-MXF-XX-XX-SH-E-61000 - Generator Schedule and sections Ss_80_00_00_00 Lifts & Ss_70_10_30_72 Electricity Generation – Generator of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
	Warning	Smoke detection (Dwellings)											
		Smoke detection (Community facilities)	Fire Engineer / Architect/ Services Engineer						The buildings will be provided with an enhanced category L1/P1 fire alarm system to BS 5839-1: 2017. The Guildhall and adjacent backstage, Red Barn and Shakespeare Barn buildings are to be provided with a voice alarm (VA) and Public Address (PA) system in the form of a live voice alarm (Type V2) to BS 5839-8: 2013. The building will be provided with Emergency Voice Communication (EVCs) systems for disabled refuges to BS 5839-9: 2021	See Max Fordham information: E-71XXX series drawings and sections Ss_75_10_68_68 Public Address Systems, Ss_75_50_11_95 Voice Alarm Systems & Ss_75_50_28_29 Fire Detection and Alarm of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details. See E-71XXX series drawings and sections Ss_75_50_11_27 Disabled Refuge Systems of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
B2 Internal fire spread (linings)	Dryling, Ceilings & doors.	Wall-types location drawings								STGG-HTL-Z1-00-DR-A-21-00100 STGG-HTL-Z1-01-DR-A-21-00101 STGG-HTL-Z1-RF-DR-A-21-00103 STGG-HTL-Z1-00-DR-A-22-00100 STGG-HTL-Z1-01-DR-A-22-00101 STGG-HTL-Z1-B1-DR-A-22-00099 STGG-HTL-Z1-M1-DR-A-22-00102 STGG-HTL-Z2-00-DR-A-22-00100 STGG-HTL-Z2-01-DR-A-22-00101 STGG-HTL-Z2-B1-DR-A-22-00099			
		Architectural performance specification - plasterboard walls								Add spec			
		Architectural performance specification - ceilings								Add spec			
		Firestopping - Typical services penetrations - risers, floors at risers, cladding, svp penetrations, penetration from core risers to corridor ceilings, penetration into apartments.								Add reference to Firestopping specification clauses. Wall penetration firestopping details: STGG-HTL-ZZ-ZZ-DR-A-22510			To be developed with specialist sub-contractor during Stage 5.
		Door schedule								STGG-HTL-ZZ-ZZ-SH-A-31000			
	Insulation	Commentary report showing compliance, including Insulation product literature showing surface spread of flame index.											
	Lifts	Specification inc. finishes	Services Engineer / Architect										To be developed with specialist sub-contractor during Stage 5.
B3 Internal fire spread (structure)		Design Criteria Report	Fire Engineer										
	Smoke Control	Design strategy and details	Services Engineer						The following fire and smoke curtains to BS 8524-1: 2013 and BS 8524-2: 2013 are provided: •120-minute fire and smoke curtain (1no) to enclose the lift for evacuation from the backstage area •60-minute fire and smoke curtain (1no) to enclose the Shakespeare Barn kitchen Mechanical smoke ventilation is provided from the Guildhall stage, with at least 60-minute fire rated ductwork to BS 13501-4: 2005+A1:2009 and fans provided to BS EN 12101-3: 2015.	See Max Fordham M-20XXX series drawings, schedules STGG-MXF-XX-XX-SH-M-20000 - Ventilation Equipment Schedule and STGG-MXF-XX-XX-SH-M-20001 - Ductwork and Ancillaries Schedule; and sections Ss_65_40_80_00 Smoke Extract and Smoke Control & Ss_75_50_28_29 Fire Detection and Alarm of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details			
B4 External fire spread		Information listed in General, above.	Fire Engineer to confirm										
B5 Access and facilities for the fire service	Fire Service facilities	Access routes and dry riser locations etc. Included in General above.	Fire Engineer / Architect/ Services Engineer						Dry risers, fire fighting lifts and basement ventilation are not provided on site. See the fire strategy for justification. For the PV array, a DC isolator switch (disconnectors that isolate the lines between solar modules and inverters) for the use by the fire service.				
	Sprinkler systems	GA plans and specification	Services Engineer						An automatic fire suppression system in the form of a sprinkler system to BS EN 12845: 2015+A1: 2019 has been provided to provide property protection. The fire strategy notes that this system also provides considerable benefits for life safety. The sprinkler system is to be provided in accordance with BS EN 12845 with an Ordinary Hazard Classification of OH1 and a water storage capacity of 49.4m3. The sprinkler tank and pumps are to be provided in the existing basement cellar rooms where there is a limited amount of space available in this area, therefore the sprinkler tank had to be rationalised to a volume of 49.4m3. This amounts to a volume reduction of ca. 11% from that recommended in BS EN 12845. See the Fire Strategy section 8.1 for justification of this reduction. The sprinkler system is to be provided with automatically activated electric-motor driven pumps (one duty and one standby). Backup power for the sprinkler pumps is to be provided from a life safety generator.	The sprinkler system is a specialist design package. See the Gordonson Fire drawings for details and section Ss_55_30_98_85 Sprinklers of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for the Employer's Requirements			To be developed with specialist sub-contractor during Stage 5.
APPROVED DOCUMENT C SITE PREPARATION AND RESISTANT TO CONTAMINANTS AND MOISTURE													

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
Approved Document C Contamination - General	General	Contaminated ground report	Structural Engineer/ Architect							Check planning submission document			
		Settlement Report								Mom to advise HT			
C1 Preparation of site and resistance to contaminants	Gas protection	Gas membrane and venting design								Mom to advise HT			
		Signoff of vent detail								Not required TBC			
C2 Resistance to moisture	DPM	Ground floor slab & edge details (showing membrance and insulation)								HT list details			
APPROVED DOCUMENT D TOXIC SUBSTANCES													
D1 Cavity insulation			Architect							HT list details			
APPROVED DOCUMENT RESISTANCE TO THE PASSAGE OF SOUND													
Approved Document E Resistance to the Passage of Sound - General	General - Acoustic treatment of drylining, doors, cladding, superstructure, roofing, ground floor plant block walls, core (lift and stair) walls, services lagging.	Acoustic Report	Acoustician							Please refer to Acoustics report "16140 - Environmental Noise Impact Report": STGG-CBL-ZZ-ZZ-RP-AC-10-90310 Please refer to Acoustician sound separataion markups: STGG-CBL-Z1-B1-DR-AC-10-21100 STGG-CBL-Z1-00-DR-AC-10-21101 STGG-CBL-Z1-01-DR-AC-10-21102 STGG-CBL-Z1-M1-DR-AC-10-21103 STGG-CBL-Z1-RF-DR-AC-10-21104 STGG-CBL-Z2-B1-DR-AC-10-22110 STGG-CBL-Z2-00-DR-AC-10-22111 STGG-CBL-Z2-01-DR-AC-10-22112 STGG-CBL-Z2-M1-DR-AC-10-22113			
		Details of louvres, drylining wall, ceiling types etc demonstrating compliance with Acoustic Report	Architect							Shakespeare Barn Rooftop Plant Screen - STGG-HTL-Z1-XX-DR-A-21-00514 STGG-HTL-Z1-XX-DR-A-21-00515 White Barn Annex Plant Screen - STGG-HTL-Z1-XX-DR-A-21-00516 Sculpture Garden Plant Screen - STGG-HTL-Z1-XX-DR-A-21-00517 Typical internal wall buildup details: STGG-HTL-ZZ-ZZ-DR-A-22500 STGG-HTL-ZZ-ZZ-DR-A-22501 STGG-HTL-ZZ-ZZ-DR-A-22502 Typical floor buildup details: STGG-HTL-ZZ-ZZ-DR-A-23500 STGG-HTL-ZZ-ZZ-DR-A-23501 Typical ceiling buildup details: STGG-HTL-ZZ-ZZ-DR-A-45500 Acoustic performance of doors is listed in the door schedule: STGG-HTL-ZZ-ZZ-SH-A-31000			
APPROVED DOCUMENT F VENTILATION													
F1 Means of ventilation	MHVR, windows.	Specific report including commentary and supporting calculations on means of ventilation for each type of space, eg apartment bedrooms, kitchens, bathrooms, living areas, also common indoor areas, ~~Including also typical detail drawings of ventilation grilles at apartment facade, landscape louvre housing et al.~~	Services Engineer						The ventilation is a mixture of mechanical and natural ventilation in different spaces, depending on the usage of that space. See the Ventilation and Extraction Statement for details of the ventilation strategy.	See Max Fordham M-20XXX series drawings and sections Ss_65_40_33_00 General Ventilation & Ss_65_40_33_45 Kitchen Ventilation of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
	Common parts	As above											
APPROVED DOCUMENT G HYGENE													
G1 Sanitary conveniences and washing facilities	Bathrooms	GA Plans / Bathroom designs	Architect						ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022 British Standard, BS 6465-1:2006+A1:2009, Sanitary Installations - Part 1: Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.	STGG-HTL-Z1-00-DR-A-00100 STGG-HTL-Z1-01-DR-A-00101 STGG-HTL-Z1-B1-DR-A-00099 STGG-HTL-Z1-M1-DR-A-00102 STGG-HTL-Z1-RF-DR-A-00103 STGG-HTL-Z2-00-DR-A-00100 STGG-HTL-Z2-01-DR-A-00101 STGG-HTL-Z2-B1-DR-A-00099 STGG-HTL-Z2-RF-DR-A-00103 Refer also to Toilet Accommodation Filenote "2302_STGG_Stage 4 Sanitary Provision" See Max Fordham P-20XXX series drawings and sections Ss_55_70_38_00 Hot & Cold Water of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
G2 Bathrooms		As G1 above							Wholesome potable water is provided to all sanitaryware direct from the incoming mains water supply. No bulk water storage or pressure boosting is provided. The incoming supply is softened.				
G3 Hot water storage	Hot water	Drawings / report describing specific hot water storage design and demonstrating Part G3 compliance, including services schematics, tank specification, appliance product literature / manufacturer's data sheets.	Services Engineer						Hot water is generally provided to sanitaryware via instantaneous hot water heaters. Hot water for the kitchens is provided via storage vessels, heated via ASHP or direct electric heaters where there is insufficient space for an ASHP. Expansion vessels, temperature and pressure relief valves are provided within the installation.	See Max Fordham P-20XXX series drawings and sections Ss_55_70_38_00 Hot & Cold Water of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
		Hot water appliances certificates.											
APPROVED DOCUMENT H DRAINAGE AND WASTE DISPOSAL													
	Subslab drainage	Plans & section details	Structural Engineer							See the Civil Engineer's information for details of the below ground foul water drainage.			MOM to issue GA drawings
		Below Ground Drainage Flow calculations								See the Civil Engineer's information for details of the below ground foul water drainage.			MOM to included in Surface Water Strategy Report

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
H1 / H3 Foul and rainwater water drainage	Above ground drainage	GA Plans - foul water drainage	Services Engineer						Above ground drainage is provided in accordance with approved document H and BS EN 12056-1 System Type III. The majority of the rainwater goods are to be retained or replaced like for like. Where new infill roofs etc. have been added, new rainwater good have been added to connect into the existing system and designed in line with BS 12056 and Approved Document H.	See Max Fordham P-10XXX series drawings and section Ss_50_30_04_00 Above Ground Waste Water Drainage of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details. See P-10XXX series drawings and section Ss_50_30_02_00 Rainwater System of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
		Above Ground Drainage Flow calculations											
H2 Wastewater treatment		N/A											
H4 Building over sewers		GA plans / section. Bedding and backfilling sections and specification.	NA										
H5 Separate systems of drainage		Information contained in H1 and H3 above	Service Engineer										
H6 Solid waste storage	Refuse areas	Site wide refuse strategy								Refer to Stage 4 Servicing Stratgey: Y:\2302 Kings Lynn Guildhall\03-Graphics\Diagrams\Stage 4\250220_Stage 4 Servicing Strategy Diagram			
APPROVED DOCUMENT J COMBUSTION APPLIANCES AND FUEL STORAGE SYSTEMS													
J	General	Site wide strategy	Services Engineer						The new installation is generally heated electrically (via ASHPs and direct electric heating elements) and does not generally have new combustion products. The exceptions to this is the new standby diesel generator, which is to be a packaged unit designed to comply with the requirements of Part J. There is also an existing gas boiler to number 29 that is to be retained.	See section Ss_70_10_30_72 Electricity Generation – Generator of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details of the diesel generator. The existing system is to be inspected and any non-compliances with part J (or other requirements) will be rectified as part of the works.			
J1 - J6		As above											
APPROVED DOCUMENT K PROTECTION FROM FALLING, COLLISION AND IMPACT													
Approved Document K Protection from falling, collision and impact - General	General - balustrades, balconies~~,~~ ~~windows~~, stair flight & LDSs, stair landings, ~~roofs.~~	Drawings (plans and sections) showing areas at risk.	Architect							Refer to scope drawings: STGG-HTL-Z1-00-DR-A-24100 STGG-HTL-Z1-01-DR-A-24101 STGG-HTL-Z1-B1-DR-A-24099 STGG-HTL-Z2-00-DR-A-24100 STGG-HTL-Z2-01-DR-A-24101 STGG-HTL-Z2-B1-DR-A-24099 STGG-HTL-GH-01-DR-A-034101 STGG-HTL-GH-M1-DR-A-034102			
	Stairs												
	Stair 01 - Sisson Stair									Refer to drawings: STGG-HTL-GH-ZZ-DR-A-05106 STGG-HTL-GH-ZZ-DR-A-05107		Risers: 156mm Goings: 275mm Number of steps: 24 (12+12) Width between walls/ stringers/ balustrades: 1372mm / 1433mm Deviations from Appr. Doc K:	
	Stair 02 - Reception to Undercroft Stair									Refer to drawings: STGG-HTL-Z1-XX-DR-A-24032 STGG-HTL-Z1-XX-DR-A-24232 STGG-HTL-Z1-XX-DR-A-24504		Risers: 170mm Goings: 250mm Number of steps: 9 Width between walls/ stringers/ balustrades: 1400mm Deviations from Appr. Doc K:	
	Stair 03 - Guildhall Gallery Stair									Refer to drawing: STGG-HTL-GH-ZZ-DR-A-05105		Risers: 169mm Goings: 260mm Number of steps: 15 Width between walls/ stringers/ balustrades: 1010mm Deviations from Appr. Doc K: Number of steps in a continuous flight exceeds 12, stair width between stringers less than 1200mm, handrails extend less than 300mm past the foot of the stair on both sides	
	Stair 04 - No.29 Link Connection Stair									Refer to drawing: TGG-HTL-Z1-XX-DR-A-24031		Risers:159mm Goings: 250mm Number of steps: 9 Width between walls/ stringers/ balustrades: 925mm Deviations from Appr. Doc K: Stair width between enclosing wall and balustrade less than 1200mm	

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	Stair 05 - Guildhall Screen Gallery Stair									Refer to drawing: STGG-HTL-GH-ZZ-DR-A-05101		Risers: 163mm Goings: 250mm Number of steps: 15 Width between walls/ stringers/ balustrades: 1100mm Deviations from Appr. Doc K: Number of steps in a continuous flight exceeds 12, stair width between enclosing wall and stringer less than 1200mm	
	Stair 06 - No.29 King Street Retained Stair											As existing, no modifications proposed.	
	Stair 07 - No.29 King Street Stair									Refer to drawings: STGG-HTL-Z1-XX-DR-A-24007 STGG-HTL-Z1-XX-DR-A-24503		Risers: 161mm Goings: 250mm Number of steps: 15 (7+8) Width between walls/ stringers/ balustrades: 940mm (minimum, enclosing wall varies) Deviations from Appr. Doc K: Stair width between enclosing wall and balustrade less than 1200mm	
	Stair 08 - No.29 King Street Attic Stair											As existing, no modifications proposed.	
	Stair 09 - Shakespeare Barn Stair									Refer to drawings: STGG-HTL-SB-00-DR-A-00100 STGG-HTL-SB-01-DR-A-00101		Risers: 169mm Goings: 250mm Number of steps: 16 (9+7) Width between walls/ stringers/ balustrades: 1242mm Deviations from Appr. Doc K:	
	Stair 10 - Shakespeare Barn to Backstage Stair									Refer to drawings: STGG-HTL-SB-01-DR-A-00101		Risers: 166mm Goings: 270mm Number of steps: 6 Width between walls/ stringers/ balustrades: 1570mm Deviations from Appr. Doc K:	
	Stair 11 - Shakespeare Barn Roof Deck Access Stair									Refer to drawings: STGG-HTL-SB-01-DR-A-00101 STGG-HTL-SB-RF-DR-A-00103		Risers: 243mm Goings: 180mm Number of steps: 12 Width between walls/ stringers/ balustrades: 700mm Deviations from Appr. Doc K: Risers exceed 170mm, goings less than 250mm, stair width between enclosing guardrails less than 1200mm	
	Stair 12 - Foyer to Tunnel Stairs									Refer to drawings: STGG-HTL-Z1-XX-DR-A-24012 STGG-HTL-Z1-XX-DR-A-24502		Risers: 161mm Goings: 250mm Number of steps: 14 Width between walls/ stringers/ balustrades: 1200mm Deviations from Appr. Doc K: Number of steps in a continuous flight exceeds 12	
	Stair 13 - Dressing Room Stairs									Refer to drawings: STGG-HTL-N1-00-DR-A-00100 STGG-HTL-N1-01-DR-A-00101		Risers: 166mm Goings: 250mm Number of steps: 13 Width between walls/ stringers/ balustrades: 1460mm Deviations from Appr. Doc K: Number of steps in a continuous flight exceeds 12, handrails extend less than 300mm past the top of the stair on both sides	
	Stair 14 - North Range Creative Hub Entry Stairs									Refer to drawings: STGG-HTL-N2-01-DR-A-00101		Risers: 152mm Goings: 250mm Number of steps: 15 (11+4) Width between walls/ stringers/ balustrades: 1375mm / 1185mm Deviations from Appr. Doc K: Stair width between enclosing walls less than 1200mm for upper flights only	
	Stair 15 - North Range Tunnel Escape Stair											As existing, no modifications proposed.	

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
	Stair 16 - Restaurant Staff Stair											One handrail to be added, otherwise stair to remain as existing, no further modifications proposed.	
	Stair 17 - Restaurant Kitchen Stair									Refer to drawings:		Risers: 150mm Goings: 250mm Number of steps: 5 Width between walls/ stringers/ balustrades: 1000mm Deviations from Appr. Doc K: Stair width between enclosing walls less than 1200mm	
	Stair 18 - Restaurant Front of House Stairs									Refer to drawings: STGG-HTL-Z2-XX-DR-A-24018 STGG-HTL-Z2-XX-DR-A-24505		Risers: 167mm Goings: 250mm Number of steps: 16 (6+10) Width between walls/ stringers/ balustrades: 1107mm / 1130mm Deviations from Appr. Doc K: Stair width between enclosing wall and stringer less than 1200mm	
	Stair 19 - Restaurant Cellar Access Stair									Refer to drawings: STGG-HTL-N3-00-DR-A-00100		Risers: 156mm Goings: 250mm Number of steps: 9 Width between walls/ stringers/ balustrades: 900mm Deviations from Appr. Doc K: Stair width between enclosing wall and stringer less than 1200mm	
	Stair 20 - White Barn Creative Hub Stairs									Refer to drawings: STGG-HTL-W1-00-DR-A-00100 STGG-HTL-W1-01-DR-A-00101		Risers: 167mm Goings: 280mm Number of steps: 16 (8+8) Width between walls/ stringers/ balustrades: 1200mm Deviations from Appr. Doc K:	
	Stair 21 - White Barn Annexe Creative Hub Stairs									Refer to drawings: STGG-HTL-W2-00-DR-A-00100 STGG-HTL-W2-01-DR-A-00101		Risers:164mm Goings:250mm Number of steps: 16 (5+7+4) Width between walls/ stringers/ balustrades: 1200mm Deviations from Appr. Doc K:	
	Stair 22 - North Range Creative Hub Stair									Refer to drawings: STGG-HTL-N2-01-DR-A-00101		Risers: 170mm Goings: 250mm Number of steps: 3 Width between walls/ stringers/ balustrades: 1200mm Deviations from Appr. Doc K:	
	Stair 23 - Resturant Plant Attic Access Stairs									Refer to drawings: STGG-HTL-N2-01-DR-A-00101 STGG-HTL-N3-M1-DR-A-00102		Risers: 160mm Goings: 177mm Number of steps: 14 (8+6) Width between walls/ stringers/ balustrades: 800mm Deviations from Appr. Doc K: Goings less than 250mm, stair width between stringer and enclosing wall less than 1200mm	
	Guildhall Temporary Stage Steps									Refer to drawing: STGG-HTL-GH-01-DR-A24001		Risers: 146 mm Goings: 250 mm Number of steps: 5 Width between walls/ stringers/ balustrades: 800mm Deviations from Appr. Doc K: Risers less than 150mm, stair width between guardrail and enclosing wall less than 1200mm	
	Central river terrace stair leading to grass terraces	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002 KG214-JCLA-DR-L-2002		Risers: 150 mm Goings: 444 mm Number of steps: 2 2no handrails - width between handrails 2000mm Deviations from Appr. Doc K: The stair does not provide direct access to a building so no balustrade required as change in level less than 600mm	
	River terrace stair (existing)	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002 KG214-JCLA-DR-L-2002		Existing stairs retained - Brickwork to be repointed by others	
	Wall type W05 - Retaining wall to grass terraces (existing & proposed)	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002 KG214-JCLA-DR-L-2002		Distance from T.O.W to FGL is 1300mm Deviations from Appr. Doc K: The balustrade ranges in height from 1630 - 1020mm in order to align through with existing terrace level. The section of less than 1100mm height is only a 945mm stretch along the full length of 3135mm	

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	Riverside garden stair (existing) (NB: Possibility of this stair being removed subject to coordination with Momentum at next stage on Flood attenuation within Riverside Garden Lawn. Existing low wall would be continued - this sits at less than 600mm from FGL of adjacent rivergate path so would not require a balustrade - BC to confirm)	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002		Existing stairs retained - Any repointing repair to brickwork by other - existing stone to be retained	
	Riverside garden - Garden House Steps	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002 KG214-JCLA-DR-L-2005		Level change from FGL of Watergate path 410mm Number of steps: 2 Risers: 180 & 160mm Width of steps: Varies from 1200-1500mm No balustrade because level change is less than 600mm	
	Maltings Yard - Garden House Steps	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1001 KG214-JCLA-DR-L-3005		Risers: 170 mm Goings: varies 855 mm min Number of steps: 2 This step does not provide direct access to a building. So Part M & K do not apply. Handrail along one side of the steps - boundary wall to riverside garden - does it have to project 300mm beyond the bottom step given it's exempt from regulations, it doesn't extend 300mm beyond edge of top step as it would obstruct access route to Arbour. Railing along east side of steps - purpose for protection from vehicles. sits 730mm from top of step but not a handrail or balustrade - BC to confirm	
	Maltings Yard - steps into North range	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1001 KG214-JCLA-DR-L-3006		Risers: varies - 156mm, 150mm & 176mm Goings: Varies - 276mm, 280mm & 287mm Number of steps: 3 on each set Width of steps between balustrades, 1200 -1225mm The handrail of the stair does not extend 300mm out from edge of bottom stair as it would form an obstruction to circulation route. BC to advise. BC to advise on requirement for tactile surface in building threshold	
	ALL PROPOSED EXTERNAL STEPS									Refer to drawing: KG214-JCLA-DR-L-1001 KG214-JCLA-DR-L-1002 & details & Sections as above		Variation from Part K: Nosing's inlayed brass or bronze strip 55mm wide on treads of stairs only. HADA have advised this is OK from accessibility perspective. BC to advise	
	River terrace stair (existing)	Landscape Architect											
	Ramps/ Slopes												
	Fermoy Gallery Lobby Ramp												

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
	Riverside garden - Flowery Mead Sloping Path	Landscape Architect								Refer to drawing: KG214-JCLA-DR-L-1002 KG214-JCLA-DR-L-2002		Length 25710mm Width 1560mm Level change 1060mm Deviations from CDM regulations - CDM REQUIRES A LANDING EVERY 500MM CHANGE IN HEIGHT UP TO 1:60 ; This has a height change of 620mm along the second part of the ramp. HADA mentioned there may be a case given the historic setting if the level change is marginal and each end is 'book ended' – i.e. if a landing results in the slope becoming a steeper ramp and requiring handrails. We may be able to seek a variation with BC. The flowery mead path does not provide direct access to a building so based on previous correspondence with SWECO it does not have to comply with part K or M. We are proposing a handrail along it's length as opposed to a balustrade. This rail height ranges from 900mm to 1200mm at points along it's length The handrail is therefore 100mm higher than the standard 1100mm dimension given in Part M. This allows the rail to sit at a consistent height above the brickwork upstand of the ramp. We believe this is important from a design perspective and feel that 1.2m would still be comfortable. HADA would	
	add other ramps												
	Balustrades								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022				
	Guildhall Auditorium main gallery front								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022	Refer to balustrade detail drawings: STGG-HTL-GH-ZZ-DR-A-34500 STGG-HTL-GH-ZZ-DR-A-34502			
	Guildhall Auditorium main gallery rear (to side galleries)								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022	Refer to balustrade detail drawings: STGG-HTL-GH-ZZ-DR-A-34500			
	Guildhall Auditorium gallery back of seating rake								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022	Refer to balustrade detail drawings: STGG-HTL-GH-ZZ-DR-A-34502			
	Guildhall Auditorium performer gallery								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022	Refer to balustrade detail drawings: STGG-HTL-GH-ZZ-DR-A-34500			
	Guildhall Auditorium side slips (to sides of stalls pit)								ABTT Techincal Standards for Places of Entertainment aka 'Yellow Book' July 2022	Refer to balustrade detail drawings: STGG-HTL-GH-ZZ-DR-A-34501			
	River terrace balustrade												
		Window schedule (1:20 elevations) showing ironmongery and operation.	Architect							Refer to typical window type drawings: STGG-HTL-ZZ-XX-DR-A-32202 STGG-HTL-ZZ-XX-DR-A-32203 STGG-HTL-ZZ-XX-DR-A-32204 STGG-HTL-ZZ-XX-DR-A-32205 STGG-HTL-ZZ-XX-DR-A-32206 STGG-HTL-ZZ-XX-DR-A-32207 STGG-HTL-ZZ-XX-DR-A-32208 STGG-HTL-ZZ-XX-DR-A-32501 Also refer to curtain wall drawings: STGG-HTL-Z1-XX-DD-A-32200 STGG-HTL-Z1-XX-DR-A-32201 STGG-HTL-Z1-XX-DR-A-32500 Also refer to entrance window drawing: STGG-HTL-Z1-XX-DR-A-32211 Also refer to Red Barn window drawings: STGG-HTL-Z1-XX-DR-A-32209 STGG-HTL-Z1-XX-DR-A-32212 Also refer to Foyer Link rooflight drawing: STGG-HTL-ZZ-ZZ-DR-DR-32213 Also refer to window schedule: STGG-HTL-ZZ-XX-SH-A-32000			
		Windows Architectural Specification								Add references			

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
Glazing - safety in relation to impact, opening and cleaning - General	General - Windows / Doors	Access and maintenance strategy.	Architect							Refer to window maintenance elevations: STGG-HTL-ZZ-ZZ-DR-A-32203 STGG-HTL-ZZ-ZZ-DR-A-32300E STGG-HTL-ZZ-ZZ-DR-A-32301E STGG-HTL-ZZ-ZZ-DR-A-32302E STGG-HTL-ZZ-ZZ-DR-A-32303E STGG-HTL-ZZ-ZZ-DR-A-32304E STGG-HTL-ZZ-ZZ-DR-A-32305E STGG-HTL-ZZ-ZZ-DR-A-32306E STGG-HTL-ZZ-ZZ-DR-A-32307E STGG-HTL-ZZ-ZZ-DR-A-32308E STGG-HTL-ZZ-ZZ-DR-A-32309E			
		Door schedule (1:20 elevations) showing ironmongery, glazed panels.								Refer to typical external door type drawings: STGG-HTL-Z1-XX-DD-A-31200 STGG-HTL-ZZ-XX-DR-A-31201 STGG-HTL-ZZ-XX-DR-A-31202 STGG-HTL-Z1-XX-DR-A-31203 STGG-HTL-Z1-XX-DR-A-31204 STGG-HTL-Z1-XX-DR-A-31205 STGG-HTL-Z1-XX-DR-A-31206 STGG-HTL-Z1-XX-DR-A-31207 STGG-HTL-Z1-XX-DR-A-31208 STGG-HTL-ZZ-XX-DR-A-31209 STGG-HTL-ZZ-XX-DR-A-31210 Refer to typical internal door type drawings: STGG-HTL-ZZ-XX-DR-A-31100 STGG-HTL-ZZ-XX-DR-A-31101 STGG-HTL-ZZ-XX-DR-A-31102 STGG-HTL-ZZ-XX-DR-A-31104 STGG-HTL-ZZ-XX-DR-A-31105 STGG-HTL-ZZ-XX-DR-A-31106 STGG-HTL-ZZ-XX-DR-A-31107 STGG-HTL-ZZ-XX-DR-A-31108 STGG-HTL-ZZ-XX-DR-A-31109 STGG-HTL-ZZ-XX-DR-A-31110 STGG-HTL-ZZ-XX-DR-A-31111 STGG-HTL-ZZ-XX-DR-A-31112 STGG-HTL-ZZ-XX-DR-A-31113 STGG-HTL-ZZ-XX-DR-A-31114 Also refer to door & ironmongery schedules: STGG-HTL-ZZ-ZZ-SH-A-31000 STGG-HTL-ZZ-ZZ-SH-A-31010			
APPROVED DOCUMENT L CONSERVATION OF FUEL AND POWER													
L1A Conservation of fuel and power in new dwellings	Building Envelope (Cladding, roofing, sub-slab, windows and external doors).	SAP calculations, showing compliance with Part L 2006 (and CfSH level 3) for building envelope, as well as each individual apartment.	NA										
		Part L1A - 2006 compliance checklist (mostly covered by SAP calcs).											
		1:200 General Arrangement plans & sections & elevations.											
		Schedule of U-Values											
		Specifications (if required to demonstrate u-values)											
		Details of Fixed internal and external lighting											
		Heating / hot water system meet requirements of Domestic Heating Compliance Guide?											
		Construction: evidence of use of accredited and non-accredited details and inspections.											
		Air pressure testing certificates											
		Commissioning completion certificate											
		O&M manual giving information on energy efficient operation											
L2A Conservation of fuel and power in buildings other than dwellings	Common parts	Part L2A - 2006 compliance checklist:	Services Engineer						Where thermal elements are replaced or new thermal elements have been added, the u-values have been designed to better the values of table 4.2 where possible within the context of the listed nature of the building and where practical. Care has been taken to improve the overall heat loss of the building in a holistic way, considering the thermal transmission of building fabric, resulting condensation risk and impact on the building itself, plus airtightness of the building. See the architectural information for more details. Heat gains from building services are limited by fully insulating all hot pipework. New building services installed have been installed to better the efficiencies set out in Section 6 where technically feasible, within the constraints of the listed nature of the building. In general the new fixed building services are very high efficiency: concessions to the listed nature of the building have generally had to be made in the fabric design rather than the system design. Whilst the development is not Net Zero Carbon, aspects of the project which have been designed to reduce carbon emissions associated with the construction and operation of the building include: -Electrification of the site and removing the majority of the gas demand -Specification of low GWP refrigerants for heat pumps -New PV array to produce onsite renewable electricity -Metering and monitoring to allow review of energy consumption -Minimising heat demands through improved fabric and air-tightness, reducing ventilation loads and incorporating heat recovery. The project includes the new provision of fixed building services to several previously unconditioned spaces and as such consequential improvements are assumed to apply. The project includes a complete replacement of the fixed building services systems and the upgrade of thermal elements where technically and economically feasible. This constitutes >10% of the	See STGG-MXF-XX-XX-SH-J-41000 - Pipework Schedule and sections Ss_55_70_38_00Hot & Cold Water Ss_60_40_00_00Space Heating and Cooling of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details. Refer to U-Value tracker: Y:\2302 Kings Lynn Guildhall\02-Design\Schedules\U-Values		
		1:200 General Arrangement plans & sections & elevations - provided elsewhere											
		Schedule of U-Values											
		Specifications (if required to demonstrate u-values)											
		Details of Fixed internal and external lighting, energy meters, building services generally.											
		Control of solar gain											
		Construction: details to demonstrate limits on thermal bridging and inspections.											
		Air pressure testing certificates											

RELEVANT DOCUMENTS & GUIDANCE	ELEMENT	INFORMATION REQUIRED IN SUPPORT OF APPROVAL	DISCIPLINE / CONSULTANT	RIBA WORK STAGES					DESIGN GUIDE / DOCUMENT REFERENCED	NOTE / LINK TO EVIDENCE	DATE ISSUED	ADDITIONAL INFORMATION	ACTION REQUIRED
		Commissioning report							All fixed building services shall be fully commissioned to optimise their in-use performance and use no more fuel and power than is reasonable in the circumstance.	See "STGG-MXF-XX-XX-SP-J-30200 - St George's Guildhall, King's Lynn - Preliminaries for the Mechanical, Electrical & Public Health (MEP) Installations" for details of the commissioning requirements. This includes a requirement for seasonal commissioning and optimisation.			
		Building log book.							Operating and maintenance manuals including information about how the fixed building services can be operated in a manner to use no more fuel and power than is reasonable in the circumstances will be provided by the contractor.	See "STGG-MXF-XX-XX-SP-J-30200 - St George's Guildhall, King's Lynn - Preliminaries for the Mechanical, Electrical & Public Health (MEP) Installations" for details of the requirements for the O&M information.			
APPROVED DOCUMENT M ACCESS TO AND USE OF BUILDINGS													
Approved Document M Access to and use of buildings - General	General	GA plans and unit layouts, bathroom drawings	Architect							Refer to GA Plans: STGG-HTL-Z1-00-DR-A-00100 STGG-HTL-Z1-01-DR-A-00101 STGG-HTL-Z1-B1-DR-A-00099 STGG-HTL-Z1-M1-DR-A-00102 STGG-HTL-Z1-RF-DR-A-00103 STGG-HTL-Z2-00-DR-A-00100 STGG-HTL-Z2-01-DR-A-00101 STGG-HTL-Z2-B1-DR-A-00099 STGG-HTL-Z2-RF-DR-A-00103 Refer also to toilet arrangement drawings: STGG-HTL-ZZ-ZZ-DR-A-74101 STGG-HTL-ZZ-ZZ-DR-A-74102 STGG-HTL-ZZ-ZZ-DR-A-74103 STGG-HTL-ZZ-ZZ-DR-A-74104 STGG-HTL-ZZ-ZZ-DR-A-74105			
	Lifts	Lift drawings and spec								Refer to lift drawings: STGG-HTL-Z1-XX-DR-A-24030 STGG-HTL-Z1-XX-DR-A-24031 STGG-HTL-Z1-XX-DR-A-24032 STGG-HTL-Z1-XX-DR-A-24230 STGG-HTL-Z1-XX-DR-A-24231 STGG-HTL-Z1-XX-DR-A-24232 STGG-HTL-Z2-XX-DR-A-24033 STGG-HTL-Z1-XX-DR-A-24233 Also refer to Service Engineer's lift specs: See STGG-MXF-XX-XX-SH-E-90000 - Lift Schedule and sections Ss_80_00_00_00 Lifts of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for			
APPROVED DOCUMENT P ELECTRICAL SAFETY													
P1 Design, installation, inspection and testing	Electrical installations	Commentary report describing Installation, inspection and testing regime.	N/A - only applies to dwellings										
P2 Provision of information													
APPROVED DOCUMENT R INFRASTRUCTURE AND ELECTRICAL COMMUNICATIONS													
R1 Infrastructure for electronic communications High-speed-ready in-building physical infrastructure	Electrical installations	Specification inc. drawings	Service Engineer						New fibre incoming telecoms connections are being provided to the building.	See Max Fordham section SS_75_10_21_88 Telecommunications of "STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations" for details.			
APPROVED DOCUMENT S ELECTRIC VEHICLE CHARGING													
S6 Standards for electric vehicle charge points and cable routes	General	Specification inc. drawings	Service Engineer / Architect						There are fewer than 10 parking spaces, however an EV charging point is being provided in the Shakespeare's Courtyard.	See Max Fordham drawing "STGG-MXF-Z1-00-DR-E-22100 - Low Voltage Distribution Layout - Level G+0 - Zone 1" for details.			
APPROVED DOCUMENT T TOILET ACCOMMODATION													
T1 Toilet Accomodation	General	Specification inc. drawings GA plans bathroom drawings	Architect							Refer to GA Plans: STGG-HTL-Z1-00-DR-A-00100 STGG-HTL-Z1-01-DR-A-00101 STGG-HTL-Z1-B1-DR-A-00099 STGG-HTL-Z1-M1-DR-A-00102 STGG-HTL-Z1-RF-DR-A-00103 STGG-HTL-Z2-00-DR-A-00100 STGG-HTL-Z2-01-DR-A-00101 STGG-HTL-Z2-B1-DR-A-00099 STGG-HTL-Z2-RF-DR-A-00103 Refer also to toilet arrangement drawings: STGG-HTL-ZZ-ZZ-DR-A-74101 STGG-HTL-ZZ-ZZ-DR-A-74102 STGG-HTL-ZZ-ZZ-DR-A-74103 STGG-HTL-ZZ-ZZ-DR-A-74104 STGG-HTL-ZZ-ZZ-DR-A-74105 STGG-HTL-ZZ-ZZ-DR-A-74106 Refer also to Toilet Accommodation Filenote "2302_STGG_Stage 4 Sanitary Provision"			

C. Max Fordham Stage 4 Report
Building Services Engineering

St George's Guildhall, Kings Lynn

Stage 4 Report

Issue 1

3rd March 2025

MAX FORDHAM

`Status Code	revision	status description	project code		originator		volume		level		type		role		number
D1	P01	Issued For Costing	XXXXX	-	MXF	-	XX	-	XX	-	RP	-	J	-	30100

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ISSUE HISTORY

Issue	Date	Description
1	3/3/25	Stage 4 Issue

MAX FORDHAM

CONTENTS

MAX FORDHAM

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

This report summarises the position of the design at RIBA Stage 4 of the project, listing the major design changes from the previous Stage 3 report, the access and maintenance requirements for the building and how the design complies with the building regulations and CDM requirements.

There have been some larger changes to the design (listed below) but the majority of the changes between stages 3 and 4 are design development.

The major changes are:

- Existing services to no. 29 retained
- New gas supply omitted as the total heat load can now be accommodated by the heat pumps.
- GIS conditioning omitted from the White Barn - GIS conditioning is not required for the whole volume, so the environment systems have been reselected to suit.
- Cable changes to MICC to suit National Trust requirements.

Some other notable changes include:

- Water supply to sprinkler tanks and White Barn to be a secondary supply run below ground rather than having a single supply to site (significant coordination savings)
- Main goods lift reduced in size to be a standard product rather than bespoke lift.
- PVs omitted from the old warehouse roof to minimise the planning risk (PVs remain on the White Barn and White Barn Annex)
- Lightning protection system selected as an isolated protection system with finials on the roof to provide improved property protection
- Horizontal Dry Riser omitted
- Restaurant designed to be a tenanted area.
- Provision of small power to landscape

The report summarises how the design complies with the requirements of CDM, Building Safety and the Building Regulations in section 3.0.

This includes the access and maintenance strategy for the building and a building regulations tracker.

2.0 SUMMARY OF DESIGN DEVELOPMENT

Work Section	Updated since S3	Rationale	Outstanding Actions
E-22 LV Distribution	- Main and secondary Switchpanel selections made - Main containment routes sized - IT racks added around site - PVs omitted from Old Warehouse roof	- Design development - Design development - Design development - PVs omitted due to planning risk	- National Trust to confirm acceptance by them / their insurers of the proposed cabling strategy
E-23 Small Power and Data	- Incorporated updates to theatre technical design - Laid out small power and data provisions	- Design Development - Design Development	- Client to confirm IT requirements (e.g. racks, equipment etc). Specification includes a reasonable allowance for this type of building.
E-30 Lighting	- Back of house fittings finalised. - Power and controls circuiting developed throughout	- Design Development. - Design Development	- Architectural lighting to be developed to RIBA stage 4 level of detail in front of house areas
E-40 Combined ELV Systems	- Architect and client's security scoping information incorporated	- Design Development	- The contract documentation is written to include all CCTV and access control elements to give a coordinated installation. This approach is to be confirmed with the client and project team.
E-71 Fire Detection and Alarm	- Detector positions shown (note: CDP element – final positions TBC by specialist during construction) - Aspiration detection omitted from all spaces other than Guildhall - Voice alarm layouts produced	- Design Development - Design Development to minimise cost - Design Development	
E-72 Lightning Protection	- Lightning protection risk assessment undertaken (by others) - Lightning protection documentation developed	- Lightning protection system selected as an isolated protection system with finials on the roof to provide improved property protection - Design Development	
E-90 Lifts	- Main goods lift reduced in size to standard lift size. - Lift schedule produced	- Lift changed to a standard product to minimise the capital cost	- Architectural requirements for finishes to be confirmed (standard finishes assumed at this stage)
J-30 Multiple Combined Services	- Location of North building exit relocated to base of ventilation riser - Coordinated below ground services with structural engineer, architect and landscape architect	- Design Development - Design Development	
M-10 Heating and Cooling	- Existing No.29 gas boiler retained. Existing No.29 heating system retained where feasible – new radiators proposed as necessary. - New gas boiler to site omitted - Main Air Source Heat Pumps updated and reduced in number (higher capacity per heat pump and refined heat load.) - Pipework running through Guildhall oversized to allow for future connection of No.29 to sitewide heating system. Space allowed on roof for additional air source heat pumps for additional load. - Cold Room Unit omitted from Shakespeare Barn kitchen. Cold Room Unit for restaurant relocated to Bin Store. - 2no. buffer vessels rationalised to 1no. in Shakespeare Barn. - All underfloor heating omitted.	- The existing no. 29 services are to be retained as far as possible to minimise project costs. - Further design development and detail, combined with the availability of higher capacity heat pumps mean that the peak load can be covered by the heat pumps, removing the need for a new gas boiler. - Allowance for future site decarbonisation / replacement of the no. 29 boilers. - Cold room omitted from Shakespeare Barn by others Cold room unit for the restaurant relocated to avoid having it in the courtyard. - Design development	

Work Section	Updated since S3	Rationale	Outstanding Actions
M-20 Ventilation	- Extract fans serving dressing rooms replaced with MVHR. - Existing extract fans serving No.29 retained. - MVHR added for Shakespeare Barn Dry Store - GIS conditioning omitted from White Barn. AHU reselected.	- Improved environmental and energy performance - The existing no. 29 services are to be retained as far as possible to minimise project costs. - GIS conditioning is not required for the whole volume, so the environment systems have been reselected to suit.	
P-10 Above Ground Drainage	- $1m^3$ sump proposed for basement with drainage through NWR façade for floor protection of sprinkler tank room - Reduced number of SVPs to atmosphere by inclusion of Air Admittance Valves	- This is to suit the maintenance requirements of the sprinkler system. - Design development	
P-20 Piped Supply	- Water supply to sprinkler tanks and White Barn to be a secondary supply run below ground rather than having a single supply to site (significant coordination savings) - Non-softened water supply omitted. - Air Source Heat Pump for hot water for restaurant omitted. - Existing water meters serving No.29 and No.29C retained.	- Design development leading to significant coordination savings. - The non-softened supply is not needed. - There is insufficient external space for the ASHP for the riverside restaurant so this has been replaced by a direct electric system. - The existing no. 29 services are to be retained as far as possible to minimise project costs.	
P-30 Gas Distribution and Supply	- New gas supply and meter to Shakespeare Barn omitted - Existing gas supply and meter to No.29 retained.	- The new gas is no longer needed and can be omitted - No. 29 services are being retained where possible.	
P-40 Fire Extinguishing Systems	- Sprinkler specialist design input incorporated for White Barn and North Warehouse Range. - Sprinkler tank and pump locations swapped. - Horizontal Dry Riser omitted as instructed	- Design development - Design development - The horizontal dry riser is no longer included in the fire strategy – see fire strategy for details.	- National Trust to confirm acceptance of proposed Sprinkler Tank location
No.29 King Street	- Generally existing services retained where feasible.	- To minimise project cost	
Shakespeare Barn	- Coordination with updated architectural layouts	- Design development	
Guildhall	- Agreed routing of ductwork to serve gallery levels	- Design development	
North Warehouse Range	- Restaurant designed to be a tenanted area. Submetering to heating, water and electrical consumption.	- Design development	
Landscape	- Provision of small power to landscape	- Small power provided to allow flexibility for performances and events around the site	

3.0 CDM, BUILDING SAFETY & BUILDING REGULATIONS

3.1 Residual Risk Register

See attached schedule: "STGG-MXF-XX-XX-SH-J-00000 - Residual Risks Schedule"

3.2 Designer competency statement

See attached statement: "MaxFordhamLLP-DesignerCompetencyStatement"

3.3 Access and Maintenance Strategy

There are major items of plant located at all levels of the building.

Floor	Plant
Basement	Sprinkler Tank and Sprinkler Pumps
Ground	Substation Sitewide Main Electrical Plant White Barn Ventilation Plant White Barn Heating Plant NWR Hot Water Plant
First	NWR Performance Space Ventilation Plant NWR Kitchen Ventilation Plant Sitewide Heating Plant
Roof	Guildhall Ventilation and Smoke Ventilation Plant Sitewide Heating and Cooling Plant SB Kitchen Ventilation Plant SB Hot Water Plant

Plant access routes to all locations have been developed considering the size, weight and access frequency of the plant and are shown on the following pages.

Generally, large items of plant (Air Handling Units, Sprinkler Tanks) will need to be broken down into their constituent parts for delivery to site and assembled in situ. Smaller items of plant may be delivered to access points on ground floor whole and transported around the building as required.

Lift access to first floor is available in some but not all locations. In the Shakespeare Barn, a lifting beam is to be provided between first floor and roof for lifting of heavier items of plant, such as motors.

Shakespeare Barn Roof Plant
For plant located on the Shakespeare Barn roof, there a couple of options for initial installation. Plant could be delivered through the passageway into the Shakespeare Courtyard and lifted from the ground using a temporary lifting platform. However, the route through this passageway is particularly constrained (approx. 2000W x 2500H at its smallest extent), limiting vehicular access.

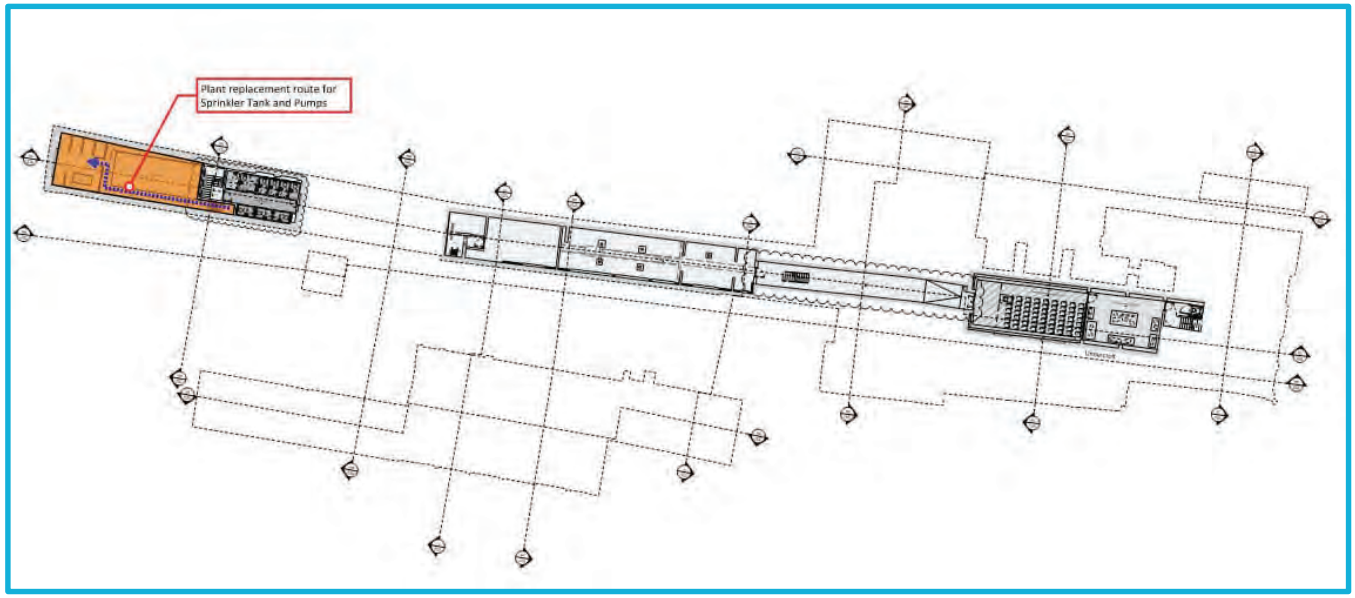
An alternative would be for plant to be delivered into the Main Courtyard via the alternative passageway (approx. 2500W x 3500H at its smallest extent) and lifted into position on the Shakespeare Barn roof over the North Warehouse Range. This could allow for the larger items of plant to be delivered to site whole.

Ongoing Maintenance and Replacement
Once plant is installed, it will need to be cleaned and maintained, with consumable components, such as filters, replaced at regular intervals. Generally speaking, components which will require replacement will be considerably smaller and lighter than the whole unit assembly from which they are taken.

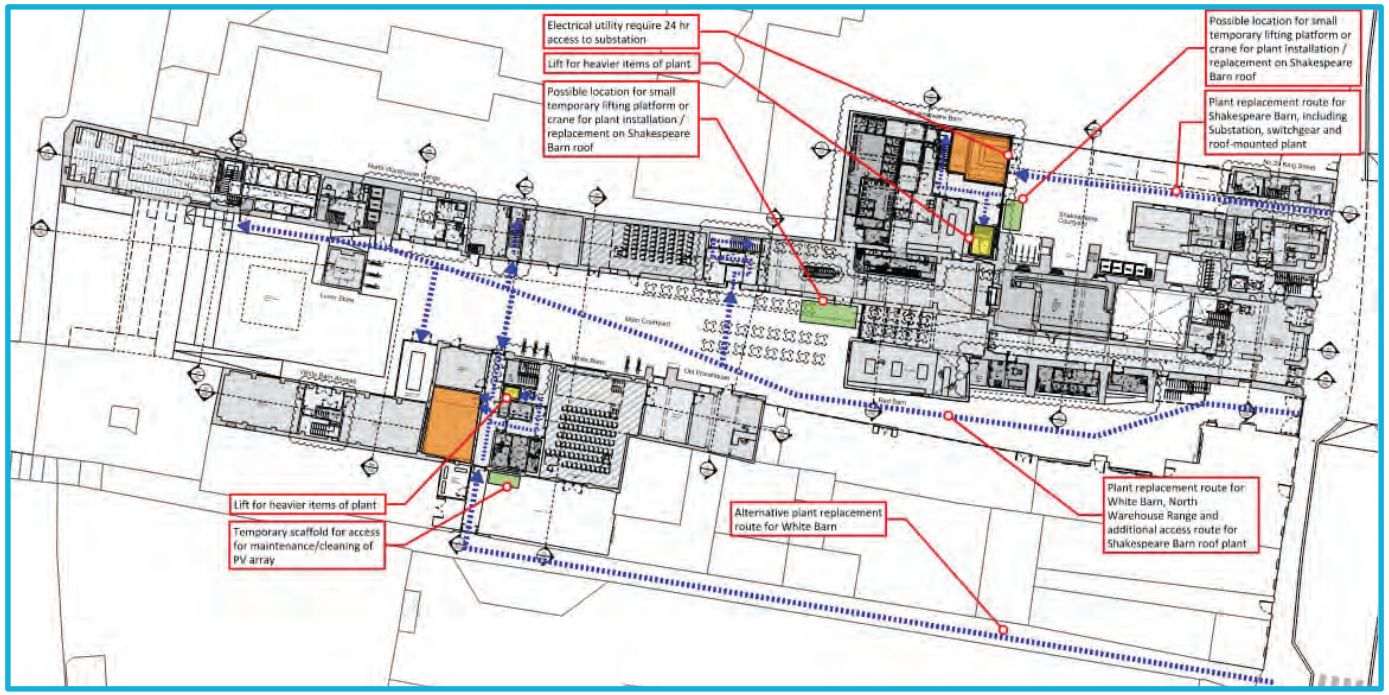
Life Safety Systems
Life safety systems will require regular testing. For fire alarms, emergency lighting and lifts, this is relatively straightforward and should not have a significant impact on day-to-day operations.

However, testing of the Generator, Smoke Extract Fans and Sprinkler Pumps will incur significant noise generation so this will need to be scheduled appropriately. Below is an *indicative* testing regime – a suitably qualified maintenance contractor will need to be employed following completion to develop and undertake procedures appropriate to the site. Note, the below only refers to active testing of equipment, in addition inspection will be required on a more regular basis.

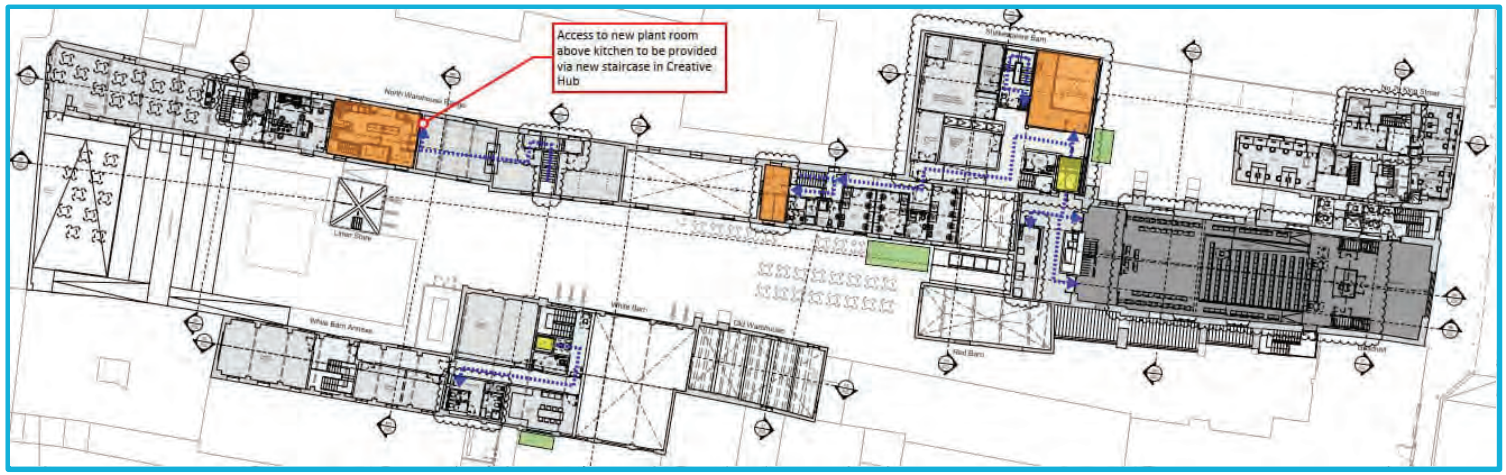
Fire Safety System	Weekly	Monthly	3-Monthly	6-Monthly	12-Monthly	10-Yearly	References
Smoke Extract Fans	Test each fan at 20% duty for 15 minutes			Test each fan at 100% duty for 15 minutes			Smoke Control Association BS 9999:2017
Sprinkler Pumps	Automatic pump starting on reduction of water pressure		Secondary electrical supply (generator) operated		Pumps tested at full load condition	Tank drain down for inspection	BS 9999:2017 BS 12485:2015 + A1:2019
Generator		Failure of primary supply to be simulated once per month for 1 hour					BS 9999:2017
Evacuation Lifts	Lift operation and operation of firefighter switches	Failure of primary supply to be simulated once per month for 1 hour					BS 9999:2017
Emergency Lighting		Functional test of every emergency light for 60 seconds			Duration test of whole system for 3 hours		BS 5266-1:2016 BS EN 50172:2004
Fire Alarm / Voice Alarm	Manual call point activated (different each week) for 5-60 seconds				Control and Indicating Equipment, Detector, Beacon, Sounder, Loudspeaker operation checked		BS 5939-1:2017 BS 5839-8:2023



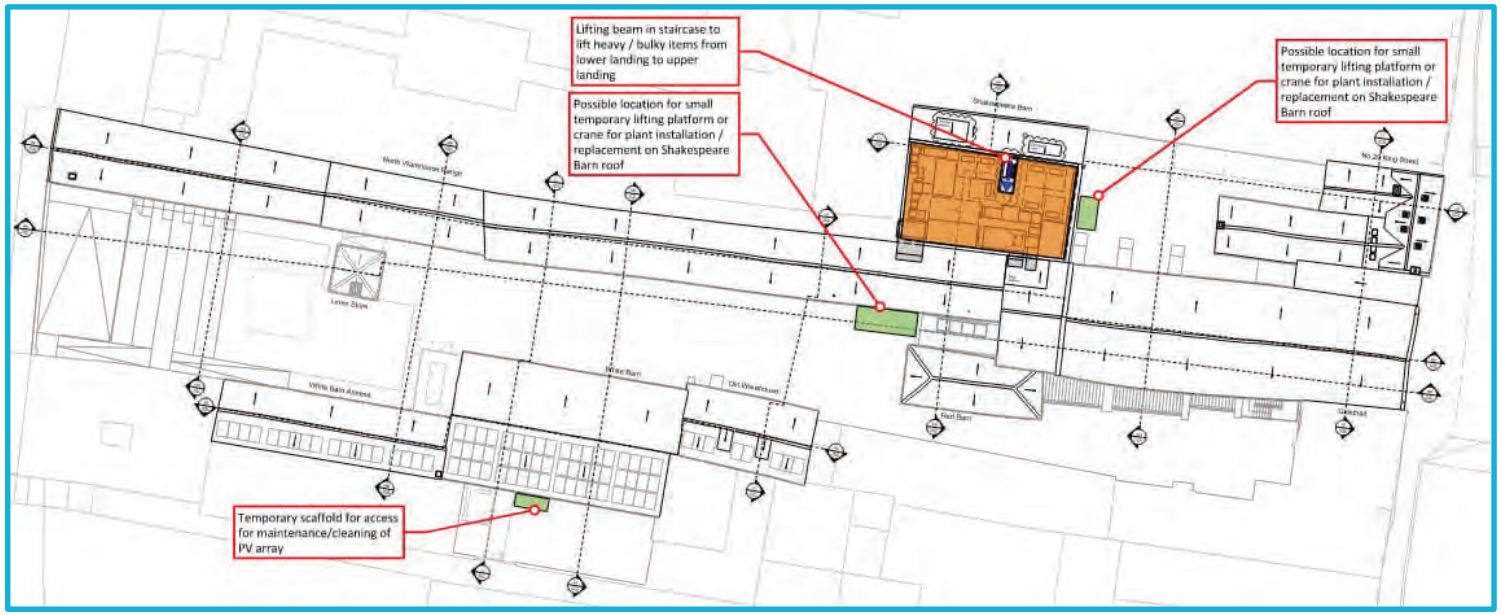
Access Strategy - Basement



Access Strategy – Ground Floor



Access Strategy – First Floor



Access Strategy - Roof

3.4 Building Regulations Tracker

This document summarises the approach taken in the design to comply with the relevant sections of the building regulations and signposts the documentation that details this design. This document only includes elements relating to the MEP installations arising from the deliverables in our appointment and it should be read alongside the documentation from the wider design team.

REF	APPLICATION	DESCRIPTION/TYPE
Approved Document A: Structure		
A	n/a	
Approved Document B – Fire Safety – buildings classified as Group 5 – Assembly and Recreation		
B1	**Means of warning and escape**	See the fire strategy for the overall requirements.
	Fire Detection and alarm systems	The buildings will be provided with an enhanced category L1/P1 fire alarm system to BS 5839-1: 2017. The Guildhall and adjacent backstage, Red Barn and Shakespeare Barn buildings are to be provided with a voice alarm (VA) and Public Address (PA) system in the form of a live voice alarm (Type V2) to BS 5839-8: 2013. See **E-71XXX series drawings** and sections **Ss_75_10_68_68 Public Address Systems, Ss_75_50_11_95 Voice Alarm Systems** & **Ss_75_50_28_29 Fire Detection and Alarm** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details
	Emergency Voice Communication Systems	The building will be provided with Emergency Voice Communication (EVCs) systems for disabled refuges to BS 5839-9: 2021 See **E-71XXX series drawings** and sections **Ss_75_50_11_27 Disabled Refuge Systems** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details
	Lighting of escape routes	All escape routes and accommodation are provided with artificial lighting to BS 5266-1 2016 See **E-30XXX series drawings** and section **Ss_70_80_33_12 Emergency Lighting** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details
	Provision of Evacuation lifts	Lift installations (4no) to be provided such that they are suitable for evacuation to BS 9999: 2017, BS EN 81-20: 2020 and BS EN 81-70: 2021+A1:2022. The lifts are provided with a secondary power supply from a standby diesel generator. See schedules **STGG-MXF-XX-XX-SH-E-90000 - Lift Schedule** & **STGG-MXF-XX-XX-SH-E-61000 - Generator Schedule** and sections **Ss_80_00_00_00 Lifts** & **Ss_70_10_30_72 Electricity Generation – Generator** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details
B2	**Internal fire spread (linings)**	See the fire strategy for requirements.
B3	**Internal fire spread (structure)**	See the fire strategy for requirements.
	Smoke Control	The following fire and smoke curtains to BS 8524-1: 2013 and BS 8524-2: 2013 are provided: • 120-minute fire and smoke curtain (1no) to enclose the lift for evacuation from the backstage area • 60-minute fire and smoke curtain (1no) to enclose the Shakespeare Barn kitchen • 30-minute fire and smoke curtains (1no) to protect escape stair 9 final exit corridor on the ground floor Mechanical smoke ventilation is provided from the Guildhall stage, with at least 60-minute fire rated ductwork to BS 13501-4: 2005+A1:2009 and fans provided to BS EN 12101-3: 2015. See **M-20XXX series drawings,** schedules **STGG-MXF-XX-XX-SH-M-20000 - Ventilation Equipment Schedule** and **STGG-MXF-XX-XX-SH-M-20001 - Ductwork and Ancillaries Schedule**; and sections **Ss_65_40_80_00 Smoke Extract and Smoke Control** & **Ss_75_50_28_29 Fire Detection and Alarm** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details

REF	APPLICATION	DESCRIPTION/TYPE
	Sprinklers	An automatic fire suppression system in the form of a sprinkler system to BS EN 12845: 2015+A1: 2019 has been provided to provide property protection. The fire strategy notes that this system also provides considerable benefits for life safety. The sprinkler system is to be provided in accordance with BS EN 12845 with an Ordinary Hazard Classification of OH1 and a water storage capacity of 49.4m^3. The sprinkler tank and pumps are to be provided in the existing basement cellar rooms where there is a limited amount of space available in this area, therefore the sprinkler tank had to be rationalised to a volume of 49.4m3. This amounts to a volume reduction of ca. 11% from that recommended in BS EN 12845. See the Fire Strategy section 8.1 for justification of this reduction. The sprinkler system is to be provided with automatically activated electric-motor driven pumps (one duty and one standby). Backup power for the sprinkler pumps is to be provided from a life safety generator. The sprinkler system is a specialist design package. See **the Gordonson Fire** drawings for details and section **Ss_55_30_98_85 Sprinklers** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for the Employer's Requirements
	Protection of openings and Fire Stopping	All service penetrations through fire resisting walls are to be fire stopped to manufacturer's approved and tested details as far as possible. These elements are designated as Contractor Design Portions to ensure that the Contractor takes ownership of the continuity and integrity of these walls and to take account of the need for fire stopping in existing building fabric, which may not allow installation to a fully tested detail. In these situations, the fire stopping specialist will propose the most appropriate solution for that individual instance. Class ES rated fire dampers are specified throughout to limit smoke leakage and transfer. See **M-20XXX series drawings,** schedule **STGG-MXF-XX-XX-SH-M-20001 - Ductwork and Ancillaries Schedule**; and section **Ss_65_40_33_00 General Ventilation** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details of fire dampers in ventilation ductwork.
B4	**External fire spread**	See the fire strategy for requirements.
B5	**Access and facilities for the fire service**	See the fire strategy for requirements. Dry risers, fire fighting lifts and basement ventilation are not provided on site. See the fire strategy for justification. For the PV array, a DC isolator switch (disconnectors that isolate the lines between solar modules and inverters) for the use by the fire service.
Approved Document C - Site preparation and resistance to contaminates and moisture		
C	n/a	
Approved Document D - Toxic Substances		
D	n/a	
Approved Document E - Resistance to the passage of sound		
E	n/a	
Approved Document F - Ventilation		
F	**Means of ventilation**	The ventilation is a mixture of mechanical and natural ventilation in different spaces, depending on the usage of that space. See the **Ventilation and Extraction Statement** for details of the ventilation strategy. See **M-20XXX series drawings** and sections **Ss_65_40_33_00 General Ventilation** & **Ss_65_40_33_45 Kitchen Ventilation** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.

REF	APPLICATION	DESCRIPTION/TYPE
Approved Document G - Sanitation, hot water safety and water efficiency		
G1	**Cold Water Supply**	Wholesome potable water is provided to all sanitaryware direct from the incoming mains water supply. No bulk water storage or pressure boosting is provided. The incoming supply is softened. See **P-20XXX series drawings** and sections **Ss_55_70_38_00 Hot & Cold Water** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.
G2	**Water Efficiency**	See architect's information for details of sanitaryware and detailed GA Plans / Bathroom designs
G3	**Hot water supply and systems**	Hot water is generally provided to sanitaryware via instantaneous hot water heaters. Hot water for the kitchens is provided via storage vessels, heated via ASHP or direct electric heaters where there is insufficient space for an ASHP. Expansion vessels, temperature and pressure relief valves are provided within the installation. See **P-20XXX series drawings** and sections **Ss_55_70_38_00 Hot & Cold Water** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.
G4	**Sanitary conveniences and washing facilities**	See architect's information for details of sanitaryware and detailed GA Plans / Bathroom designs
G5	**Bathrooms**	See architect's information for details of sanitaryware and detailed GA Plans / Bathroom designs
G6	**Kitchens and food preparation areas**	See architect's information for details of sanitaryware and detailed GA Plans / Bathroom designs
Approved Document H - Drainage and Waste Disposal		
H1	**Foul water drainage**	See the Civil Engineer's information for details of the below ground foul water drainage. Above ground drainage is provided in accordance with approved document H and BS EN 12056-1 System Type III See **P-10XXX series drawings** and section **Ss_50_30_04_00 Above Ground Waste Water Drainage** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.
H2	**Wastewater treatment systems and cesspools**	n/a
H3	**Rainwater drainage**	The majority of the rainwater goods are to be retained or replaced like for like. Where new infill roofs etc. have been added, new rainwater good have been added to connect into the existing system and designed in line with BS 12056 and Approved Document H See **P-10XXX series drawings** and section **Ss_50_30_02_00 Rainwater System** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.
H4	**Separate systems of drainage**	See the Civil Engineer's information for details of the below ground drainage.
H5	**Solid waste storage**	See site refuge strategy by others
Approved Document J - Combustion appliances and fuel storage systems		
J	**Combustion appliances and fuel storage systems**	The new installation is generally heated electrically (via ASHPs and direct electric heating elements) and does not generally have new combustion products. The exceptions to this is the new standby diesel generator, which is to be a packaged unit designed to comply with the requirements of Part J. There is also an existing gas boiler to number 29 that is to be retained. See section **Ss_70_10_30_72 Electricity Generation – Generator** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details of the diesel generator. The existing system is to be inspected and any non-compliances with part J (or other requirements) will be rectified as part of the works.

REF	APPLICATION	DESCRIPTION/TYPE
Approved Document K - Protection from falling, collision and impact		
K	n/a	
Approved Document L - Conservation of fuel and power		
L	**Volume 2 – Buildings other than dwellings**	This is a refurbishment rather than a new building so only the applicable sections are addressed below:
L	**Schedule 1: Limiting heat gains and losses**	Where thermal elements are replaced or new thermal elements have been added, the u-values have been designed to better the values of table 4.2 where possible within the context of the listed nature of the building and where practical. Care has been taken to improve the overall heat loss of the building in a holistic way, considering the thermal transmission of building fabric, resulting condensation risk and impact on the building itself, plus airtightness of the building. See the architectural information for more details. Heat gains from building services are limited by fully insulating all hot pipework. See **STGG-MXF-XX-XX-SH-J-41000 - Pipework Schedule** and sections **Ss_55_70_38_00 Hot & Cold Water Ss_60_40_00_00 Space Heating and Cooling** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details.
L	**Schedule 1: Providing fixed building services which are energy efficient, have effective control and are commissioned effectively**	new building services installed have been installed to better the efficiencies set out in Section 6 where technically feasible, within the constraints of the listed nature of the building. In general the new fixed building services are very high efficiency: concessions to the listed nature of the building have generally had to be made in the fabric design rather than the system design. Whilst the development is not Net Zero Carbon, aspects of the project which have been designed to reduce carbon emissions associated with the construction and operation of the building include: - Electrification of the site and removing the majority of the gas demand - Specification of low GWP refrigerants for heat pumps - New PV array to produce onsite renewable electricity - Metering and monitoring to allow review of energy consumption - Minimising heat demands through improved fabric and air-tightness, reducing ventilation loads and incorporating heat recovery
L	**Schedule 1: Commissioning**	All fixed building services shall be fully commissioned to optimise their in-use performance and use no more fuel and power than is reasonable in the circumstance. See "**STGG-MXF-XX-XX-SP-J-30200 - St George's Guildhall, King's Lynn - Preliminaries for the Mechanical, Electrical & Public Health (MEP) Installations**" for details of the commissioning requirements. This includes a requirement for seasonal commissioning and optimisation.
L	**Information about use of fuel and power**	Operating and maintenance manuals including information about how the fixed building services can be operated in a manner to use no more fuel and power than is reasonable in the circumstances will be provided by the contractor. See "**STGG-MXF-XX-XX-SP-J-30200 - St George's Guildhall, King's Lynn - Preliminaries for the Mechanical, Electrical & Public Health (MEP) Installations**" for details of the requirements for the O&M information.
L	**Consequential Improvements**	The project includes the new provision of fixed building services to several previously unconditioned spaces and as such consequential improvements are assumed to apply. The project includes a complete replacement of the fixed building services systems and the upgrade of thermal elements where technically and economically feasible. This constitutes >10% of the principal works.
Approved Document M - Access to and use of buildings		
M	**Access to and use of buildings other than dwellings**	See architectural information for details. See **STGG-MXF-XX-XX-SH-E-90000 - Lift Schedule** and sections **Ss_80_00_00_00 Lifts** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details of the lifts.
Approved Document O - Overheating		
O	n/a - only relevant for dwellings	
Approved Document P - Electrical Safety		
P	n/a - only relevant for dwellings	

REF	APPLICATION	DESCRIPTION/TYPE
Approved Document Q - Security		
Q	n/a - only relevant for dwellings	
Approved Document R - Physical infrastructure for high speed electronic communications networks.		
R	**High-speed-ready in-building physical infrastructure**	New fibre incoming telecoms connections are being provided to the building. See section **SS_75_10_21_88 Telecommunications** of "**STGG-MXF-XX-XX-SP-J-30100 St George's Guildhall, King's Lynn - Specification for the Mechanical, Electrical & Public Health (MEP) Installations**" for details
Approved Document S - Infrastructure for the charging of electric vehicles		
S	**S5 Buildings undergoing major renovation which are not residential buildings or mixed-use buildings**	There are fewer than 10 parking spaces, however an EV charging point is being provided in the Shakespeare's Courtyard. See drawing "**STGG-MXF-Z1-00-DR-E-22100 - Low Voltage Distribution Layout - Level G+0 - Zone 1**" for details.

St George's Guildhall, Kings Lynn

Architect: **Haworth Tompkins Limited - London**
Issue Status: A1 – Issued for Tender

POTENTIAL HAZARDS / RISKS SPECIFIC TO THE PROJECT

Notes:

1. This schedule includes information about aspects of the services work covered under this contract that may affect the health and safety of persons involved in the construction, operation, maintenance or demolition of the work, or affected by it. It is provided in accordance with the Construction (Design and Management) Regulations 2015.
2. The possible actions are broadly indicative and are for general guidance. The relevant contractor shall inform the Principal Contractor of the general approach and specific action he/she intends to take to deal with each health and safety matter identified. Where the specific action proposed involves further design work, the relevant contractor shall also inform the Principal Designer.
3. This schedule should be read in conjunction with the Hazard/Access/Maintenance notes on drawings, and all other contract documents.
4. This schedule is only intended to highlight significant risks associated with the design that are i) not likely to be obvious to a competent contractor, ii) unusual, or iii) likely to be difficult to manage effectively. Contractors, or persons carrying out the works, are expected to identify and assess all other risks associated with the work.

WORK SECTION	TASK	DESCRIPTION OF HAZARD	SUGGESTED ACTION REQUIRED	HAZARD CATEGORY (refer to key 2)	PERSONS AT RISK (refer to key 3)
Ss_15_00	Site services	Contract involves working around existing site services to be retained, modified or diverted.	Refer to MF existing site services drawing STGG-MXF-ZZ-ZZ-DR-J-30000 for approximate locations of services. Conduct further surveys as deemed necessary to determine extent of services by means of electromagnetic (CAT) techniques, trial pits or slit trenches. Agree scope of survey works with engineer prior to carrying out work. Mark and protect services as necessary to ensure safe work in this area.	F, L, M	C, S, M
Ss_55_20	Removing gas supplies	Contract involves removal of natural gas supply (and associated infrastructure) serving the site. Work will involve some gas-fed appliances becoming redundant.	Ensure all gas supplies have been isolated prior to removal of appliances and infrastructure. Test pipelines prior to stripping out to ensure they are dead. Agree programme with client prior to carrying out works. Issue method statement(s).	H, L, O	C
Ss_55_20	Live gas supplies	The gas supply to No. 29 and supplies to neighbouring properties to the south are to remain during the works. The exact routing of the supply to no. 29 and through the building is unknown.	Trace and identify the existing gas pipes along their whole length. Ensure that the gas supply to no. 29 has been isolated and purged prior to any works near to the pipework. Fully inspect and test the pipework prior to re-engaging this supply. Clearly identify and protect the supplies to the adjacent properties. Refer to MF existing site services drawing STGG-MXF-ZZ-ZZ-DR-J-30000 for approximate locations of these services	H, L, O	C
Ss_60_40	Propane Heat Pumps	Contract involves installing heat pumps that use Propane as a refrigerant.	Refer to manufacturer's information on precautions required for installing Propane Heat Pumps. Clearly mark out the area around the heat pumps that is required to be clear of ignition sources (e.g. plug sockets, lights, etc. and windows / ventilation ducts / drains etc) and ensure that all subcontractors are aware of these requirements.	H	C, M
Ss_70_30	Existing electrical supplies to site	Contract involves removal of existing LV supplies within the site. There are multiple separate utility supplies into the site.	Locate underground LV cables using electromagnetic (CAT) techniques. Work will involve isolating the electrical supplies to the existing buildings. Ensure that all redundant LV supplies are isolated prior to works.	F	C, S
Pm_40_20	Installing Services within small voids	Contract involves installing services in the void between the historic floorboards of the Guildhall and the barrel vault of the undercroft, which is of very limited head height.	Where possible, install services in this area prior to reinstating the historic floorboards, to allow access from above. Plan installation and work to minimise the need for operatives to enter this void (e.g. locate joints etc. in areas of greater access). Provide method statements.	O	C, M
Ss_65, Ss_70, Ss_75	Working at height on pitched roofs	Contract involves installing services on or through pitched roofs (e.g. lightning protection systems, ventilation cowls, PV array).	Take suitable precautions for working at height both during initial installation and for maintenance activities. Provide appropriate scaffolding and supports.	A	C, M

Residual Risk Schedule
Dwg #: **J7371/STGG-MXF-XX-XX-SH-J-00000 Rev P01**

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MAX FORDHAM

St George's Guildhall, Kings Lynn

Architect: **Haworth Tompkins Limited - London**
Issue Status: A1 – Issued for Tender

WORK SECTION	TASK	DESCRIPTION OF HAZARD	SUGGESTED ACTION REQUIRED	HAZARD CATEGORY (refer to key 2)	PERSONS AT RISK (refer to key 3)
Ss_25	Installing builderswork through existing structure	New builderswork holes are required through fabric of unknown age and condition.	Refer to structural engineer's information. Survey condition of fabric prior to making penetrations. Make allowance for temporary supports during installations.	C	C

Key

1. WORK SECTION: As per Uniclass Classification Code (Ss_10_00: Earthworks Remediation and Temporary Systems, Ss_50_30: Above-Ground Drainage, Ss_55_20: Gas Distribution and Supply, Ss_55_30: Fire Extinguishing, Ss_55_70: Water Distribution and Supply, Ss_60_40: Space Heating and Cooling, Ss_65_40: Ventilation, Ss_70_10: Power Generation, Ss_70_30: Electrical Distribution, Ss_70_80: Lighting etc.).
2. HAZARD CATEGORY: A: falls from height; B: vehicles; C: collapse; D: manual handling; E: moving objects; F: electricity; G: machine movement; H: fire and explosion; I: noise and vibration; J: drowning; K: tripping or slipping; L: harmful substances; M: disease and health; N: radiation; O: confined spaces; P: visibility; Q: obstructions.
3. TARGET GROUP: C: contractor; M: maintenance staff; S: user/ occupiers; V: visitors; P: members of the public; E: children, the elderly or vulnerable.

Rev	Date	Status	Description	Engineer	Project Leader
P01	21/02/25	A1 – Issued for Tender	Stage 4 Tender	GM	HRE

Residual Risk Schedule
Dwg #: **J7371/STGG-MXF-XX-XX-SH-J-00000 Rev P01**

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D. Momentum Stage 4 Report
Structural Engineering

MOMENTUM
structural engineers

St. George's Guildhall

Stage 04 Design Report
Civil and Structural Engineering

27 February 2025
5605-MOM-XX-XX-RP-S-1104

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Unit 3.1 & 3.2 . The Loom . 14 Gower's Walk . London E1 8PY . 020 77396939
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This document has been prepared for the sole benefit, use and information of St George's Guildhall, King Lynn and the National Trust and for the purposes set out in the following pages.

The liability of Momentum Consulting Engineers Ltd in respect of the information contained in the document will not extend to any third party.

Background

Momentum have been asked by Borough Council of King's Lynn and West Norfolk to develop civil and structural proposals for the renovation of St George's Guildhall.

Authors

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Sophie Vaughan

Checker

David Morris

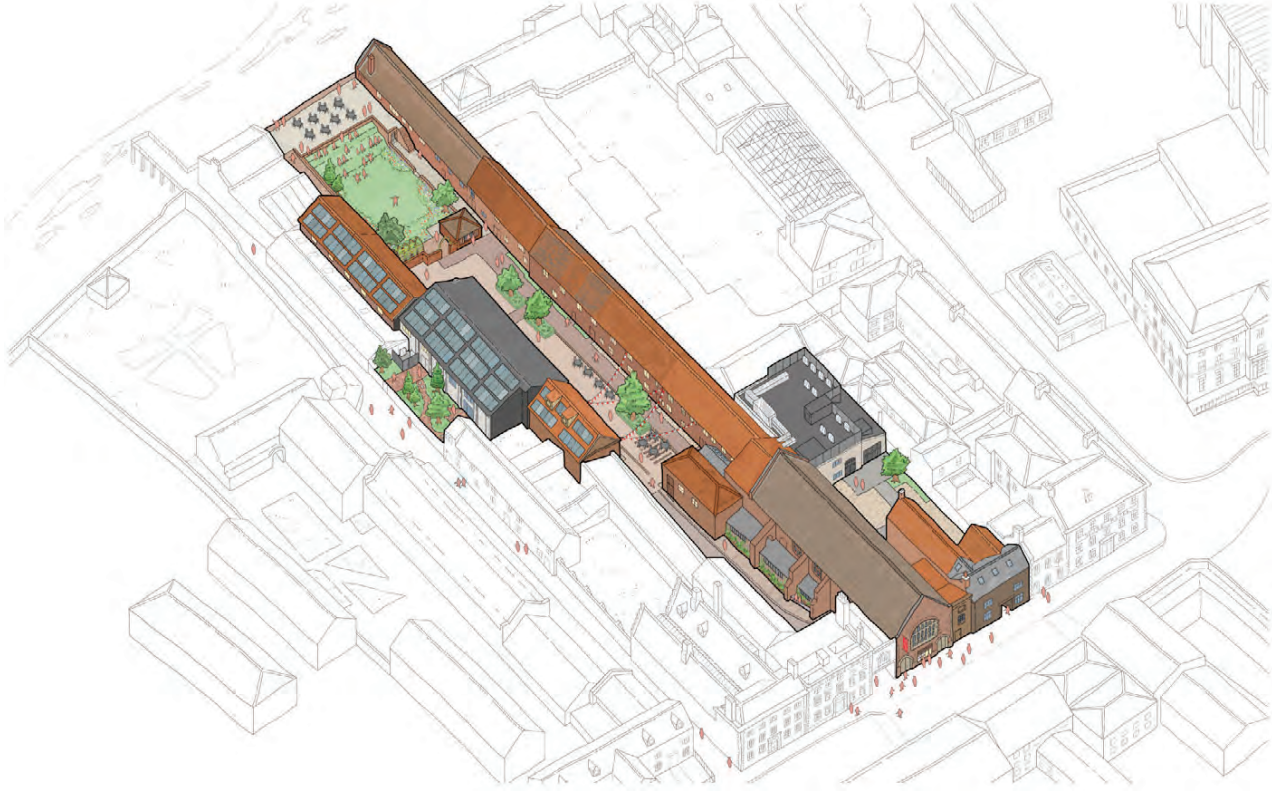
Issue History

Rev.	Date	Comments
P01	27/02/2025	Stage 4 Issue

Contents

Overview

The purpose of this report is to outline the design development and the documentation prepared during the RIBA Stage 4 design process.



Work Carried out during RIBA Stage 4:

- Technical design for superstructure across all building on the site in line with the revised architectural proposals.
- Coordination with the Architect and development of connections between structural elements
- Assessment of Guildhall gallery structural scheme options to address the impacts of a steel-flitched oak glum option versus a traditional oak frame structure, and design report for Architect's review.
- Review of timber surveys and assessment of scheme following timber strength grading.
- Continued assessment of crack monitoring and commentary on results to date.
- Development of the below ground drainage scheme and drainage strategy report to address pre-commencement planning conditions.
- Further review of geotechnical investigations, including trial pit results and infiltration testing.
- Foundation scheme for Shakespeare Barn revised from pads to raft foundation to mitigate the need for underpinning along the party wall lines.
- Constructibility has been considered and advised on key aspects of the site
- Provide designer's risk assessments and method statements for various parts of the structure.
- Development and coordination with Landscape Architect for external works

Key documents produced during RIBA Stage 4:

Drawings:

- General arrangement drawings
- Section drawings
- Detail drawings
- Assembly drawings
- Crack repair elevations

Reports:

- Designer's Risk Assessment
- Structural Specification
- Designer Competency Statement
- Surface Water Strategy Report
- Timber and damp survey specification
- Masonry and timber repair specification

Items of further surveys, design development and coordination:

- Continued monitoring of crack tell-tales and assessment to determine whether further intervention is required.
- Further surveys of existing below ground drainage to clarify discrepancies between the utilities and CCTV surveys, and determine the outfall size and location of the primary drain in the Maltings Yard to the river.
- Second timber condition survey by Hutton + Rostron during enabling works to assess condition of Guildhall historic timbers, and development of any repair specifications and details to address required actions from the survey.
- Consultations with local planning and water authorities regarding the Surface Water Drainage Strategy report
- Coordination with the Architect and manufacturers (where relevant) regarding stairs and lifts.
- Minor coordination with the Landscape Architect and MEP engineer as it relates to drainage
- Coordination with historic timber consultant regarding the reinstated historic truss
- Development of various details during construction following opening-up works on site including, but not limited to:
    - Details of builder's work openings
    - Repair details to historic timbers where required
    - Details of various new-to-existing structural interfaces that could not be resolved during Stage 4, e.g. in-situ padstone details, lintels. Etc.

Design Development: Structure

The following sections describe key design developments and changes in the scheme during Stage 4. These pages are to provide an overview only and are not intended to be an exhaustive list of design changes.Items are numbered and cross-reference to images shown on the right.

1. Guildhall

1.1. Details for the new roof bracing has developed and coordinated with the Architect too optimise the spacing of the ties and headroom. Positions of ties are now located between trusses, and fixed via steel elements to the back of the trusses, thereby avoiding fixings directly to the underside of the trusses within the theatre space. Design of the mid-point coupler is to be developed further with the Architect.

1.2. The gallery structure has been revised and coordinated with the latest architectural scheme and now includes just one staircase. Development of assembly details, stairs and balustrades has been completed. Further details will be required to address connection details of secondary structural elements.

1.3. Connection details for new-to-existing structural interfaces have been developed and coordinated with the lead architect and conservation architect. For example, bearing of primary transfer beams below gallery structure, gallery-to-wall connections.

1.4. The main staircase from the foyer to the Guildhall is now retained, but will be modified to accommodate the new levels of the Guildhall. Historic drawings suggest the existing stairs are concrete, and structure has been sized to re-support the north edge where a wall below is being removed, however these assumptions will be confirmed during the opening up works.

1.5. The existing floor in the entrance space is to be partly broken out to allow for the new timber stair down to basement level. The existing wall at basement level is suspected to be to a noon-retaining wall, and conceals a void space below the foyer floor. This is to be confirmed via opening up works during the enabling works.

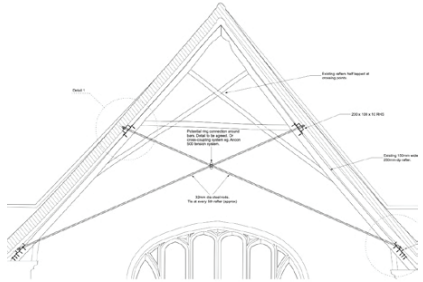
1.6. A stage trap structure has been included within the stage area. A new timber stud frame has provisionally been allowed for. Specifics of trap opening mechanism or and platforms have not been developed and will need to be addressed during Stage 5 if required.

1.7. Various amendments made to coordinate with building services. For example, heavier but shallower steel beam to accommodate more space for services below the stage, and various trimming elements around the stage floor. Further coordination required around the front of the stage to allow for routing cable trays.

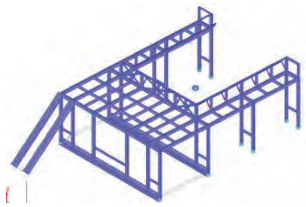
1.8. Constructibility of the new internal Guildhall structures has been considered in further detail and allowances made to help enable the works, such as providing splices in the main gallery transfer beams.

1.9. Design developed for the new openings made in west gable wall of the Guildhall. Required lintels sized and coordinated with building services. An indicative temporary works scheme has been developed to demonstrate the intended construction sequence.

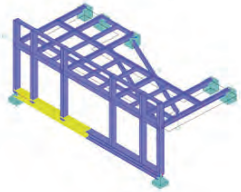
1.10. Positions of new and existing openings have been coordinated with the Architect, and lintel specifications provided where required. Where existing lintels or masonry arches are to be re-used, these will to be reviewed on site once opened up.



1.1 Section Guildhall roof bracing

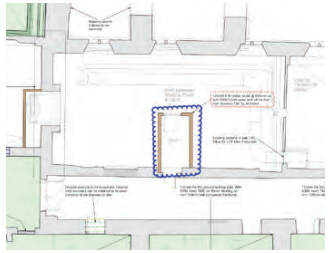


1.2 Guildhall gallery structure model

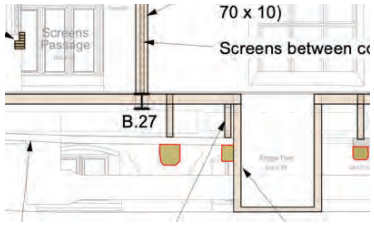


1.3 Guildhall primary beams below gallery structure model

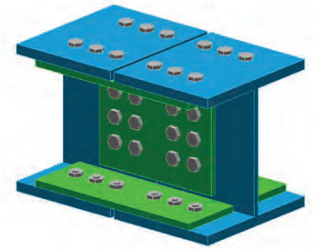
1.5 Plan drawing of timber stair in basement level



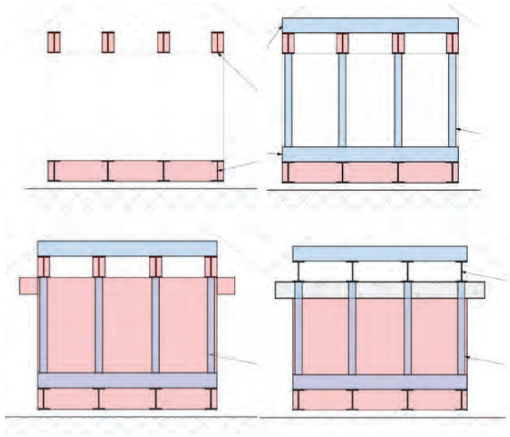
1.6 Plan showing stage trap structure.



1.7 Section indicating shallower beam (B27)



1.8 Splice detail model



1.9 Temporary works sequence for openings in Guildhall gable wall

2. Buttress infill

2.1. Masonry built planter added in line with latest design. Additional piers/ties of masonry at regular centres provide an element of retaining resistance.

2.2. The proposed external wall build-up developed. Timber stud walls with RSA header beams over the window openings to provide clear-span over clerestory windows, coordinated to accommodate hidden gutter detail.

2.3. Substructure design developed; the existing bearing slab is to be demolished and replaced with 150mm thick concrete slab. 450mm wide strips footings required below external walls.

3. No.29 and No.29 link

3.1. Substructure design developed. New 150mm thick slab to be installed in the No.29 link to accommodate raised timber floor structure and lift pits and shaft walls.

3.2. Stairs have been rearranged and developed to suit Architect drawings. New timber floor structures included where existing floors are being removed. Comments on stair design drawings provided to architects to confirm form and sizes in principle.

3.3. The external masonry wall on the west elevation off the link has been omitted. Instead there is a new infill wall above the existing buttress consisting of a masonry wall at ground floor level and and timber construction above, with a new concrete foundation. The roof structure has developed including joist sizes, specification of hangers. Refer to KS-RF-DR-S-00103.

3.4. New and existing openings have been coordinated with the Architect.

4. North range 1

4.1. The existing brick vault is to be partially broken out to accommodate a new RC staircase down into the undercroft tunnel, with RC ring beam around the stair opening to resist the lateral loads from the vault. The existing opening will be infilled with a new RC slab, tied into the existing concrete surrounds. New concrete footing to be provided below foot of staircase.

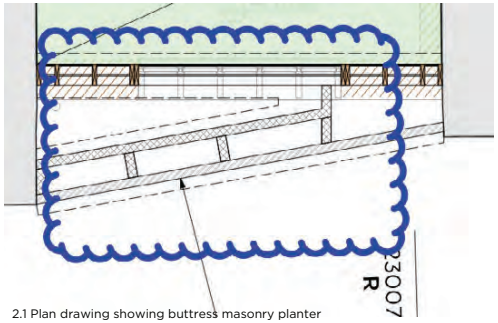
4.2. The existing floor structures are to be retained where possible, however further opening up is required to confirm arrangement and condition in each area, and whether removed walls are load-bearing. A new timber stud wall is to support existing first floor timber joists.

4.3. The new bar will sit above a raised 100mm deep concrete plinth on top of existing floor .

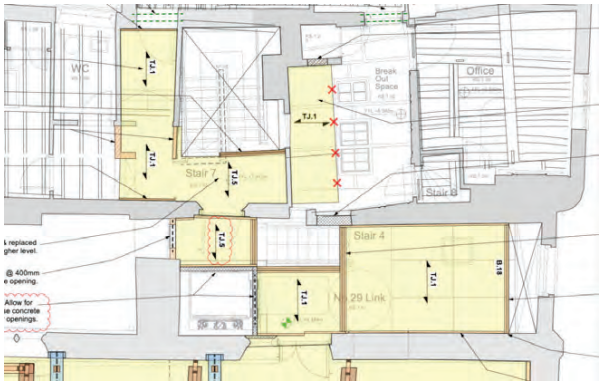
4.4. Supplementary beams have been included below the floor of the theatre equipment room to facilitate the openings required for the ventilation plant.

4.5. Foyer roof trusses spaced further apart and includes trimmers around roof lights. The interface with the existing walls has been developed and details designed to account for the variation in the existing walls.

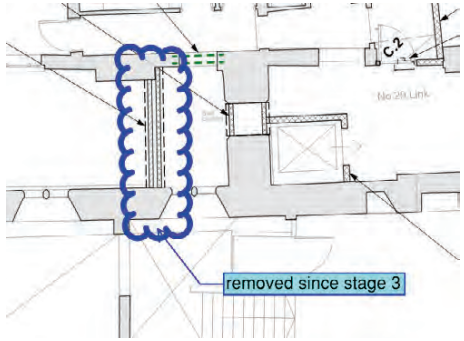
4.6. The dormer, located to the west of the Guildhall has been enlarged so that it is the full width of the backstage area.



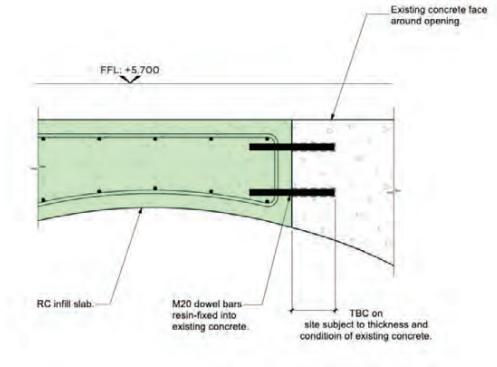
2.1 Plan drawing showing buttress masonry planter



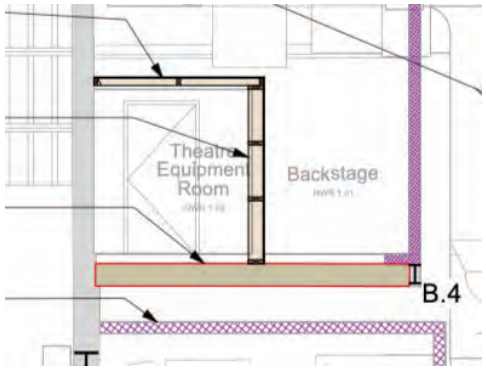
3.2 No.29 first floor arrangement



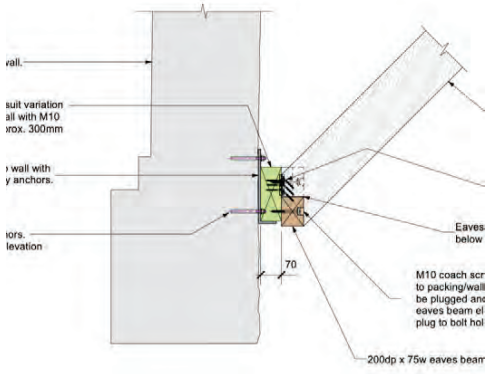
3.3 Stage 3 plan drawing showing external wall to be omitted



4.1 Detail showing new RC stair tied into existing slab



4.4 Section showing theatre equipment room structure



4.5 Foyer roof truss detail

5. Red barn

5.1. The foundation scheme has been developed; the existing slab is to be demolished and replaced with 150mm thick concrete slab. No damage should occur to the existing external walls or the footings below.

5.2. Details of lintels around the existing and new openings developed.

6. North warehouse 2

6.1. Scheme developed to re-used existing timber beams and floor joists where possible, subject to condition on site. Where required, replacement joists will be a like-for like replacement.

6.2. Positions of new and existing openings have been coordinated with the Architect.

7. North warehouse 3

7.1. Details of the restaurant staircase have been developed and are now RC from basement level up to the half landing, and then timber up to GF level. Details of stair balustrade developed with initial input from Momentum. Further development required to confirm fixing details into stair stringers and walls.

7.2. Details of the restaurant toilet internal structure developed to include new p beam and block floor supported on masonry upstand walls and mass concrete footings, with non-load bearing clockwork cubicle walls above.

7.3. Infill walls within the cellar below the restaurant are to be removed to make room for the sprinkler tank. Screw piles to the sprinkler tank slab are now deemed not to be required, and the slab may be cast directly ono top of the existing floor structure with an additional levelling screed poured on top of the existing floor.

7.4. A new steel beam at roof level has been introduced to support the AHU (including pad stones in existing masonry walls) as required for building services. If existing structure is found to be adequate the beam could become obsolete. In addition to a new steel beam, the AHU will be accessed via a new stair and new opening with lintel above.

8. Old warehouse

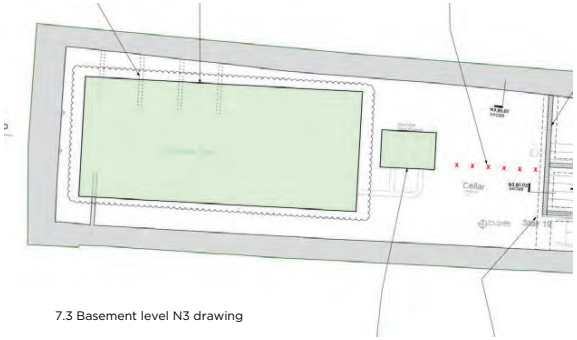
8.1. Existing timber beams are to be raised up on new piers to improve headroom. Temporary propping is required during repositioning to be confirmed by the contractor.

8.2. The existing cross wall with be re-build in blockwork an tied into external walls.

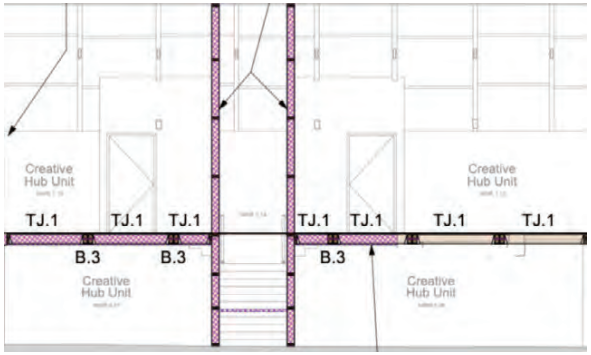
8.3. Cracks in the east elevation wall are being monitored for movement. Initial monitoring suggests movement is still occurring, however it's not clear if this is simply seasonal movement. Crack stitching has been specified for initial crack repairs, however if further monitoring concludes that the north wall is still moving, then a more substantial remedial solution may be required. The exact details of the remediation will be subject to the cause and amount of movement exhibited.

8.4. 2No. New timber dormer structures have been introduced in the roof, replacing the existing dormers.

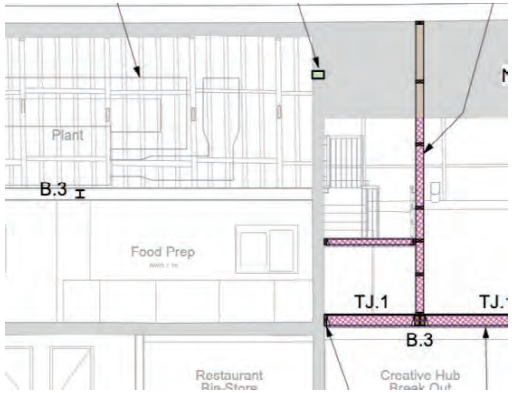
5.2 Photo of existing opening in Red Barn



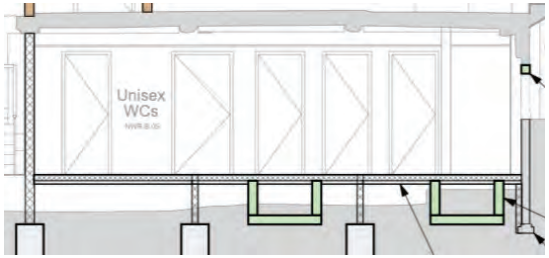
7.3 Basement level N3 drawing



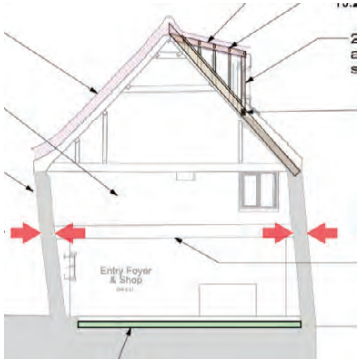
6.1 Section of N2 indicating existing beams to be retained



7.4 Section N3 steel beam at roof level and new timber stair



7.2 Section N3 beam and block floor with access to manholes



8.4 Section old warehouse new timber dormer

9. Shakespeare barn

9.1. The pad foundations scheme from Stage 3 has been redesigned to a raft slab. This allows for a more flexible layout of the below ground drainage pipes which no longer need to avid pad locations. This also mitigates the likelihood needing to underpin along the north party wall, which should provide a significant cost saving.

9.2. The substation structure has been incorporated into the Shakespeare Barn, however this exact dimensions of the substation structure need to be confirmed by UKPN.

9.3. Arrangement of metal-web joists at first floor has been altered so that they span further, consequently the spacing between the joists are decreased. Double joists required to allow for wider service routes and openings.

9.4. To provide adequate head room in the space to the west of the substation, solid shallower joists are installed in lieu of deep post joists.

9.5. The ramp structure between first floor of the north warehouse range and Shakespeare barn has been developed to suit the proposed level changes at first floor.

9.6. There is a sloping roof towards the north will be solid timber rafters (previously metal-web joists).

9.7. Support structure for the roof-top plant screen has been developed in further detail following input from the acoustic panel manufacturers.

10. White barn

10.1. Timber screens in the white barn garden with associated pad foundations beneath introduced to form plant enclosure.

11. White barn annexe

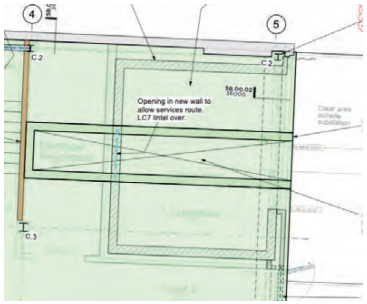
11.1. Timber stair specified at stage 3 has been replaced with steel stair.

11.2. New and existing openings have been coordinated with the Architect. A new lintel is required over opening in the north elevation. Existing openings bricked up to south external wall to suit Architect drawings.

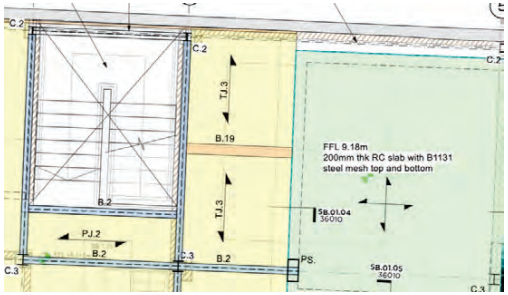
11.3. The existing slab to be retained where possible, however these will need to bee broken out to accommodate the ground drainage.

12. Linen Store

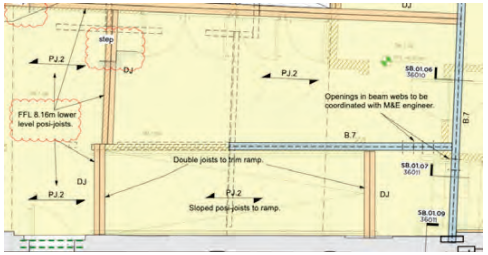
12.1. New openings have been coordinated with the Architect. A new lintels are to be provided over opening in east elevation.



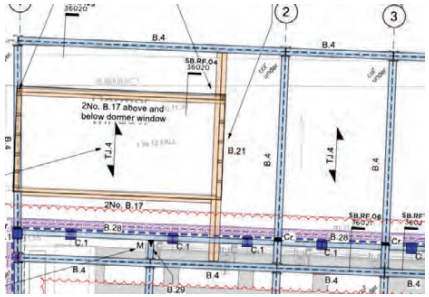
9.2 Plan drawing shakespeare barn substation



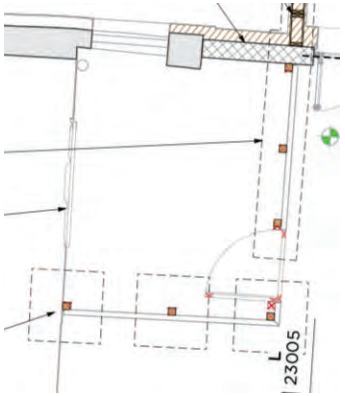
9.4 Plan drawing shallower solid joists



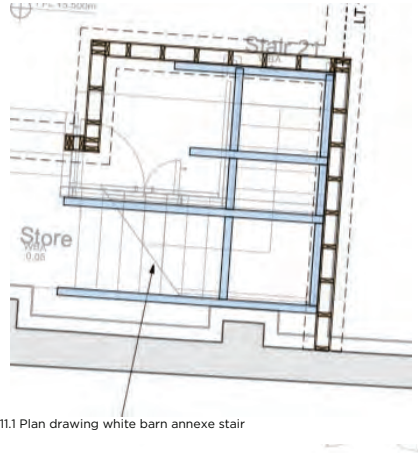
9.5 Plan drawing ramp structure



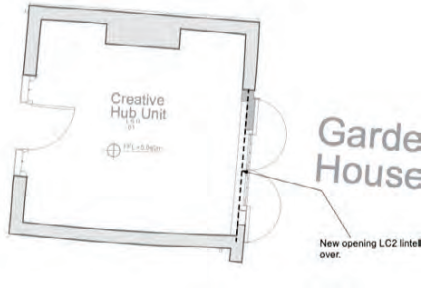
9.6 Plan drawing Shakespeare barn sloping roof



10.1 Plan drawing white barn plant enclose



11.1 Plan drawing white barn annexe stair



12.1 Plan drawing linen store new opening

Design Development: Civil and External Works

13. Below ground drainage - Foul

13.1. Foul drainage is largely unchanged from Stage 3 with principle routes from appliances to the discharge points remaining the same. Various routes have seen minor amendments, with the most changes occurring around the Shakespeare Barn.

13.2. Levels have been added to new manholes and a manhole schedule prepared.

14. Below ground drainage - Surface water

14.1. The surface water drainage design has undergone significant development to meet the requirements set out in the Anglian Water surface water drainage policies, and to coordinate this with the landscape proposals.

14.2. A greater number of existing rainwater pipes - mostly located in the east Maltings Yard, but also at the White Barn Garden - are now being disconnected from the existing combined sewage system and diverted to the river via the primary route through the Maltings Yard.

14.3. The increase in surface water flow through the Maltings Yard has prompted the need for an attenuation storage tank below the main concourse. This is in part due to the flow being restricted by the size of the existing pipework in the Maltings Yard, but also due to the potential for the system becoming tidally locked at the outfall. (Note: Tidal locking is the term for when the level of the tide at the outfall of the pipe rises above the level of the water within the drainage system, preventing water from being discharged into the river). The design requirements for the tidally-locked system will need to be agreed with the Lead Local Flood Authority.

14.4. Surface water attenuation storage has been provided in the Shakespeare Courtyard in order to restrict surface water run-off to the existing rates, in line with the Anglian Water surface water drainage policy. These include a combination of geocellular storage tanks and gravel sub-bases. The attenuation storage has been designed conservatively assuming that the run-off rates include both foul and surface-water run-off rates. This will need to be confirmed with Anglian water.

15. External Works

15.1. Sub-base specification has been provided in coordination with the landscape architect's pavement build-up specification.

15.2. Details of external free-standing and retaining walls have been provided and coordinated with the landscape architect's scheme.

Items for further development and coordination

16. Structural items

16.1. Production of steel connection force tables to allow for contractor steel-steel connection design

16.2. Reinforced concrete design intent drawings to allow contractor to carry out reinforcement detailing.

16.3. Further development and coordination of structural details for secondary structural elements e.g. s stairs and balustrades.

16.4. Ongoing crack and movement monitoring and development of any remedial details (if required).

16.5. Review of second-phase timber condition survey report and site visit (if necessary) and develop schedule of repairs and details for elements required.

16.6. Coordination with timber repair specialist to re-support historic oak truss above Guildhall.

17. Civil and external works items

17.1. Coordination with MEP engineer to agree position of attenuation tanks to avoid clashes with service trench routes.

17.2. Coordination with Landscape architects to include area of impermeable paving and where existing surfaces need to broken out and replaced.

17.3. Consultation with Lead Local Flood Authority and Local Water Authority to agree site run-off rates, and submission of Surface Water Drainage Strategy Report for approval to close out pre-commencement planning condition.

MOMENTUM
structural engineers

HAZARD ELIMINATION AND MANAGEMENT STRATEGY

Job No:		Project:		Date of Issue:	Revision:
2302		St George's Guildhall, King's Lynn		28/02/2025	B
REFERENCE CONSTRAINT/ ACTIVITY OR ELEMENT		HAZARD	MEASURES TO ELIMINATE/ RELEVANT GUIDANCE	MANAGER	ELIMINATED
MOMENTUM DESIGNER RISK REGISTER					
	Groundworks - Deep excavations	Unstable excavations during construction and potential influence on adjacent structures with shallow foundations	Proposed new foundations are shallow strip and raft foundations. Some excavations are expected be <1m deep. Existing foundations must not be damaged or undermined. Design has been developed to avoid underpinning where possible. Deep drainage chambers may bee required, but have been kept to a minimum depth where possible. Contractor to prepare method statement for working in deep excavations and allow for suitable temporary works to prop sides of excavations where necessary.		
	Groundworks - Deep excavations	Working in confined spaces	Contractor to review works and confirm if working in confined spaces is necessary, and if so to prepare a relevant method statement and risk assessment.		
(D2)	Groundworks - below ground services (inc. high voltage cables)	Risk of striking live services.	New foundations and drainage runs have been routed to avoid more congested areas of site where possible. Utilities and CCTV surveys have been carried out and will be supplied to Main Contractor.		
	Groundworks - underpinning	Temporary instability of structures above and potentially unstable excavation walls.	Trial pits have been carried out where possible to identify levels of existing footings and locations where underpinning may be required. Where underpinning is required, a recommended hit-and-miss sequencing will be provided to Contractor. Contractor to follow recommended sequencing unless agreed otherwise, and allow for temporary sacrificial propping. Contractor to prepare job-specific method statement and risk assessment for underpinning works.		
(D5)	Groundworks - vault/ chamber and sink holes	Risk of unstable ground due to suspected underground vault/ chamber. There have been instances of sinkholes appearing near to the site.	Contractor to be aware of subsidence risk due to ground conditions sand below ground water flows. The surface water drainage strategy has mitigateed the risk of sink holes on the site where possible.		
	Working near highways	Risk of personnel struck by vehicles.	Contractor to consider construction approach and work from within the site boundary where possible. Where working in or adjacent to highways is necessary, industry safety guidelines and protocols must be followed.		
(C9)	Working near watercourses	Risk of falling into watercourse and risk of drowning	All works are expected to be able to be carried out within the site boundary and within a safe distance of the watercourse. Contractor to ensure adequate site hoarding or guard railing is placed along all access routes or boundaries adjacent to the watercourse.		
(C10)	Flooding	Partial or site-wide flooding during construction.	Contractor to be vigilant of weather forecast and any potential flood warnings. Temporary flood defences should be provided during flood warning events where appropriate. No work should be carried out within areas of flooded site, with access to those areas suitably closed off to site personnel and the public.		
(D1)	Contamination - Asbestos	Asbestos has been identified across many areas of site, with further potential of asbestos to be present in the ground.	Asbestos screening tests have been carried out and the report will be provided to Main Contractor. Professional removal of asbestos required prior to commencement of construction or demolition works.		
(D3/C3)	Working at height	Working at height required for all works to roofs and floors not ono the ground floor.	Designs have considered member sizes and sequencing to allow for ground assembly and lifting into place, limiting the amount of time spent working at height. Contractor to follow best practice to mitigate risks.		
(D3)	Loading onto existing structure during construction	Temporary construction loading may exceed capacity of existing floors.	Design loading plans have been provided for all areas of the building. Contractor to ensure temporary construction loading does not exceed capacity of any existing or new floors taking into account sequencing, temporary loading, and any strengthening works required to facilitate the permanent works design.		
(C6)	Temporary instability	- Temporary instability of Guildhall roof during repair works due to removal of any braces, sarking boards, tie bars or other items that may be providing stability. - Temporary instability of existing floor joists - Damage to external masonry walls whilst raising existing beam in old warehouse - Crack stitching/ repair works to masonry walls - Openings made to Guildhall wall	The contractor should note the recommended construction sequence and follow repair works/ temporary works specifications provided by Momentum. The Contractor to prepare method statement and risk assessment. The Contractor may propose alternative sequence, including providing temporary works designs. The must be submitted to Momentum for review.		
	Fire risk	Risk of fire during during construction due to the amount of historic, dry timber and ignition from potential construction works.	Hot works such as site welding have not been included as part of the permanent design works. Contractor is expected to follow typical site safety guidelines to avoid potential ignition of timber structures or stored materials.		
	Works to existing foyer/box office floor.	Suspected void below floor. Risk of partial collapse or falling into void. Contractor must excersise caution when carrying out works around existing floor.	Opening up works are to be carried out to confirm presence and extent of any void as well as establish how the existing floor structure is supported.		

E. Charcoalblue Stage 4 Report
Theatre Technical & Acoustic Design

ST GEORGE'S GUILDHALL

STAGE 4 SUMMARY REPORT – R02

King's Lynn, UK

Issue
February 2025

CHARCOALBLUE
THEATRICAL INNOVATION | ESTD 2004

Executive Summary

This report provides a list summary of the theatre planning, technical systems and acoustic design development and documentation undertaken during RIBA Stage 4, as well as a budget estimate.

It should be read in the conjunction with the previous RIBA stage reports written for this project, and the accompanying specifications, drawings and schedules which have been prepared during Stage 4.

This document was previously issued in craft form and has been updated for Stage 4 issue with internal and project team review comments.

This report has been updated in January 2025 with a revised budget for the proposed seat type after further architectural development and a seating manufacturer price estimate.

Additional, updates are shown in blue for the final February 2025 version of this document.

1. WORK SUMMARY

1.1. DESIGN

ACOUSTICS

- Coordination of mechanical service noise criteria
- Coordination of external plant screening
- Coordination of internal partition, door, and glazing details
- Coordination of internal materials and finishes

THEATRE DESIGN

- Coordination of final seat setting out
- Coordination of final balcony tiering setting out
- Coordination of balcony front bar with access and sightlines
- Coordination of high balcony rigging bar positioning with audience sightlines and access equipment
- Coordination of auditorium seat design and detailing (ongoing)

TECHNICAL

- Coordination of mechanical and electrical services with theatre equipment, including lighting control.
- Coordination of rigging point detailing with medieval wood ceiling rafters
- Coordination of rear mount projector and specialist facility panels positions and box mount detailing with internal design of room and architectural materials
- Coordination of balcony high bar rigging and customised access solution now added to the scheme.
- Coordination of equipment room layout
- Review and optimise positions for projection and screen positions and loudspeakers positions (based on identified preferred manufacturer)

CHANGES SINCE STAGE 3

- Development of loudspeaker system details and Inclusion of Alive Norfolk feedback for preferred loudspeaker system and rigging strategy.
- Review and development of projector lens and contrast/brightness requirements.
- Relocation of transverse balcony rigging bar (before = aligned to balcony edge / after = above seating tiers further downstage)
- Development of custom access step units for access to the high-level rigging bar above the balcony seating area.
- Relocation of upstage motorised truss further downstage, to create masked crossover and performer entrances behind upstage full black, and a corresponding shuffling of the rest of the rigging bars.
- Integration of connection panels into the balcony front and auditorium ceiling, with development of the architectural detailing of these panels.
- Integration of projector and connection panels in screens passage with architectural details.
- Integration of connection panels in stage area and performer gallery – development of combined panels with integral containment routing.
- Relocation of various connection panels and power supplies around the site.
- Simplification of Stage 3 lighting scheme in backstage area and location of control panels for lighting in the Guildhall.
- Simplification of Stage 3 paging system and coverage.

END OF STAGE 4 – REMAINING COORDINATION ITEMS

- Relocation of stage level temporary cable pass to north wall of Guildhall (overlooking Shakespeare Yard) and safe external access to opening in wall for offering-up broadcast cable to aperture
- Relocation of outside broadcast van power supply to Shakespeare Yard
- Location and control topology for drivers for LED houselight fittings for the Guildhall. Drivers and locations are as specified by Max Fordham, but coordination required to ensure that the linking control cabling from our control system is correctly designed and will work.
- Presence of trapped zone on stage and provision, if any, of theatre technical services to this feature. We understood this item has been omitted as a feature of the stage area and have currently provided no services to it, although it remains on the most recent architectural plans and sections (as of February 2025)
- Coordination of balcony seat row spacing with rigging bar access above using bespoke access equipment
- Specification of loose chairs on Guildhall stage: in the tender documents: these have been specified as free-standing, non-stackable items of furniture to match the look of the loose and floor mounted seats in the stalls and balcony. However, as a tender option they could be simplified to loose stacking chairs, enabling simpler storage as well as easier transportation and use elsewhere on the site.

1.2. DOCUMENTATION

- Acoustics performance criteria and architectural specifications
- Theatre seating specification
- Stagelighting, audiovisual and stage engineering system performance specifications
- Stage lighting, audiovisual, stage engineering system equipment and seating schedules
- Stage 4 equipment and seating budget (this document – see overleaf)
- General arrangement drawings
- Detail drawings
- System schematics
- Assembly drawings
- Facility planning schedule
- Designer risk assessment
- Designer competency statement

2. PERFORMANCE SYSTEM COSTS

In this section, we provide our budget cost estimates for the technical performance systems for the Guildhall.

The cost figures in these tables are based on a database of tender returns gathered from other UK projects of a similar scale.

The tables below provide costs broken down by each design discipline.

Tables are updated in **RED** with a revised budget for the proposed seat type after further architectural development and a seating manufacturer price estimate.

Correction of a typo in **BLUE** under stage engineering / masking. The subtotal remains unaffected.

PRELIMINARIES

The costs in these tables are shown exclusive of any overall project preliminaries, so for clarity, they should be read in conjunction with the overall project cost plan.

In the tables that follow, the preliminaries involved with the specialist system packages are called out separately as a 'Design, installation and project management' line item.

This is to allow us to show the 'real' cost of the equipment in the individual line items for ease of market comparison, with the specialist contractor preliminaries and overheads called out separately, as a direct proportion of the equipment costs. Main contractor overheads and overall project preliminaries will be in addition to these.

EXCLUSIONS

In the next section we have provided a summary of items associated with the performance systems that we have not included in our costs, as a list of 'exclusions'. These will not be part of the specialist packages that are eventually developed for tender by Charcoalblue at the end of RIBA Stage 4.

The cost consultants should ensure that these are picked up and included in other areas of the cost plan.

2.1. GUILDHALL

STAGE ENGINEERING	ESTIMATE
Power supplies, power wiring & containment	In EC's scope
Structure to support rigging	In MC's scope
Power and cabling	£25,000
Controls	£71,500
Chain hoist system	£133,700
Fixed rigging pipes	£17,000
Masking	£59,000
Steps	£4,000
Safety signage	£500
Access equipment	£10,250
Design, installation & project management	£50,000
SUBTOTAL	**£370,950**

STAGELIGHTING	ESTIMATE
Power supplies, power wiring & containment	In EC's scope
Infrastructure	£ 37,800
Stagelighting control systems	£ 5,950
Houselight control system	£ 8,800
Stagelighting fixtures	£ 53,250
Stagelighting loose cables	£ 3,700
Access equipment	£ 4,000
Design, installation & project management	£ 28,500
SUBTOTAL	**£142,000**

AUDIOVISUAL	ESTIMATE
Power supplies, power wiring & containment	In EC's scope
Infrastructure	£90,100
Communication system	£10,020
Paging, assisted listening & show relay systems	£32,900
Video systems	£30,350
Sound Systems	£44,250
Design, installation & project management	£133,100
SUBTOTAL	**£340,720**

SEATING	ESTIMATE
Stalls – loose, fixed and removable seats	£130,000
Balcony – fixed seats	£31,000
Screens passage gallery – removable seats	£8,250
Design, installation & project management	Included
SUBTOTAL	**£169,250**

~~Due to the current flux to the seating design we have added a range of costs to allow for ongoing development. These figures will be refined as we coordinate the final seating design.~~

2.2. PORTABLE EQUIPMENT

Portable equipment is intended for shared use in the secondary performance spaces, which now includes the existing Fermoy Gallery and the White Barn as well as the Undercroft.

In anticipation of budget constraints, we are recommending that specialist loose equipment and infrastructure for stagelighting, stage engineering and seating in these secondary spaces is not included within the project budget.

Key audiovisual interconnectivity between these spaces and the Guildhall is, however, included in the budget in the previous section.

Loose audiovisual equipment is outlined below and the accompanying EQS.

The costs allow for a single portable system to be shared across all the spaces. Additional equipment would be required for simultaneous use of more than one of these spaces.

PORTABLE AUDIOVISUAL EQUIPMENT	ESTIMATE
Equipment	£60,000
Design & project management	Included
SUBTOTAL	**£59,470**

2.3. TOTAL

SUMMARY	ESTIMATE
STAGE ENGINEERING – GUILDHALL	£370,950
STAGELIGHTING - GUILDHALL	£ 142,000
AUDIOVISUAL - GUILDHALL	£ 340,720
AUDIOVISUAL - PORTABLE	£59,470
SEATING - GUILDHALL	£169,250
TOTAL	**£1,082,390**

2.4. COST EXCLUSIONS

EXCLUSIONS FROM THE PERFORMANCE SYSTEM COSTS

The costs detailed in the equipment schedules are for the systems and equipment that will be included in the specifications for the specialist theatre packages at tender stage.

There will be additional, associated costs that are not included in the equipment schedules, as outlined below.

Suitable allowances and contingencies should be included elsewhere in the cost plan.

ELECTRICAL SYSTEMS

- All containment, power wiring and installation for stagelighting and audiovisual systems.
- All primary containment, power wiring and installation for stage engineering systems (all final connections to SE equipment are included in our costs).
- Power supplies and distribution to stagelighting, audiovisual and stage engineering equipment racks, including distribution equipment within equipment rooms.
- Power outlets specifically intended for the connection of temporary performance equipment and outside broadcast throughout the building.

LIGHTING

- Supply and installation of all dimmable houselighting and switchable worklight fixtures (both white and blue) in the stage area, auditorium and associated technical areas, including wiring and containment.
- Emergency lighting systems and fixtures, including maintained supplies and any changeover units.
- All general and decorative lighting outside the stage area, auditorium and associated technical areas of each performance space.
- Loose performance lighting fixtures and accessories other than those listed in the accompanying equipment schedules.

CONTROL ROOMS & EQUIPMENT ROOMS

- Control area fit-out.
- SL & AV equipment room fit-out and cooling.

AUDITORIUM

- Secondary steelwork or wood truss reinforcement required for support of performance rigging, stagelighting and audiovisual systems.
- Secondary steelwork or wood truss reinforcement for fixed lighting rigging positions around the various levels of the auditoria, including balcony front rigging rails, etc.
- Fixed rigging positions except those shown in the specialist scope of the stage engineering contractor in the RIBA Stage 4 drawings and schedule.
- Any PPE or fall-restraint systems required for safe access to high-level rigging positions. Custom access solution is ncluded for the high balcony rigging bar.
- DCI compliant cinema systems (it is understood this is not required).

STAGE & BACKSTAGE

- Stage floor and sub-floor construction.
- All floor timber and floor finishes, including all fascia and access hatches / traps and dip troughs to stage floor.
- Rigging beams or any secondary steelwork or reinforcement required above stage to support technical theatre equipment.
- Any temporary get-in rigging and hoists.
- Get-in lift.
- Any raised loading bay, ramps and levellers.
- Material handling equipment - e.g., pallet trucks, forklifts, etc, if required.
- Access equipment other than those cited in Charcoalblue's RIBA Stage 4 equipment lists (note, a push-about MEWP is ncluded as an essential item to facilitate access to luminaires for focussing, as well as a custom fold-out platform for safely accessing the rigging points for lights above the balcony)
- Stage decking for future formats not detailed in the RIBA Stage 4 drawings.
- Rigging accessories and loose items other than those listed in the stage engineering RIBA Stage 4 equipment schedule.

COMMUNICATIONS

- Voice evacuation system (PAVA). Costs do include for show relay and backstage paging system relating to the Guildhall Courtyard and Undercroft venues.
- Staff 'walkie-talkies' or intercom coverage to other areas.
- Security systems of any sort.
- Rooftop satellite receiver / transmitter for live broadcast.
- Building wide ICT systems and WAN/external broadband fibre connections.
- Meeting rooms AV systems.
- Temporary cable routes internally or for outside broadcast access through the building and any associated builders work.

  (Although these will not form part of the specialist packages, we suggest an allowance of £1,200 per pass-through. Refer to CBL drawing 90-01111).

FRONT OF HOUSE AREAS

- General front-of-house display screens, digital signage or large-scale video displays, apart from stage relay and latecomers' screens.
- IT and presentation equipment in any offices, meeting rooms, etc.
- Front of house portable sound systems.
- Exhibition screens or equipment.

SEATING

- All architectural metalwork around seating areas – balcony fronts, handrails, grab rails etc.
- Floor finishes throughout auditorium areas.
- Any loose seating not shown in the RIBA Stage 4 drawings.

GENERAL

- Design contingency has been excluded from the figures above, on the basis that the project carries an overall design contingency.
- Main contractor's discount.
- Main contractor's preliminaries. All specialist sub-contractor preliminaries are included.
- Inflation - costs are as at November 2024.
- Exchange rate fluctuations – much of the performance equipment will be sourced from manufacturers in other countries.
- VAT.

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THEATRICAL INNOVATION | ESTD 2004

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Assumptions:
1. The following assessment provides information about the inherent risks, design risk mitigation/reduction, and residual risks from systems in our intended design. The inherent, mitigated/reduced, and residual risks are present in the use and maintenance of the specified equipment and systems. While some systems' design is able to mitigate/reduce risks for installation, the installation process and risks involved are subject to subcontractor final design, Principal Contractor workflow sequencing, and subcontractor competency/responsibility, including subcontractor risk assessment and method statement for their intended installation. All risks to be reviewed by the specialist subcontractor prior to fabrication and installation, and residual risks included in the subcontractor's risk assessments provided to the Principal Designer and Principal Contractor.
2. Information on the residual risks must also be passed on to the contractors, managers or end users identified.
3. Subcontractors' risk assessments to be included in the O&M manuals, including any residual risks, to allow the Client/End User to manage those risks.
4. All specialist operations to be carried out by competent persons (i.e. those with sufficient training, experience or knowledge), and where necessary, under appropriate supervision.
5. Risk factors identified within are qualitative, not quantitative. The numbers and colour coding are provided as guidance identifying the residual risks for the Client/End User in anticipation of their own Risk Assessment and Method Statements (RAMS).
6. Under CDM 2015 the designer must:
   a. make the client aware of their responsibilites under CDM before construction work starts.
   b. account for pre-construction information provided by the Client and Principal Designer in their design.
   c. eliminate risks to anyone affected by the project, and where necessary, include risk reduction and the control of residual risks.
   d. provide design information to the Principal Designer for inclusion in pre-construction information and their H&S file, and to the Client and Principal Contractor to allow them to comply with their duties.
   e. to communicate, cooperate and coordinate with the design team and contractors.
7. The specialist subcontractor has a 'Designer' role under CDM and, as such, must comply with the above.
8. Post award of contract, the subcontractor must comply with the requirements of the Principal Designer and Main Contractor, and ensure that the Main Contractor is fully informed regarding installation, operation and maintenance risks.

Consider: risks inherent in use and maintenance; how installation and removal may be impacted by Principal Contractor sequencing and final design; safe access for routine maintenance; maintenance and use according to instructions by equipment supplier. Report as part of omissions in the tender process any measures not covered in the specification that are required for safe use.

Risk Factor		Severity				
		1	2	3	4	5
Likelihood	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

Hierarchy of controls	
Elimination	Remove the hazard
Substitution	Replace the hazard
Engineering Controls	Isolate people from the hazard
Administrative Controls	Change or control the way people work
PPE	Protect individuals with equipment

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Risk Factors:		Risk Rating
Likelihood	Severity:	1-4 = Low - Accept or monitor
1= Rare	1= Delay to work/near miss	5-12 = Moderate - Further action required
2 = Unlikely	2 = Minor injury (First Aid administered)	15-25 = High Risk - Mitigation action is required
3 = Possible	3 = Moderate Injury (Recorded 3 day absence)	
4 = Likely	4 = Serious Injury (RIDDOR reportable)	
5 = Certain	5 = Fatality	

Ref	Activity	Hazard	Measures taken in design to eliminate or reduce the hazard		Residual Risk			Manager	Information on the residual risk
				Control	Likelihood	Severity	Rating		
Installation works									
GEN-01	Specialist contractor designing detail of technical theatre systems	Design failing to meet required standards of safety or use	Specialist contractor tender returns evaluated by theatre consultant against the relevant performance specification and advice shared with main contractor/client as to whether the tender return is compliant. Contractor drawings reviewed and evaluated on an A/B/C approval system before going into production. Concerns around suitability or compliance reviewed at the earliest opportunity	Elimination	1	5	5	Specialist Contractor	End user to receive instruction on the safe and appropriate use of systems by the specialist contractor before practical completion Witness testing to be carried out during commissioning of specialist systems
GEN-02	Installing performance equipment in an elevated work location (e.g. on high level roof elements)	Falls from height	None - we expect Main Contractor to design and install temporary scaffolding and platforms whilst the building is a construction site	Administrative Controls	3	5	15	Main Contractor SE Contractor SLAV Contractor	Elevated work platforms, handrails and guarding to be installed by Main Contractor for installation period, where necessary, to be in line with method statements and risk assessments.
GEN-03	Installing performance equipment in an elevated work location (e.g. on high level roof elements)	Falling tools / equipment	None - during construction, we expect all Contractors to secure loose tools and equipment in ine with their RAMS	Administrative Controls	3	5	15	Main Contractor SE Contractor SLAV Contractor	Main Contractor to ensure all sub-contractors have taken this into account in their RAMs
GEN-04	Installing technical equipment from strong points, truss or bars, exceeding load	Structural collapse of part of the building	Performance specification is coordinated with structural engineer to ensure structure and strong points are suitable to carry required loads.	Elimination	1	5	5	Structural Engineer Main Contractor SE Contractor	Specialist contractors to confirm loads of all installed equipment are within design limits. ELL to be shared with End-user before use.
TD-01	Setting out and installing seating	Personal injury from manual handling or crushing	Seating specification includes requirement for seating to be within manual handling tolerances. Seating developed using components that are assembled on site to limit weight	Engineering Controls	2	2	4	Specialist Seating Contractor	Specialist subcontractor to provide sufficient resource, training and time on site to ensure operatives are aware of handling guidelines and have adequate time for installation without 'cutting corners'
TD-02	Setting out and installing seating	Personal injury from use of tools to install seating	Seating specified to use components that are assembled on site, using basic site equipment and power tools.	Administrative Controls	3	2	6	Specialist Seating Contractor	Specialist subcontractor to provide sufficient resource, training and time on site to ensure that staff are provided with appropriate training in use of tools and PPE suitable for the task, in line with their method statements and risk assessments
TD-03	Setting out and installing seating	Falls from height, slips and trips - seating set out over slope / tiered levels / balcony with some uneven surfaces.	Tier risers limited in height throughout.	Administrative Controls	2	4	8	Specialist Seating Contractor	Specialist subcontractor to conduct site assessment and provide sufficient resource, training and time on site to ensure balustrades/temporary handrail systems are in place where necessary.

16140 - ST GEORGE'S GUILDHALL, KING'S LYNN

Risk Factors:		Risk Rating
Likelihood	Severity:	1-4 = Low - Accept or monitor
1 = Rare	1 = Delay to work/near miss	5-12 = Moderate - Further action required
2 = Unlikely	2 = Minor injury (First Aid administered)	15-25 = High Risk - Mitigation action is required
3 = Possible	3 = Moderate Injury (Recorded 3 day absence)	
4 = Likely	4 = Serious Injury (RIDDOR reportable)	
5 = Certain	5 = Fatality	

Ref	Activity	Hazard	Measures taken in design to eliminate or reduce the hazard		Residual Risk			Manager	Information on the residual risk
				Control	Likelihood	Severity	Rating		
Completed building operations / maintenance									
SE-01	Use of all systems	Limbs, hair or clothes getting caught in machinery / crushed by moving parts, trapped or crushed by lift edges	Performance specification includes provision of guards on moving machinery (chain hoist chassis). A residual risk occurs where the hoisting chain ingests into the unit. Hoists are positioned at high level and are not normally accessible unless personnel are positioned close by in the MEWP. Control of chain hoists is via a hold-to-run system on a pendent with line of sight to the room.	Engineering Controls	2	5	10	SE Contractor End User	
SLAV-01	Installing, maintaining, focusing or removing equipment in an elevated work location	Falling tools	None - tools and equipment are not included in the specification	Engineering Controls	3	5	15	End User	End-user to ensure that all hand tools used at height are attached with lanyards, and suitable exclusion zones are managed below high-level working.
SLAV-02	Installing, maintaining, focusing or removing equipment in an elevated work location	Falling equipment	All loose equipment supplied with rated sfety bonds	Engineering Controls	3	5	15	End User	End-user to ensure that all equipment is supplied with safety bonds and that they are used. Suitable exclusion zones to be managed below high-level working.
SLAV-03	Rigging, installation and maintenance of fixtures on hoist bars and fixed bars	Falls from height	System design allows flying bars / trusses to be lowered in to allow rigging, installation and maintenance of equipment at floor level. Performance specification requires ELL to to be identified on each lifting device	Administrative Controls	1	5	5	End User	End-user to ensure their method statements and risk assessments avoid working at height wherever possible
SLAV-04	Rigging, focusing and maintenance of fixtures on hoist bars or fixed bars - where work has to be carried out at high level	Falls from height	Design reduces the need to access equipment at height as much as reasonably practicable. Where access at height is unavoidable, a MEWP is included in the specification for access at height above stage. A set of folding access steps with integrated guardrail is included in the specification for access to rigging bars above the balcony seating.	Administrative Controls	3	5	15	End User	End-user to include use of suitable MEWPs or other access equipment into their method statements and risk assessments
SLAV-05	Connecting fixtures to a power supply, testing fixtures	Electric shock due to faulty equipment	Performance specification requires that all power supplies, dimmers and relays be fitted with RCD devices	Engineering Controls	3	5	15	Specialist SL/AV contractor / End-user	End-user to receive instruction on management and regular testing of RCDs and RCBOs.
SLAV-06	Connection and disconnection of temporary performance equipment from large power panels	Electric shock	All large power panels for connection of temporary equipment to be designed with integral RCDs / RCBOs or variable earth leakage devices.	Engineering Controls	3	5	15	Specialist SL/AV contractor / End-user	End-user to receive instruction on management of RCDs and RCBOs, including variable earth leakage trips on larger panels. End-user to have
SLAV-07	Use of high brightness video projector	Damage to the eye	Projector and lens selection to be compliant with 'Risk Group 2' - safe to use except direct prolonged exposure to lens. Projector placed in controlled area (stage) and operated by competent staff. Projector positioned above head height.	Engineering Controls	3	4	12	Specialist SL/AV contractor / End-user	Projector switching via staff control - information on risk group 2 to be provided within O&M manual
SLV-08	Use of sound reinforcement system	Hearing loss/tinnitus	Sound system positioned away from head height and direct exposure to source. High quality components used to minimise listneign fatigue, audio processor to include for signal limiting.	Administrative Controls	3	4	12	Specialist SL/AV contractor / End-user	End user to monitor staff exposure and provide additional protection if required as part of the operational risk assesment
TD-04	Removing and reinstating removable seating	Personal injury from manual handling or crushing	Seating specification includes requirement for seating to be within manual handling tolerances for one or two person lift. Trolleys to be provided for moving seats	Engineering Controls	3	2	6	Specialist seating contractor / End-user	End-user to receive instruction on the safe and appropriate use of trolley system by the specialist contractor before practical completion
TD-05	Operating seat tip-up or transfer arm catch	Personal injury from finger trap or seat tipping	Seating specification outlines requirement for seating to limit potential for finger trap of moving parts. Seat specification outlines a requirement for seats to be securely fixed and/or to resist weight distributed on the leading edge of the seat pan. Regular maintenance required. Seats to go through thorough prototyping activity to test and mitigate	Engineering Controls	2	2	4	Specialist seating contractor / End-user	End-user to receive instruction on how to maintain seating. Seating manufacturer on hand to offer long term maintenance contracts/warranties where required

F. JCLA Stage 4 Report
Landscape Design

Stage 4 Report_Soft and Hard Landscape

KG214-JCLA-RP-L-6001

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Revision: T01

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Introduction

Stage 4 has entailed the technical design of the landscape for the four areas comprising the Guildhall, resulting in the drawings and specification recently issued for Billing. The landscape package reflects design development and design team co-ordination during the work stage. The presentations to the client team and the National Trust midway through Stage 4 were of great value in confirming and clarifying the scheme content and proposed materials.

This document provides a general update as a companion to the issued drawings and specification. Particular items requiring client comment or further co-ordination are pointed out, as well as changes compared to the Stage 3 design.

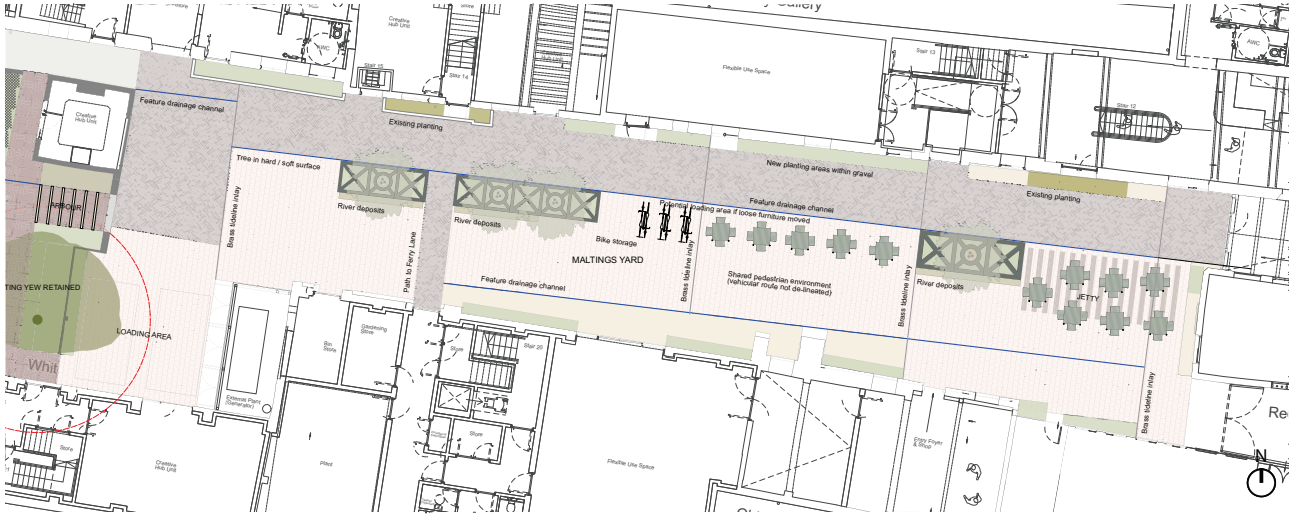
Maltings Yard - Summary of Stage 4 changes

Hard landscape

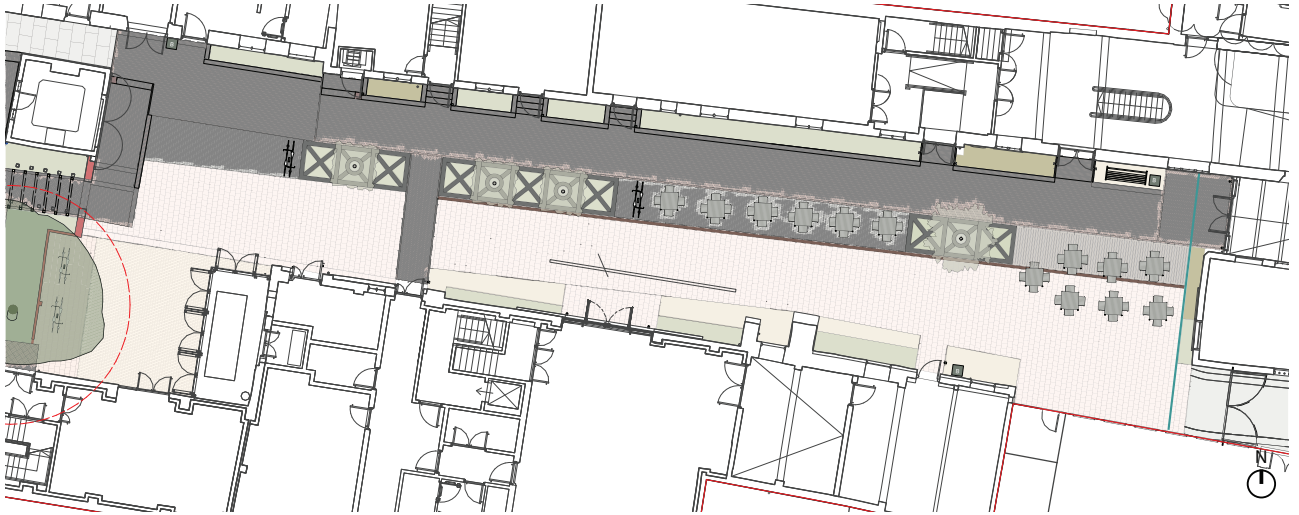
- Layout of brick path from The Guildhall to the Riverside Garden updated
- Existing levels reworked to work with new channel drainage strategy
- Jetty layout adjusted and Concrete Pig Slat panels specified
- Introduction of additional brick areas to align through with Knot Gardens - additional brick type specified
- Width of path from White Barn to North Range increased to 1.5m
- Configuration of gravel areas to north elevation of White Barn changed existing surface retained for entrance to White Barn
- Width of proposed opening in existing wall to White Barn Annexe entrance reduced
- Steps and retaining wall introduced alongside existing wall and Garden House building
- Number of stepped entrances to North Range increased resulting in reworking of levels strategy
- Detail of gates developed
- Specification for loose gravel borders and mulch changed from Limestone to Flint
- Drainage channel and gully covers specified
- Queen mothers bench to be retained
- Timber Espalier Fan trellis and climber grid trellises designed
- Door stop elements added across scheme
- Additional bike stands added to space connecting King Street and Maltings Yard, refer to plan on page 12

Soft landscape

- Extents of planting beds increased and finalised
- Planting specification and planting plans developed
- Extent of existing planting intended for retention has been reduced due to clashes with proposed windows and doors along North Range
- Planting removed within space connecting King Street and Maltings Yard, refer to plan on page 12



Maltings Yard - Stage 3 plan



Maltings Yard - Stage 4 plan

Maltings Yard - Outstanding coordination / Items requiring Client sign-off

See Pictorial spec page 15

Hard Landscape

- Client to approve proposed Hay Palisade loose table and chairs and confirm preferred RAL
- Client to approve proposed drainage elements
- Momentum to confirm areas where existing subbase can be reused below proposed and existing paving.
- Architects to confirm detail for a ‘corduroy’ hazard warning surface to be provided at top to new stepped entrances to North Range (If inside of door likely to be a corduroy matting - details for movement joint to be coordinated
- Architects to confirm increased width of proposed new opening to North elevation of White Barn acceptable, in order to align through with proposed 1.5m width Ferry Lane path running from south to North.
- Input required from accessibility consultant, building control and architects on all proposed metal balustrades/ handrails and stair nosings.
- Design team and client comment required for proposed timber fan espalier and climber grids.
- Design team and client comment required for proposed metal gate
- Setting out drawings to be issued at Stage 5
- Detail for brass strip representing historic riverline to be developed with Hardscape
- Momentum to confirm whether concrete foundations can be reduced in size - sustainability question
- Momentum to input on service covers spec/reuse and repositioning
- Handrails and trellises to be added to GA’s
- Details for all stepped entrances North Range for Stage 5
- Long and short sections through Maltings Yard for Stage 5
- Additional detail required for timber door stop elements, input required from Momentum

HADA /building control feedback required for:

- Brass/ bronze metal inlay 55mm wide to form stair nosings on tread only of proposed brick steps
- Handrail to one side of garden kiosk steps only
- Height of balustrade to garden kiosk retaining wall - purpose to protect from vehicles rather than Part K
- Confirmation that we can avoid handrails to north range steps extending into path .

Soft Landscape

- Client to confirm that inclusion of planting requiring more specialised maintenance is acceptable, i.e. espalier fruit trees, knot gardens with hedges, infill planting and topiarised trees. Refer to Soft landscape and maintenance summary for more information.

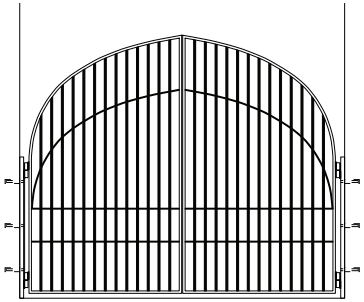
Maltings Yard - Existing site materials to be reused & planting to be kept

Hard Landscape

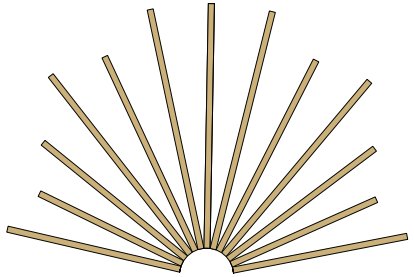
- Queen mothers bench
- Loose stone boulders
- Stone from planter edges
- Paving to be reused, including York Slabs and concrete small element pavers.
- Refer to existing landscape removal plan.

Soft Landscape

- Section of existing Wisteria retained and adapted - West of North range
- Existing Fig to be retained - East of North range
- Existing Fig to be retained and adapted - Red Barn West Elevation



Proposed metal gate to Maltings Yard, refer to details for more information



Example of proposed timber trellis, refer to details for more information

Various existing materials are proposed to be retained for reuse, for example existing York slabs in Maltings Yard. Refer to existing landscape removals plan and proposed landscape plans.

Maltings Yard - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

Inspired by Elizabethan era gardens, a series of knot gardens are inserted into the central yard: low clipped hedges giving a frame to infill plants and trees. Three lime trees are proposed as ‘box head’ specimens, acting as a formal centre piece in the middle of the space. One free-growing cherry give a wider canopy to seating areas. Along the façades espalier fruit trees and climbers provide greening, flower and fruit. The species selected will mainly be ones familiar to the Elizabethans, with the design being a contemporary take on historic planting styles.

Note: The design incorporates a number of planting types that require regular pruning to maintain their shape. These are key to achieve the design goals as agreed with the Client. Careful selection of species and forms aims to ensure this will be as straight froward and easy a procedure as possible, to minimise maintenance requirements as far as possible. Suitably trained personnel should nonetheless be carrying out all pruning works.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of knot garden hedges to maintain specified height and width, allow for 2-3 times a year. Remove and compost arisings.
- Pruning of box head trees to maintain specified dimensions and shape, allow for 2-3 times a year. Remove and compost arisings.
- Annual pruning of espalier trees to maintain fan-trained shape, pruning time to suit species. Remove and compost arisings. Tie branches to trellis system as required.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Annual pruning of herbs, time to suit species. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch if required, to specified depth.
- Allow for watering in periods of prolonged extreme drought, to ensure survival of planting.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Removal of excess amounts of fallen leaves within knot gardens in autumn.

Fan trained fruit trees will green the facades, giving flowering, fruit and a strong architectural value through the year. Fan trained specimens have been selected over more formal types of espalier form, as they are a comparatively easy type of espalier to maintain. Note that trained persons should be carrying out the pruning to ensure no damage to the trees and that desired shape is maintained over time.

Three of the knot garden trees are proposed to be box head specimens, a form of topiary that is relatively easy to maintain. The trees will need to be pruned a few times a year to maintain the original shape and desired dimensions. Trained persons should be carrying out the pruning to ensure the best results.

Example of pruned gerimander hedges in knot garden, giving a formal frame to looser infill planting. Pruning 2-3 times a year will be required to ensure the size and shape of the hedging is retained over time.

Riverside Garden - Summary of Stage 4 changes

Hard landscape

- Incorporation of handrails and balustrades following comments by HADA
- Review of levels throughout
- Detail design brick walls and surface
- Detail design of arbour
- Detail design of Riverside terrace
- Lawned terracing extent reduced
- No dig construction detail within RPA of Yew tree
- Wire trellis detail to sloping path refer to drawings

Soft landscape

- Extents of planting areas finalised
- Planting specification and planting plans developed
- Number of proposed trees reduced from five to four

Riverside Garden - Stage 3 plan

Riverside Garden - Stage 4 plan

Riverside Garden - Outstanding coordination / Items requiring Client sign-off

See Pictorial spec page 15

Hard Landscape

- Drainage coordination with Momentum - potential attenuation in lawn area to remove requirement for flood gates
- River terrace step further detail required
- Client and design team input on all balustrades and handrails
- Client approval for proposed furniture
- Trellis detail to be developed
- Input from Building Control, accessibility consultant and architects on handrail/ balustrade to river wall
- Boundary wall – party wall agreement to be sought, input required from Momentum on detailing of planting against façade with void former
- Setting out drawings to follow at stage 5
- New openings to existing wall markup drawing to be checked with JCLA & contractor on site

Soft Landscape

- Client to confirm if topiarised shrubs should be included. Refer to Soft landscape and maintenance summary for more information.
- The health of the existing yew is to be monitored, allowance has been made for replacement tree, subject to client instruction. Incursion of arbour foundation and brick wall into Yew root protection area to be checked with Arboriculturalist.

Riverside Garden - Existing site materials to be reused & planting to be kept

Hard Landscape

- Bird bath to be set aside/stored for reuse in White Barn Garden
- Concrete flags to be relaid in situ.
- Stone slabs to cafe steps to be retained.
- Cafe steps to be retained, including handrail.
- Sections of existing brickwork to be retained and adapted.
- Refer to existing landscape removals plan

Soft Landscape

- Existing Yew to be retained unless otherwise instructed by client.
- Yew sapling to be moved to a location adjacent to the mature Yew, refer to planting plan.
- Potential relocation of existing herbaceous planting to White Barn Garden to be reviewed in the next stage.

Various existing materials are proposed to be retained for reuse, for example existing flags on the Riverside Terrace. Refer to existing landscape removals plan and proposed landscape plans.

Section/elevation through the Riverside Garden. Various items require further coordination and client sign off, as listed above.

Riverside Garden - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

The planting design reflects orchards, meadows and the medieval ‘mille fleur’ - the flowering mead. A central lawn (maintained as a spring meadow) is given a ‘bejewelled’ meadow fringe - a native meadow mix studded with ornamental plants suited to a meadow management regime. This gives further interest and seasonality, and relate to the Elizabethan’s love for the showy and unusual within the natural world. Historically common fruit trees will form features within the space: quince, medlar, mulberry etc. Scented flowering climbers will grow over an arbour.

Note: There is potential to incorporate topiarised shrubs giving an interesting contrast to the meadow, a more structured feature maintaining its form through the year, also when the meadow is cut. They would also act as a link to the planting within Maltings Yard. These would be of different height and shapes, distributed in a playful way within the meadow to form a set of theatrical ‘characters’ surrounding the outdoor stage. Refer to the Haddon Hall precedents for example images. **Inclusion of topiarised shrubs to be agreed with Client.**

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of fruit trees as required, to maximise fruiting (if desired) and to maintain crownlifted height to ensure no conflict with sightlines/movement within the garden. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis/arbour if required.
- Annual cutting back of meadow in late summer/early autumn. Leave arisings for 1 week to drop seed before removing and composting. If required cut back one more time in autumn. Note autumn flowering bulbs must not be cut.
- Lawn to be maintained as spring meadow: leave unmown in spring, to allow herbs and bulbs to flower. Prune regularly from early May. Note: Agreed paths to be maintained mown through the year. Remove and compost arisings.
- Annual cutting back of herbaceous perennials in planting beds, in late autumn/early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch, to specified depth.

Example of meadow fringe to mown lawn. Topiarised shrubs of varied height act as a playful reference to historic topiary, creating an interesting contrast to the looseness of the meadow planting while retaining structure through the year, also after the meadow is cut back in autumn. Haddon Hall.

Example of structural interest provided by topiarised shrubs in winter, when meadow is cut low. Haddon Hall.

Unusual fruit trees with historical relevance will form feature trees, such as Quince and Medlar, pictured above.

The meadow will contain ‘jewel’ plants, ornamental herbaceous perennials that are capable of being maintained as part of the meadow, i.e. being cut back annually in late summer/early autumn. These plants maximise the ornamental qualities of the meadow, providing more flamboyant flowering within a naturalistic context, a reference to the Elizabethans’ interest in exotic and special plants.

The lawn will be a flowering lawn species mix that can grow tall in spring to allow for flowering, to then be regularly mown for the rest of the year. The flowering lawn, along with the meadow, references the medieval ‘mille-fleur’.

Roses and other scented flowering climbers will grow up a arbour, forming an entrance into the Riverside Garden from Maltings Yard. The climbers may require occasional pruning to maintain their shape. Branches may need to be tied to the support structure.

- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Removal of excess amounts of fallen leaves within meadow.
- IF INCLUDED: Pruning of topiarised shrubs to maintain original shape and size, allow for 2-3 times a year. Remove and compost arisings. To be confirmed with client.

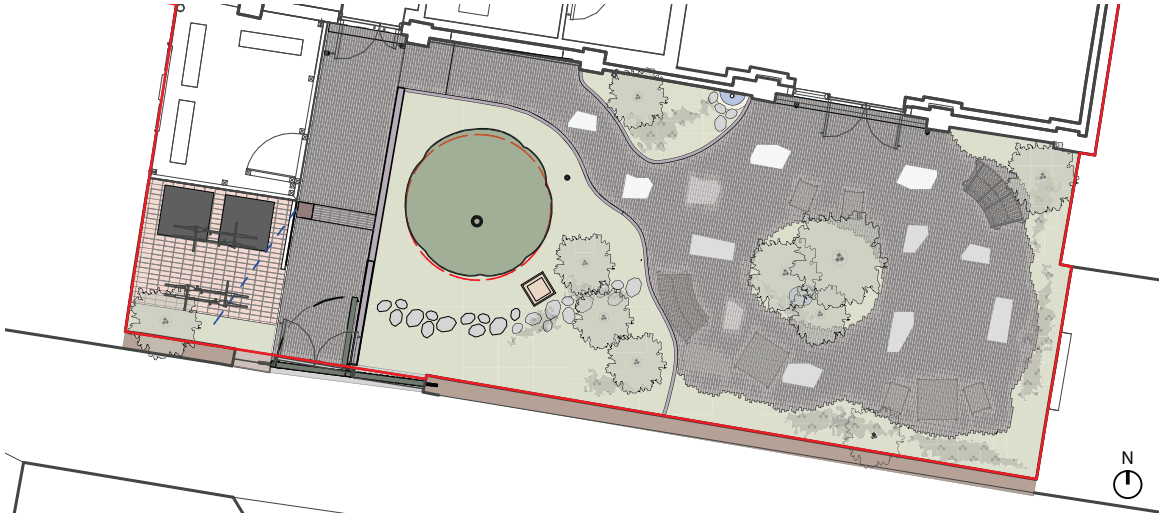
Note: Detailed maintenance instructions to be developed.

White Barn Garden - Summary of Stage 4 changes

Hard landscape
- Overhead trellis wires removed
- Reworking of levels for accessibility & drainage
- Detail developed of brick edges and wall
- Additional Van De Mortel brick type
- Winding path leading into White Barn Garden realigned to avoid root protection area of existing cherry
- Detail of new timber gates developed
- Compost bin area added with reused terracotta pavers

Soft landscape
- Extents of planting areas finalised
- Planting specification and planting plans developed
- Rain garden introduced

White Barn Garden - Stage 3 plan



White Barn Garden - Stage 4 plan

White Barn Garden - Outstanding coordination / Items requiring Client sign-off

See Pictorial spec page 15

Hard Landscape

- Detail of reclaimed stone surface developed requires further detailing at next stage in coordination with contractor
- Compost area added architects to extend plant cladding to conceal compost bins
- Client to approve steel wire trellis spec and detail
- Clients and architects to provide comments on timber gates
- Coordination required with contractor regarding water butt detail
- Setting out drawings to be issued at Stage 5

Soft Landscape

- Coordination to be finalised with Engineer re rain garden drainage/buildup
- Coordination required with Engineer regarding drainage around water butt

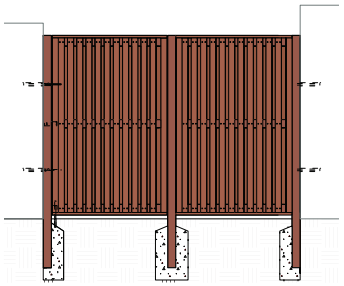
White Barn Garden - Existing site materials to be reused & planting to be kept

Hard Landscape

- Loose terracotta tiles to be kept back for reuse in compost area
- Loose slabs to be kept back to be relaid within brick surface in WBG
- Rounded flint stones to be kept back for reuse on Riverside terrace gravel edge
- Refer to existing landscape removals plan

Soft Landscape

- Existing cherry to be retained
- Mature shrubs around cherry to be retained
- Japanese maple to be retained



Proposed gate and adjacent fence panel to White Barn Garden, refer to details for more information

Various existing materials are proposed to be retained for reuse, for example terracotta tiles and stone slabs in the White Barn Garden. Refer to existing landscape removals plan and proposed landscape plans.

White Barn Garden - Soft landscape and maintenance summary

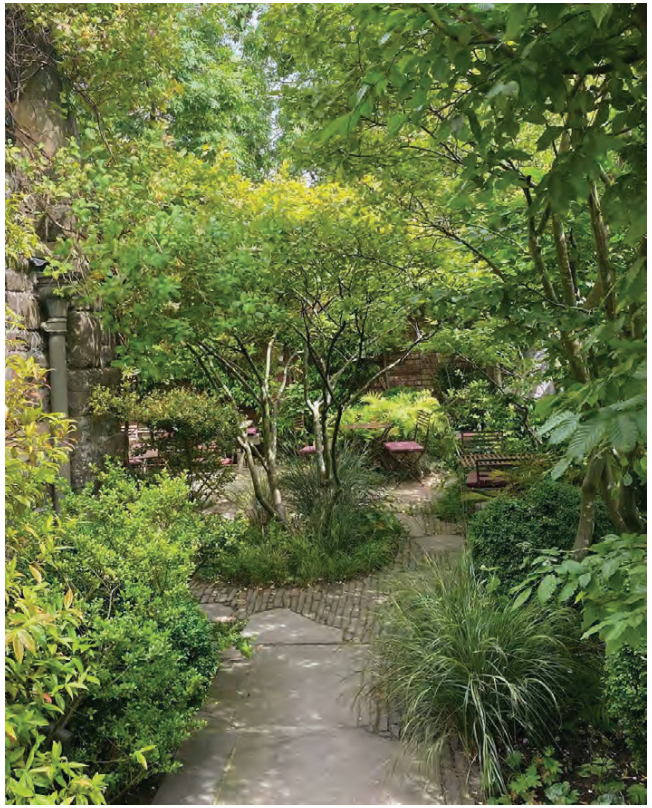
Summary of key soft landscape design principles:

The planting design within the White Barn Garden aims to capture the romance of Shakespeare and the Elizabethan gardens, with a focus on the floral, scented and lush. The overall character will be naturalistic, sensory, rich and generous, providing interest through the year. The species selected will predominantly be ones that were available in the Elizabethan era. A series of small multistem trees and shrubs will give canopy, structure and shelter; and climbers will be used to frame and green the space. A robust shade tolerant understorey will give further interest and seasonality. Some existing planting will be retained, a cherry, a Japanese maple and a group of well established shrubs.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of trees as required, maintaining crownlifted height to ensure no conflict with sightlines and/or movement within the garden. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers, only if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Pruning of shrubs, timing and method to suit species, to maximise flowering. Remove and compost arisings.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch annually, to specified depth.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.
- Allow for watering in periods of prolonged extreme drought, to ensure survival of planting.

Note: Detailed maintenance instructions to be developed.



Crownlifted multistem trees / large shrubs will give structure and canopy to the space. The crownlifted height should be maintained to allow for a rich understorey and to ensure no conflict with sightlines and movement within the garden.

Roses and other flowering climbers will green the walls around the garden. The climbers may require occasional pruning to maintain their shape. Branches may need to be tied to the trellis structure.

Mixed beds of flowering shrubs and ground-cover herbaceous perennials will create a relaxed, romantic and lush character.

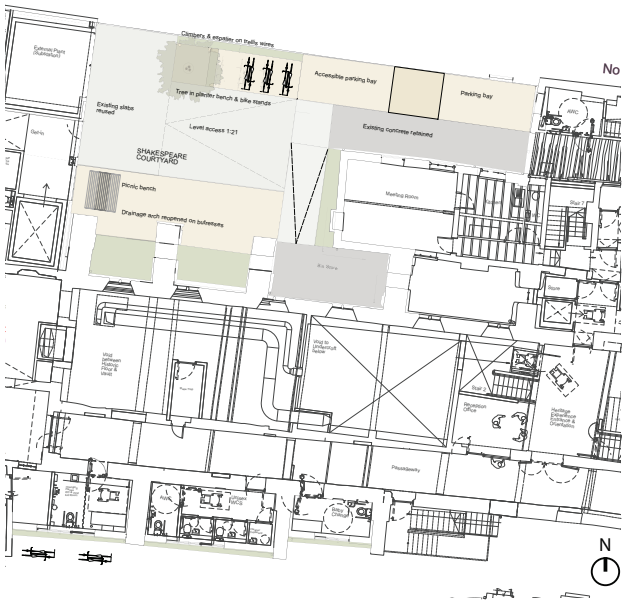
Shakespeare Courtyard - Summary of Stage 4 changes

Hard landscape

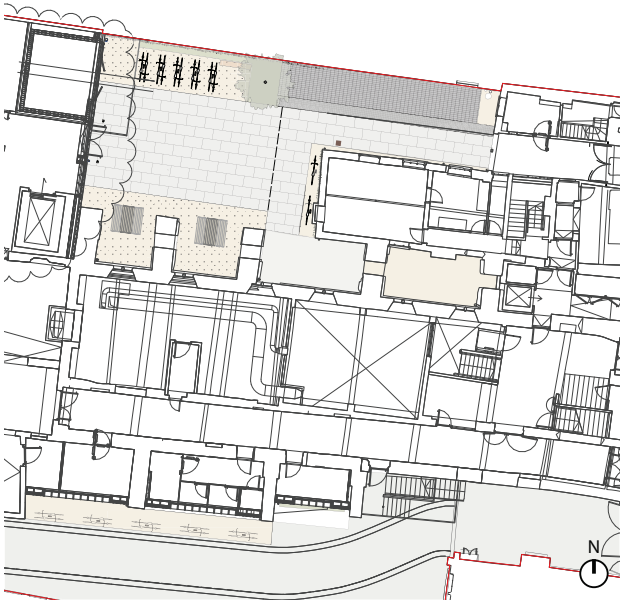
- All levels reworked for accessibility and drainage, vehicular tracking and access to plant room
- Simplification of surfaces with a focus on reuse
- Clay brick surface to parking spaces – size of bays updated for compliance
- New surface to access road due to proposed service trench below ground
- Detail of new metal gates in passageway
- New concrete screed surface to existing area of concrete hardstanding to make good surface following removal of Guildhall fire stair
- Quantity of bike racks increased and repositioned
- Quantity of picnic benches increased and repositioned
- New Gully cover
- Trellis detail developed
- Existing concrete surface removed between the east of buttresses gravel french drain added

Soft landscape

- Extents of planting areas finalised
- Tree in ground rather than raised planter due to existing service routes being redundant
- Raingarden planting areas between buttresses and along west façade of meeting room omitted following comments from national Trust steering group comments
- Planting specification and planting plans developed



Shakespeare Courtyard - Stage 3 plan



Shakespeare Courtyard - Stage 4 plan

Shakespeare Courtyard - Outstanding coordination / Items requiring Client sign-off

See Pictorial spec page 15

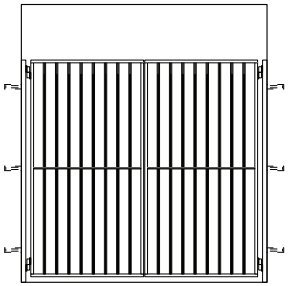
Hard Landscape

- Momentum drainage input: can existing channels be removed and French drain added as per our plan to pick up existing downpipe/runoff
- Momentum input on service cover spec and repositioning, replacement Gully cover
- Input required from UKPN confirming reinforced gravel outside plant room is OK
- Client and architect to provide comment on metal gate details including removal of existing gate at street entrance
- Potential for one of picnic benches to need paving below for accessibility
- Client approval of wire trellis detail
- Setting out drawings to be issued at Stage 5

Shakespeare Courtyard - Existing site materials to be reused & planting to be kept

Hard Landscape

- Staffordshire Blue clay pavers to be relaid in situ
- Refer to existing landscape removals plan



Proposed gate to Shakespeare Courtyard, refer to details for more information

Various existing materials are proposed to be retained for reuse, for example Staffordshire blue clay pavers in the Shakespeare Courtyard. Refer to existing landscape removals plan and proposed landscape plans.

Shakespeare Courtyard - Soft landscape and maintenance summary

Summary of key soft landscape design principles:

The planting within the Shakespeare Courtyard will give a green frame to the space, creating a relaxing environment for the staff seating area. A fig tree gives canopy and shelter, accompanied by climbers and a robust understorey of ground-cover perennials. The fig and grape vines offer fruit that can be picked by the staff.

Outline maintenance principles:

- Regular watering during the establishment phase, to ensure successful establishment and growth of all plants.
- Pruning of fig trees as required, to maintain crownlifted height and ensure no conflict with vehicular movement. Remove and compost arisings.
- Remove fallen fruit and compost.
- Pruning of climbers. Grape vines should be pruned annually to maximise fruiting. If this is not a priority, they can be left to grow more freely, only pruned if required to maintain desired shape and/or size. Remove and compost arisings. Tie climber branches to trellis if required.
- Annual cutting back of herbaceous perennials, in late autumn/ early winter, to ensure tidy appearance of planting areas. Remove and compost arisings.
- Allow bulb leaves to die back naturally, do not cut back when green. Allow bulbs to colonise.
- Regular weeding of all planting areas.
- Regular removal of litter.
- Topping up of mulch if required, to specified depth.
- Regular check for health and performance of all planting. Remove deceased/damaged branches/leaves. Replant failed planting in the next appropriate planting season.

Note: Detailed maintenance instructions to be developed.

A fig tree will give canopy, shelter and light shade within the courtyard, as well as fruit. The tree will be crownlifted to allow for vehicular movement within the space, and to give clear sightlines throughout.

Grapevines form a calm green backdrop to the space, with ornamental leaves as well as fruit. To maximise fruiting pruning should be carried out annually, but the vines can also be allowed to grow freely.

Robust ground-cover perennials, such as lady's Mantle and hardy geraniums will provide additional greening and seasonality, while suppressing weeds in the planting beds.

Pictorial Specification

Proposed bicycle rack
Manufacturer: Vestre
Product: 686C Vroom bicycle rack, small, casting into ground.
Dimensions: 200 x 800mm
Finish: Hot-dip galvanized PPC coated RAL tbc to match other metal work.

Maltings Yard, Shakespeare Courtyard

Proposed bin
Manufacturer: Streetlife
Product: Box Bin Extra Slim
Dimensions: 400 x 400 x 970mm
Finish: Powder coated

Maltings Yard, Shakespeare Courtyard

Proposed drainage channel
Manufacturer: Lateral Design Studio
Product: Aquascape Poly-Concrete Channel Drain with Cast Iron Edge "Interlaken" Grating
Dimensions: 498 x 125mm
Finish: Cast iron, allow for powder coated. RAL tbc.

Maltings Yard

Proposed drainage gully cover
Manufacturer: Lateral Design Studio
Product: Interlaken Cast Iron Square Gully Cover
Dimensions: W 297 mm x L 297 mm x H 28.7 mm
Finish: Cast iron, allow for powder coated. RAL tbc.

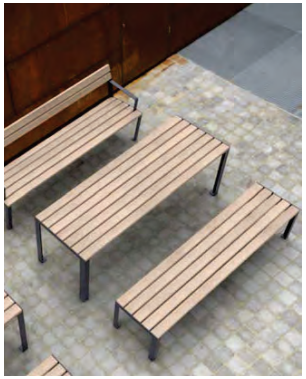
Maltings Yard, Shakespeare Courtyard, White Barn Garden

Proposed compost bin
Manufacturer: Biohort
Product: MonAmi
Dimensions: 1020 x 1020 x 840mm
Finish: As manufactured

White Barn Garden

Proposed timber bench
Manufacturer: Streetlife
Product: Drifter Bench, without backrests, with galv steel bases
Dimensions: 2000 x 300mm
Finish: As manufactured, allow for powder coating of supports, colour tbc

Shakespeare Courtyard



Proposed picnic bench and table
Manufacturer: Miramondo
Product: Strada Larchwood Bench without backrest and table
Dimensions: 1950 x 460 x 430mm, table 1950 x 650 x 700mm
Finish: Powder coated

Shakespeare Courtyard

Proposed curved bench
Manufacturer: Hay
Product: Palissade Park Dining Bench, Inward facing (concave)
Dimensions: 1590 x 790 x 800mm; seat height 450mm
Finish: Powder Coated

White Barn Garden

Proposed armchair and coffee table
Manufacturer: Hay
Product: Palissade Lounge Chair Low and Low Table
Dimensions: armchair 730 x 810 x 700mm seat height 380mm; table 815 x 860 x 380mm
Finish: Powder Coated

White Barn Garden

Proposed tables and chairs
Manufacturer: Hay
Product: Set of Palissade Table and 4 Stacking Chairs
Dimensions: Chairs 470 x 560 x 800mm; seat height 450mm; Square Table 900 x 830 x 750mm
Finish: Powder Coated

Riverside Terrace, Maltings Yard

JCLA
JONATHAN COOK LANDSCAPE ARCHITECTS LTD

Each section below contains a number of possible hazards.
They are not exhaustive.
Add hazards and numbers to the end of the section as necessary. Hide hazards not relevant.
Fill in relevant blank sections.

CDM Designer's Hazard Elimination & Management Schedule

Project Name: St George's Guildhall

Prepared by: CP

Checked by: JC

Date	Revision	Description
27.02.25	T1	Tender

Client: National Trust

RIBA Workstage: 4

Ref	Hazard Identification (unusual or significant)	The Risk	Persons at Risk	Risk Reduction Proposals (including design decisions)	Activity Stage	Status
	ONLY Significant or unusual hazards are included in this register	Identify the risk and the effects on health	Construction workers/ Public/ End Users/ Maintenance workers	List options considered and agreed/proposed solution required to eliminate or reduce risks. **If not possible, what information will be passed to the contractor to control the risk? List and name the relevant documentation for relevant material.**	Design/Construction/ Maintenance/ Use/Demolition/ Alteration	Open, closed or residual
Project Description: address, no. of buildings, no. of storeys, type of use, type of site, if includes demolition or enabling, new-build or refurbishment or remediation, type of structure, type(s) of façade(s)				**Guidance** RAG list by the HSE The General Principles of Prevention (Appendix 1 of L153 Managing Health & Safety in Construction; CDM Regulaitons 2015) CDM 2015 - Construction work sector guidance for designers published by CIRIA CDM 2015 - Workplace 'in-use' guidance for designers published by CIRIA		
0.0	Demolition/enabling Works (Not within Landscape Architect's scope Refer to Engineer's / Principal Designer / Contractors information)					
1.0	Existing structures below ground level (Refer to Engineer's / Principal Designer / Contractors information for structural / drainage elements outside of Landscape Architect's scope)					
1.1	Potentially live services below ground	Death or injury	Construction workers	Design and position of all below ground landscape features to suit required exclusion zones and potential protected archaeological elements	Design/ Construction	Open
1.2	Buried historical services and pipes	Potential disturbance when reworking ground levels. Burst pipe. Damage to artefacts	Construction workers	Exact locations of buried historical services to be identified via surveys, historical mapping and trial pits. Avoid lowering levels directly above services identified. If unavoidable, proceed slowly with extreme caution, assume service is live.	Design/ Construction	Open
1.3	Existing foundations	Structural collapse / damage to historically significant & listed structures	Construction workers	Exact locations and details of foundations identified via surveys and trial pits. Design of landscape elements foundations consider existing foundation details and positions	Design/ Construction	Open
1.4	There are potentially other existing below ground structures. Subject to confirmation by Archaeologist.	Structural collapse / damage to artefacts	Construction workers	Design and position of all below ground landscape features to suit required exclusion zones and potential protected archaeological elements	Design/ Construction	Open
2.0	Existing elements & structures above ground					
2.1	There are existing above ground structures on the site	Structural collapse/ damage to artefacts/ injury	Construction workers / Public / End users / Maintenance workers	Phasing / CMPs to be developed by relevant parties, including details of how objects are protected during works e.g. temporary fencing / controlled access / works by hand. Refer to Heritage impact statement. Suitable remedial works carried out to existing facades and relevant existing elements within the hard landscape e.g. steps, balustrades. Sufficient maintenance carried out to ensure existing elements are in good condition & safety of users is not compromised	Design/ Construction/ use demolition	Open
2.2	There are existing components insecure or likely to be dislodged by the wind, including trees in poor condition at risk of falling in high winds. Refer to arboriculturists information	Structural collapse / injury / damage to artefacts, buildings, walls & surfaces	Construction workers / Public / End users / Maintenance workers	Refer to Arboriculturist's information regarding Existing Yew Tree which is Category U.	Design/ Construction/ use demolition	Open
2.3	There are live services within existing above ground structures	Death or injury	Construction workers / Public / End users / Maintenance workers	Refer to M&E Consultant's information.	Design / Construction/ Use / Demolition	Open
3.0	Interface with Adjacent Properties, General Public and Off-site Operations					

Ref	Hazard Identification (unusual or significant)	The Risk	Persons at Risk	Risk Reduction Proposals (including design decisions)	Activity Stage	Status
3.1	Pedestrians have right of way close to or adjacent to the site. Primarily along Ferry Lane and King Street	Unauthorised access; injury	Construction workers / Public / End users / Maintenance workers	Controlled access to site whilst work is undergoing. Appropriate temporary and permanent boundary treatments applied.	Design / Construction/ Use / Demolition	Open
3.2	It is legally or physically impractical for a contractor to get access to work on boundary walls from the neighbours' side	Unauthorised access; injury	Construction workers/ Maintenance workers	Any landscape elements interfacing with boundary wall designed in a way that construction and maintenance can be carried out from side of wall within the site.	Design / Construction/ Demolition	Open
3.3	The location of the access off the public highway affects the safety of pedestrians and road users. Particularly as a result of restricted entrance passage into site	Injury; collision with moving vehicles	Construction workers	Refer to Contractor's information when available	Construction	Open
3.4	The building is close to premises that are sensitive to noise, dust and vibration etc such as surrounding domestic residents and businesses along King Street	Health issues: e.g. auditory, respiratory; loss of amenity/use	Construction workers	Refer to Contractor's information when available	Construction	Open
4.0	Access for Safe Construction					
4.1	Access into site and manoeuvring space for vehicles is heavily restricted	Injury/ damage to historically significant & listed buildings and structures	Construction workers/ End users/ Maintenance workers	Refer to Contractor's information when available for access plan and restrictions. Intercom control points at gates to control delivery/ maintenance vehicles entering into site	Design/ Construction	Open
5.0	Site Works					
5.1	It is a potential that temporary construction loads will endanger the stability of new retaining structures	Injury	Construction workers	Refer to Engineer's information.	Construction	Open
5.2	Earth moving or other works may affect the stability of existing earth retaining structures by increasing or decreasing surcharge loads	Injury/ damage to historically significant & listed structures	Construction workers	Refer to Engineer's information.	Construction	Open
5.3	Potential for temporary construction loads - building materials and waste materials to provide sheltering opportunity to invertebrates, amphibians, reptiles and small mammals	Death or injury to animals	Construction workers/ Maintenance workers	All building materials and waste materials will be stored above the ground, such as on pallets or in skips respectively. Refer to Ecologists information	Construction/Maintenance/ Demolition/Alteration	Open
5.4	Any excavations create holes for animals to fall into	Death or injury to animals	Construction workers/ Maintenance workers	Excavations will not be left open overnight, or fitted with egress boards sloped at a shallow angle. Preferably all excavations will be backfilled at the end of each working day or covered overnight to prevent animals from falling in. Refer to Ecologists information	Construction/Maintenance/ Demolition/Alteration	Open
5.5	The location of structures or below ground services means excavating through areas of contaminated ground	Health issues: e.g. auditory, respiratory; loss of amenity/use	Construction workers/ Maintenance workers	Refer to site investigation reports Inform PM if contaminated soil is encountered	Construction/Maintenance	Open
5.6	The location of structures or below ground services mean excavating close to existing live services	Death or injury	Construction workers	Design and position of all below ground landscape features to suit required exclusion zones and potential archaeological elements Refer to Engineer's information	Construction	Open
6.0	Water Related					
6.1	The River Great Ouse (a statutory main river) lies directly west of the Site. There are areas of tidal water on or near the site	Injury/ Drowning/ Disturbance to river habitat	Construction workers/ Maintenance workers	Ensure that there is an adequate method of preventing falls on to the mud or into the river and for retrieving persons Environment Agency Flood Warning System and establish an evacuation procedure Protective measures in place to protect river habitat from damage and disturbance	Construction/Maintenance/ Demolition/Alteration	Open
6.2	There are river flood defence structures on or near the site	Flooding	Construction workers/ Maintenance workers	Identify flooding risk if any alterations are made to river wall	Construction/Maintenance/ Demolition/Alteration	Open
6.3	Risk of contamination to watercourses by spills on site.	Health issues for river and people	Construction workers/ Maintenance workers	Protective measures in place to protect river course. Provide COSHH assessments as required.	Construction/Maintenance/ Demolition/Alteration	Open

Ref	Hazard Identification (unusual or significant)	The Risk	Persons at Risk	Risk Reduction Proposals (including design decisions)	Activity Stage	Status
6.4	The site or surrounding area has a history of flooding	Drowning	Construction workers/ Maintenance workers	Identify flooding risk	Design/ Construction/ Use	Open
7.0 Fire Related						
7.1	Flammable materials	Structural collapse / injury	Construction workers/ End users/ Maintenance workers	Specify treated timbers, especially for construction stage safety as well as end use	Design/ Construction	Open
7.2	Vegetation exposed to long period of drought may increase spread of flames	Death or injury	End users/ Maintenance workers	Watering schedule proposed and appropriate species to prevent drying out	Design// Maintenance	Open
9.0 External Works						
9.1	The weights of external works materials are kept to a minimum, e.g. paving materials	Injury	Construction workers	The weights of external works materials are kept to a minimum, e.g. paving slabs, kerbs	Design / Construction	Open
9.2	Works around existing trees, falling objects and branches, working at height	Falls from height Injury	Construction workers/ Maintenance workers	Works to be carried out by professional and suitably trained contractors Protective fencing to be set up where required, according to Arboriculturally information and Tree Protection Plan	Construction/Maintenance/ Demolition/Alteration	Open
9.3	Consider bats, birds, newts and other fauna with regard to their breeding seasons and relocations	Death or injury (to wildlife)	Construction workers	Refer to Ecologist's information	Construction	Open
9.4	Identify steep falls, slopes and embankments which can increase site access costs and difficulties during construction and maintenance	Injury / fall risk / Programme delay	Construction workers / Public / End users / Maintenance workers	Design suitable gradients and ramped routes to suit standard maintenance operations and Building regs compliance. Contractor to consider access requirements and additional safety measures in high fall risk locations	Design / Construction	Open
9.5	Consider poisonous or aggressive vegetation such as Japanese knotweed that can take considerable time to eradicate, or cause significant damage if ignored	Damage to structures / assets	Construction workers / Maintenance workers	Non identified so far. Ecologist to advise whether further surveys or mitigation measures are required	Construction / management/ Maintenance	Open
9.6	Consider tree roots and avoidance of killing trees during construction and causing structural damage to permanent structures	Damage to trees or structures	Trees / Public / Construction workers	Proposals to be co-ordinated with arboriculturists to ensure protective measures and method statement in place. Refer to Arboriculturist's information for further detail	Design / Construction	Open
11.0 Cleaning & Maintenance						
11.1	There may be light fittings, cctv cameras, illuminated signs etc mounted externally that are normally inaccessible from ground or floor level.	Falls from height	Maintenance workers	Allow for clear access / avoid obstructions and minimise need to work at height where feasible. External landscape proposals to be co-ordinated with M&E proposals.	Maintenance	Residual
11.2	The use of mobile access equipment used for cleaning and maintenance is likely to be restricted by steep falls and changes in levels e.g. grass terraces, west of Maltings Yard,	Falls from height	Maintenance workers	Maintenance team to develop strategy that minimises use of servicing vehicles during opening hours to avoid conflict with visitors	Maintenance	Residual
11.3	External landscaping layouts will affect access for cleaning and maintenance e.g. planted areas around buildings, deep planting beds in the White Barn Garden	Injury	Maintenance workers	Allow for stepping stones within deep planted areas for maintenance of buildings, planting, walls & structures	Maintenance	Residual
12.0 Hazardous materials, asbestos, dust and fumes etc						
12.1	Setting out of bricks blocks/pavers may mean excessive site cutting - **silica dust**	Respiratory diseases	Construction workers	To be minimised and dust suppression strategy implemented	Construction	Open
12.4	There are on-site solvent-based adhesives - gases, fumes	Respiratory diseases	Construction workers	To be eliminated or minimised Carry out COSHH assessments for adhesives/materials	Construction	Open
12.5	There are epoxy-based materials that generate toxic fumes	Respiratory diseases	Construction workers	To be eliminated or minimised	Construction	Open

Ref	Hazard Identification (unusual or significant)	The Risk	Persons at Risk	Risk Reduction Proposals (including design decisions)	Activity Stage	Status
12.4	Excavating, re-levelling and creating new planted areas in areas of contaminated ground. Gas contaminated soil in Shakespeare's Courtyard	Health issues: e.g. auditory, respiratory; loss of amenity/use	Construction workers	Refer to site investigation reports Inform PM if contaminated soil is encountered Further localised surveys required in areas of new planting to identify presence of contaminants. Design to be developed accordingly Imported material / soils to be tested to meet relevant standards	Construction	Open
12.5	On-site welding - fumes	Electric shock, fumes, gases, cancer, asthma and other health conditions	Construction workers	Look to eliminate or use alternative cold joining techniques	Construction	Open

G. Fire Surgery Stage 4 Report
Fire Engineering

THE FIRE SURGERY

St George's Guildhall, King's Lynn

Borough Council of King's Lynn & West Norfolk

Fire Strategy Report, RIBA Stage 4

Revision 1

Project Number: P23-041

Report Number: 250328R0F1 – P23-041

Date: 28th March 2025

Revision	Revision 0	Revision 1	Revision 2	Revision 3
Author	Marshall Nyamuchiwa	Marshall Nyamuchiwa		
Position	Fire Engineer	Fire Engineer		
Reviewed by	Andrew Nicholson	Andrew Nicholson		
Position	Director	Director		
Comment	Draft issue for design team comment.	Final issue for tender.		
Date	24/01/25	28/03/25		

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Contents

1 Executive Summary

This is a Draft RIBA Stage 4 fire strategy report that outlines all key fire safety design areas for the proposed redevelopment of St George's Guildhall, King's Lynn.

The intention is to show that the current scheme design can viably fulfil the fire safety principles necessary to meet the functional requirements of Part B the Building Regulations 2010. These recommendations incorporate the recommendations of the National Trust Design Standards. Where the recommendations of the National Trust Design Standards exceed those for life safety, this is highlighted throughout this report in red text.

This report is based upon the recommendations of BS 9999: 2017 — Code of practice for fire safety in the design, management and use of buildings. The report is supplemented by guidance of the Association of British Theatre Technicians (ABTT), Technical Standards for places of entertainment (2015), referenced in this report as the Yellow Guide.

The intention of the design is to benchmark to current guidance, as compliance is not always possible or expected with a grade I listed building. Where the design does not meet current guidance, alternative fire engineered, and risk-based solutions are outlined to meet the functional requirements of Part B of The Building Regulations (2010). For existing non-compliant arrangements, the approach adopted for the fire strategy is to provide improvements where it is practical to do so. This was achieved through consultation with relevant stake holders (the client, design team, Norfolk Fire and Rescue Service and the Approved Inspector (AISCS) for RIBA Stages 2).

The most significant improvement to life safety and property protection will be the provision of a sprinkler system to most buildings on site. The main drivers for providing sprinkler protection were for property protection and the need to improve firefighting conditions due to limitations with firefighting access to the existing site. Although sprinklers are not required according to guidance recommendations, this provision provides significant benefits to life safety for the existing buildings through controlling a fire in its early stages and to enhance the protection to existing elements of structure, external fire spread to adjacent buildings and firefighting operations. Sprinklers are not provided for the main Guildhall as they are unlikely to be effective in the large auditorium and they would adversely affect the aesthetic. This was agreed by all stakeholders.

A risk based approach has been applied to develop the fire strategy for the structural fire performance across the site. New load bearing elements of structure will be protected to the recommended period in guidance. For existing buildings, a risk-based approach has been developed on whether the structure is to be exposed (to express the historic details) and the likelihood of fire below the structure and the consequence for the upper floors. Where the risk is considered high, proprietary fire lined boards are proposed. The sprinkler system is also used to show adequate structural fire performance.

Other existing constraints means that the design will not achieve the recommended exits widths and dedicated protected escape stairs for means of escape. For these areas, the B1 functional requirements of The Building Regulations are met through outlining compliant travel distances to final storey exits and the provision of alternative escape routes (to separate adjacent fire compartments).

In summary, the design for the scheme was developed by considering the fire strategy holistically i.e. benchmarking to current fire safety guidance and the National Trust Design Standards, identifying key areas of non-compliance and assessing the fire risk that these arrangements will pose to life safety, through the development of fire engineered and risk-based solutions to address areas of non-compliance that would pose an unacceptable risk to life safety; and recommendations of realistic management procedures that can be upheld throughout the life cycle of the building.

1.1 Building description and project brief

The proposed scheme is to redevelop the existing buildings at St George's Guildhall. On the site, there are seven buildings adjoined to the main Guildhall building consisting of 29 King Street, Shakespeare Barn, Backstage, Red Barn, Former Fermoy Gallery, Players Workshops, and the Riverside Restaurant. The White Barn, White Barn Annexe and the Old Warehouse are adjoined to each other, and detached from the main set of buildings. There is a Linen Store that stands independently towards the set end of the site.

The Guildhall and its adjoined buildings have a footprint of ca. 1480m^2. The highest top occupied floor (G+1) in the existing Guildhall itself was measured to be ca. 5.8m above ground level. The highest top occupied floor (G+1) from the proposed redevelopment works is measured at 3.7m above ground level (the new Gallery floor is discounted as it does not exceed 50% of the Guildhall floor area).

The White Barn and its Annexe has a footprint of ca. 500m^2. The existing White Barn is a single storey building. The proposed works introduces a new floor at G+1 level where the new height to the top occupied floor will now be ca. 2.6m above ground level.

The proposed works consist mainly of redeveloping the internal layouts and it is our understanding that there limited proposed works to the external building envelopes. The works aim to improve accessibility by the provision of four new lift installations (three in the main Guildhall buildings and one in the White Barn building).

1.2 Evacuation strategy

As the buildings at St George's Guildhall have interrelated escape routes and are in close proximity, all buildings are designed on a simultaneous evacuation strategy. This arrangement is to be discussed and confirmed by the client.

The simultaneous evacuation strategy is based on a two-stage fire alarm regime, for all buildings on site, in line with section 3.1.10 of the National Trust General requirements for fire alarm systems and also the Yellow Guide for the Guildhall (when there are members of public present).

The Guildhall fire alarm system is to be operated under a two-stage regime at all times, and this arrangement deviates from the Yellow Guide recommendation to revert to a single stage regime when there no members of the public present. This arrangement is deemed to be acceptable for the Guildhall as there will be a significant number of staff present on site during hours of operation due to a wide variety of functions provided by the premises. This arrangement allows for smoke detection incidents to be adequately investigated, even when there are no members of public present in the Guildhall.

Smoke detection in the Guildhall and lobbies adjacent to the Guildhall will be silenced by a smoke inhibit switch for performances or rehearsals that consist of smoke/ haze effects only. During a 'smoke inhibit' mode, the mechanical

smoke ventilation system (MSVS) will not be activated by smoke detection. In this arrangement, the operation of the MSVS will be activated by a manual release/ activation control located adjacent to the Guildhall control desk. For this arrangement, the Guildhall control desk should be manned at all times to allow for the operation of the manual release/ activation control immediately after confirmation of a fire incident in the Guildhall.

1.3 Means of detection and warning

All buildings at St George's Guildhall will be provided with an enhanced category L1/P1 fire alarm system to BS 5839 part 1 . The Guildhall and adjacent dressing rooms, Red Barn/ North Range foyer and Shakespeare Barn (FOH) buildings are to be provided with a voice alarm (VA) and Public Address (PA) system in the form of a live voice alarm.

1.4 Guildhall occupant capacities

During shows consisting of fire loading on the stage area, the Guildhall should have a maximum combined occupancy of 304 patrons (stage, screen passage, auditorium, performers gallery and auditorium gallery) plus ca. 10 performers and 5 staff members. This is limited by the ASET/ RSET analysis conducted for the Guildhall.

When there is no fire loading on the stage area, there is scope to have more occupants (up to 510 people). These events with a significant amount of people in the Guildhall should be supported by an event fire risk assessment.

1.5 Vertical means of escape

Some of the stairs are to be provided with clear widths that are sub-1000mm. These stairs are anticipated to provide egress for a maximum of 50 people therefore this arrangement is deemed to be acceptable.

Some stairs will have final exits widths less than the stair. The exit capacity of these stairs was based on exit width factors for the smaller final exit.

Escape stair 9 is the only escape route from the Shakespeare Barn roof plant. This stair is not provided with lobby protection and the mitigation measure provided was to provide fire resisting partition and fire door on the ground floor , with alternative egress provided through the alternative escape stair 10 from G+1 floor.

Overall, the vertical means of escape to be provided is deemed to be acceptable as outlined in section 1.5 of this report.

1.6 Horizontal means of escape

Some exits are proposed to provide sub-800mm clear widths with the maximum clear width limited by existing constraints of the buildings being grade I listed. These exits are anticipated to provide exit capacity for a limited number of people (maximum of 13 occupants) hence these arrangements were deemed to be acceptable.

All travel distances are measured to be within the prescribed limits therefore the proposed layouts are acceptable. The arrangement were an alternative escape route for the riverside restaurant WCs areas on the basement floor is to be provided through the adjacent kitchen was deemed to be acceptable due to the following reasons.

- This alternative escape route will be used by a maximum of ca. 8 people.
- There will be a short travel distance within the kitchen to escape stair 12 exit measured to be ca. 6m.
- As the area used for this escape route is along a circulation space from equipment in the kitchen to the dining area, it is reasonable to expect this area to be clear of obstructions.

There is a small section where the external escape routes are adjacent to 29 King Street external walls. After allowing for a separation distance of 1.8m, there will be an escape route width of 0.5m. This arrangement was deemed to be acceptable as the external walls are on masonry construction (reasonably expected to provide an adequate fire resistance for means of escape), the openings are at a height of at least 0.9m above the walking surface, and the evacuation period can be expected to have completed (due to the provision of an enhance means of detection system) before a fire develops to an advanced stage to adversely affect the integrity of the openings adjacent to this external escape route.

Overall, the horizontal means of escape is deemed to be acceptable as outlined in sections 4.5 and 4.6 of this report.

1.7 Evacuation of people with mobility impairments

For areas with stepped access provided with a lift installation, the lift installations are suitable for evacuation. Carry up/ down procedures using evacuation chairs are to be used as a secondary means to assist the evacuation of people with mobility impairments. There should be a management plan for escape for those requiring assistance.

1.8 Fire suppression

Given the complicated layouts, heritage listed status and difficulty in firefighting access, The Fire Surgery carried out a detailed sprinkler feasibility study during RIBA Stage 2. Various fire suppression options were considered and eventually it was decided that a sprinkler system would be effective across the site. Due to the adverse impact on the heritage features of the Guildhall building, sprinkler provision to this building was deemed not to be practical. Sprinkler protection will also not be provided to the building at No. 29 King Street due to the constrained nature of this building and the limited scope of refurbishment works, and the Linen Store. All other buildings will be provided with sprinkler protection.

During the pre-consultation fire service meeting, Norfolk Fire and Rescue indicated that it would be useful for a pump in inlet to be provided to the sprinkler water storage tank so that the fire service can supplement the water supply. The water storage tank is therefore to be provided with this pump in inlet.

The sprinkler tank and pumps are to be provided in the existing basement cellar rooms. Previously at RIBA Stage 3, there was a limited amount of space available in this area therefore the sprinkler tank was to be rationalised to a volume of 49.4m^3. At RIBA Stage 4, an allowance of a sprinkler water storage with capacity of 55m^3 has been made, and this arrangement is compliant with BS EN 12845.

Cooking areas in kitchens are to be provided with a local fire suppression system under extraction hoods.

1.9 Structural fire resistance, compartmentation and fire resisting construction

The retention of existing protection to elements of structure was considered to be acceptable, cognisant that remedial structural works would be impractical due to the listed status of the buildings, and the proposed works will not increase the massing of the existing buildings.

Practical improvements will be made to existing floor structures through the provision of fire rated ceilings providing a period of at least 30 minutes fire resistance from the underside.

The char rate calculations (conducted by Momentum) shows that the existing timber beams achieve a period of at least 30 minutes structural fire resistance and could potentially maintain their integrity up to a period of 60 minutes.

The existing timber beams are therefore considered to provide adequate structural fire resistance. New exposed joist floorboards and beams are to be protected from the underside by fire rated ceiling providing a period of 30-minute fire resistance to enhance the floor structural fire resistance.

The new Guildhall gallery floors will not be provided with any structural fire resistance; this arrangement was deemed to be acceptable due to the following reasons.

- These floors do not support any structural stability elements to the existing structure and are provided to support floors for seating.
- The Guildhall will be provided with an enhanced means of smoke detection, hence any fire incident will be identified during the early stages. The galleries will be occupied by a limited number of people, resulting in quick evacuation periods from these floors. This arrangement is substantiated by the evacuation calculations outlined in the ASET/ RSET analysis report in Appendix C of this report. Any occupants on these galleries are therefore reasonably expected to have evacuated from the Guildhall by the time a fire reaches an advanced stage to adversely affect the structural integrity of these floors.

The roof plant floor supporting the Guildhall smoke extract fans will not be provided as a 120-minute fire resisting floor. This arrangement was outlined not to compromise the life safety of occupants in the Guildhall.

1.9.1 Guildhall void

There is a void beneath the Guildhall that extends a length of ca. 32.6m. According to BS 9999, a void in a single room is permitted without cavity barriers if the void does not extend more than 40m, and surfaces facing the void meet at least class C-s3, d2. This void is considered to extend across a single room hence this cavity is permitted not to be provided with cavity barriers as no dimension exceeds 40m. However, there will timber surfaces within this void, hence the surfaces exposed to the void will not meet at least class C-s3, d2. This arrangement is considered to be acceptable for this arrangement as fire detection is to be provided in this void, using an aspirating system. The provision of fire detection resulting in the early evacuation of the Guildhall before extensive unseen fire spread that could adversely affect means of escape remote to location of origin.

1.10 Stage areas

For the Guildhall, the proposed open stage arrangement is to be supported by the provision of mechanical smoke ventilation from above the stage area operating at an extraction rate of 7.5m^3/s. The introduction of a gallery level was justified through of a fire engineered solution based on conducting an ASET (Available Safe Egress Time)/ RSET (Required Safe Egress Time) analysis.

The ASET/ RSET analysis was conducted at RIBA Stage 3 and the report is provided in Appendix C. The results of this analysis show satisfactory performance of the mechanical smoke ventilation system to maintain tenable conditions in the Guildhall for escape, with varying safety margins. The results of this analysis are subject to approval from Sweco Building Control, a third-party reviewer and Norfolk Fire and Rescue.

For the flexible performance space in the Undercroft, ventilation is not required for the stage area due to its small area and no presence of seating at height. This arrangement is to be agreed with Sweco Building Control. This is commensurate with other studio theatre designs.

1.11 External fire spread

It is acceptable to retain existing external fire spread conditions (limited alterations to the building envelop). Nonetheless, an external fire spread assessment for the existing buildings, and proposed alterations was outlined in section 7 of this report.

The external walls at St Georges' Guildhall consist of masonry construction. Brick walls are inherently non-combustible therefore the external walls at St George's Guildhall are reasonably expected to provide an adequate level of fire resistance.

For external walls that coincide with the site boundary, there are small openings in these façades that are estimated to provide areas of 1m^2, however, some openings in the same fire compartment are within 4m of each other. It is considered acceptable to retain these arrangements as the proposed works improve on the existing external fire spread conditions through the provision of a sprinkler system.

On the South Range south elevation, there are new openings proposed in the external wall that coincide with the site boundary line. Each of these openings are to provide a maximum area of 1m^2 and there will be a minimum separation distance of 4m between openings in the same fire compartment. This arrangement is in line with guidance recommendations.

For façades 1 and 9 (see section Figure 37 for references), there are no adequate separation distances for the façades to be fully unprotected. These external walls consist of masonry construction therefore they are reasonably expected to provide adequate fire resistance for external fire spread. The external fire spread assessment for these façades was therefore based on the openings in these façades. For both façades, the available separation distances are adequate for the existing and new openings to be fully unprotected.

There are adequate separation distances for all other façades (at least 1m away from relevant boundaries) to be fully unprotected.

1.12 Access and facilities for the fire service

Although fire service access to the Guildhall (and adjoined buildings) based on perimeter access may be in line with current guidance, there is significantly extended travel distances for the fire service from King Street to the most remote sections of this building.

Firefighting will be improved by the sprinkler system which was acknowledged by Norfolk Fire and Rescue Service. They recommended for the provision of a pump in inlet to the water storage tank for use by the fire service to supplement water supply, which will be provided as part of these works.

Water supply for firefighting will be provided from existing public hydrants along King Street.

1.13 High level fire strategy principles

The following bullet point list highlights the key features of the fire strategy:

- All buildings on site are to adopt a simultaneous evacuation strategy. This will be based on a two-stage fire

alarm regime.

- A category L1/P1 fire detection and alarm system in accordance with BS 5839-1. This will be supplemented by a public address or live voice alarm system (Type V2) in accordance with BS 5839-8.
- Provision of refuge points equipped with emergency voice communication systems to BS 5839-9.
- The use of the lift installations as evacuation lifts to assist egress of personnel with mobility impairments to BS 9999, BS EN 81-20 and BS EN 81-70. This is to be supplemented by carry up/ down procedures using evacuation chairs by staff members.
- Emergency lighting in accordance with BS 5266.
- Emergency signage will be provided throughout the building to BS ISO 3864-1, BS EN ISO 7010 and BS 5499-4. Light emitting signage is to be provided to in the Guildhall.
- Under current guidance, loadbearing elements of structure should be protected to achieve a period of at least 30 minutes fire resistance. All remedial works to elements of structure for all buildings are recommended to be provided to a period of 60 minutes fire resistance to meet guidance of the National Trust Design Standards.
- Internal fire compartmentation is specified in accordance with BS 9999 and the National Trust Design Standards.
- 60-minute fire and smoke curtain (1no) to enclose the Shakespeare Barn kitchen.
- 120-minute fire and smoke curtain (1no) to enclose the lift for evacuation on the G+1 floor.
- A mechanical smoke ventilation system above the Guildhall stage. Ductwork for this system is to be fire rated to 60 minutes to BS 13501-3 and the fans should be able to withstand elevated temperatures to BS 12101-3.
- Automatic sprinkler system to BS EN 12845 in all buildings except the Guildhall section and No. 29 King Street building.
- A DC isolator switch (disconnectors that isolate the lines between solar modules and inverters) for the use by the fire service. Additional design fire safety recommendations and management procedures for these PV panels are outlined in section 7.3.2 for further consideration.
- Secondary back up power supply to life safety systems including (non-exhaustive list):
    - Fire alarm system – integral battery,
    - Emergency lighting – integral batteries to individual units and a central battery system,
    - All lift installations – life safety generator,
    - Mechanical smoke ventilation fans – life safety generator,
    - Sprinkler system pumps – life safety generator.
- Implementation of ‘Adequate’ level 2 fire safety management regime in accordance with BS 9999.

2 Introduction

2.1 Introduction

The Fire Surgery have been commissioned to develop the fire strategy for the proposed redevelopment at St George's Guildhall, Kings Lynn.

This report is for the RIBA Stage 4: Technical Design. It builds upon the fire strategy principles outlined in the RIBA Stage 3 fire strategy report referenced: *240524R0F0P23-041 - St Georges's Guildhall Stage 3 Fire Strategy Report*. This was consequently supported by a RIBA Stage 3 addendum design note referenced: *240709DN3F0-P23-041 St Georges Guildhall Stage 3 Addendum*.

The objectives of this fire strategy report are to provide a strategy that demonstrates that the design complies with the functional requirements of the Building Regulations 2010 for Part B, Fire Safety.

The report is to be used for design team coordination of the fire safety systems and for discussion with the Approving Authorities. There is background text to support the engineering solutions for the benefit of the Approved Inspector and the Fire Authority. For ease of reference for the design team and cost consultant, a summary of the design fire safety provisions is provided in Section 10.2.

This report is intended for the sole use of Borough Council of King's Lynn & West Norfolk (BCKL&WN) and their design team for St George's Guildhall. It should not be used in full or in part to support any other scheme.

Changes to the design of the building may invalidate the proposals of this scheme and therefore the report will need updating by the project fire engineer.

This report is a performance specification for fire safety. The detailed design of systems is by designers and contractors but shall be meet the requirements of this fire strategy.

2.2 Approvals

The design is subject to formal approval by Sweco Building Control (the Approved Inspector for the scheme). AIS Chartered Surveyors (AISCS) were the appointed Approved Inspector for the scheme at RIBA stages 2 and 3 and were in agreement with the principles in this report. It will be necessary to undertake a statutory consultation with Norfolk Fire and Rescue Service (NFRS).

A pre-statutory consultation meeting was conducted on the 19th February 2024 with Michael Brown and Timothy Harper-Allison of NFRS. The Fire Surgery presented the proposed fire strategy principles for the scheme. The meeting notes are presented in Appendix D of this report outline the fire strategy aspects discussed and agreed with NFRS. This RIBA Stage 4 fire strategy report incorporates some of these aspects of the fire strategy discussed during this meeting.

2.3 Applicable legislation

The primary pieces of legislation relevant to this project are:

- The Building Regulations 2010, for the refurbishment, and
- The Regulatory Reform (Fire Safety) Order 2005, for the ongoing management, and
- The Building Safety Act 2023.

2.4 Guidance documents

BS 9999: 2017 is the primary design guidance used for the fire strategy for this project. This is supplemented by the guidance of ABTT, Technical Standards for places of entertainment (2015), referenced in this report as the Yellow Guide.

The National Trust Design Standards were incorporated to provide additional protection beyond life safety to the building fabric.

2.5 General principles

BS 9999 states that fire safety measures and procedures etc. need to take into account the particular circumstances of the individual building or complex concerned. With regards to applying recommendations outlined in this guidance document, it is noted that existing buildings, especially historic buildings, often pose problems which are unlikely to arise in new buildings. It elaborates that historic buildings are usually listed and permitted alterations can therefore be limited without the agreements of the appropriate authorities, where the latter may agree to limited modifications to improve life safety where in turn there will be added long-term protection and preservation of the original building fabric.

According to BS 9999, fire precautions need to be seen as a whole, a package aimed at achieving an acceptable standard of fire safety. In modifying existing structures, if the new work can be shown not to have a negative impact on the remainder, it is possible that no work will be needed on the remainder, although it might be possible to offer improvement as good practice. Whilst existing buildings need not be retrospectively subject to the same standards as new buildings, however, it is important that designers apply the general principle that the safest practicable design is to be sought, and that the prior existence of an unsafe situation is not allowed to persist if it is practicable to provide remedy.

2.6 Alternative fire engineering solutions

The Building Regulations identify the above approach as an acceptable method of achieving fire safety in buildings.

Fire safety engineering can provide an alternative approach to fire safety. It may be the only practical way to achieve a satisfactory standard of fire safety in some large and complex buildings and in buildings containing different uses e.g. building of heritage and cultural interest. Fire safety engineering may also be suitable for solving a problem with an aspect of the building design. The British Standards Institute recognises the importance and advantages of fire engineering and performance-based design solutions over prescriptive-based designs. The advantages of performance-based design include:

- A design which specifically addresses a building's unique aspects and enables the realisation of architectural and client aspirations which may otherwise be restricted by standard design codes; and
- A logical basis for the development and selection of alternative fire protection options based on the project's needs and budget; and
- A strategy in which fire protection systems are integrated, rather than designed in isolation; and
- A strategy, in which other aspects of the building design, such as security, can be integrated.

Proposed fire engineering solutions to be applied at St George's Guildhall consist of the following:

- An ASE/ RSET analysis to support the open stage and gallery seating arrangement in the Guildhall. This is to consist of mechanical smoke ventilation above the stage to maintain tenable conditions for escape and demonstrated with CFD modelling to determine the ASET.
- Fire risk-based approaches to the structural fire resistance to existing elements of structure.
- Fire risk-based approaches for assessment of external fire spread.

2.7 Automatic Suppression

Given the complex arrangement of existing buildings on site, the heritage listed status and challenges for firefighting access, a feasibility study was undertaken in RIBA stages 2 and 3 on the use of automatic suppression systems in the building. The outcome of this study was that an automatic sprinkler system would be beneficial in most areas of the buildings on the site. Automatic sprinklers to the Guildhall itself was not considered practical as this would be difficult to fix to the existing timber ceiling and would compromise the heritage features. However, buildings adjacent to the Guildhall and areas considered higher fire risk will be provided with sprinklers. The system will be designed to BS EN 12845.

2.8 Fire strategy objectives

The primary objectives of the fire strategy are to meet Part B functional requirements of the Building Regulations 2010. This is concerned with life safety of the occupants and fire fighters.

The fire strategy considers single accidental fires of those associated and most likely to occur in assembly building and restaurants.

The principles of the strategy are to demonstrate occupants on a fire floor can escape into places of relative safety (protected lobbies and escape stairs) in a reasonable time.

Any text within this fire strategy highlighted in blue indicates any item that will require a positive management response from the client/ responsible person(s) for the building in terms of whether design assumptions can be delivered in practice, and items that must be specifically accounted for as part of the premises fire risk assessment (where required under the Regulatory Reform (Fire Safety) Order 2005).

2.8.1 National Trust Design Standards

The building is owned by the National Trust given its grade one listed heritage status. The National Trust have specific recommendations with regards to fire safety. These are to provide additional protection beyond life safety to the building fabric which include enhance levels of automatic fire alarm and detection and greater levels of compartmentation.

The fire strategy principles outlined in this report also meet the relevant National Trust Design Standards (NTDS) as outlined in Table 1 below. Where recommendations of the NTDS are above recommendations for life safety, this is highlighted throughout this report in red text.

NTDS document	Statutory requirements	Reference report section
Fire Safety in projects	Part B1-B5 (Functional requirements of The Building Regulations 2010).	Sections 4 to 9 for Fire safety specification. Appendix A for Fire safety management.
	Regulation 38 – Fire Safety Information.	To be provided in the RIBA Stage 6 report at handover.
	Regulatory Reform (Fire Safety) Order 2005.	Fire Risk Assessment (FRA) out of scope for the fire strategy. FRA to be completed by a competent fire risk assessor.
	Construction (Design & Management) Regulations 2015. HSG168 fire safety in construction.	Managing fire safety in construction out of scope for the fire strategy. This is to be completed by the main contractor/ principal designer in RIBA Stage 5.
Fire Protection in Buildings June 2018	Part B3 (Internal fire spread - structure)	Section 5.
General requirements for fire alarm systems	Part B1 (Means of detection and warning)	Section 4.2.
Emergency lighting	Part B1 (Means of escape)	Section 4.8.
Service Penetrations & Hidden Voids June 2018	Parts B2 and B3 (Cavities and Protection of openings and fire-stopping)	Sections 5.4, 5.7, 5.8 and 5.9.

NTDS document	Statutory requirements	Reference report section
Water Supplies for Firefighters	Part B5 (Fire mains and hydrants)	Section 9.7.

Table 1: Reference of the National Trust Design Standards

2.9 Fire safety management

Fire safety in buildings is a balance between the technical systems within the building and how the building is then used and managed. It is not possible to rely solely on the technical provisions in the building, and an active role on the part of the management is essential. It is therefore necessary that the building is used as intended in this report and that the systems are managed appropriately.

As with all buildings, there will be standard fire safety management requirements for the day to day operation of the building. It is a fundamental assumption that features described within this fire strategy will require management and maintenance throughout the life of the building.

Managing fire safety is a process that lasts throughout the life of a building, starting with the initial design, which is intended both to minimize the incidence of fire and to ensure that if a fire does occur, appropriate fire safety systems (including active, passive and procedural systems) are in place and are fully functional.

Effective management of fire safety can contribute to the protection of the building occupants in many ways:

- By working to prevent fires occurring in the first place,
- By monitoring the fire risk on an on-going basis and taking appropriate action to eliminate or reduce risk,
- By being aware of the types of people in the building (such as disabled people, elderly people, children, pregnant women, etc.) and any special needs,
- By ensuring that all of the fire safety measures in the building are kept in working order and in particular that the means of escape are always available,
- By providing adequate means for the fire service to effectively gain access to the building should a fire occur,
- By taking command in the event of a fire until the fire and rescue service arrives,
- By updating the Fire Strategy for changes in the use of the building.

Upon completion, building management will need to undertake fire risk assessments and emergency plans and have these available for inspection by the fire service at any time. This should typically be undertaken annually by a competent person and is carried out to ensure that the fire strategy is upheld throughout the life of the building and that the risk of fire is kept low. Text highlighted in **blue** in this report highlights items/ issues that need to be considered specifically as part of any fire risk assessments for this building.

BCKL&WN will commission a fire risk assessment of the building before the building is occupied. This fire risk assessment will typically be updated annually, or when there are significant changes in the building, and this will be the responsibility of BCKL&WN.

Specific areas of management required for this building include:

- Implementation and maintenance of an ‘Adequate’ fire safety management level 2 system to BS9999: 2017 (see Appendix A).
- Completion of fire risk assessments and emergency plans for the building.
- When the Guildhall fire alarm is put into ‘smoke inhibit’ mode for performances with smoke/ haze effects, the Guildhall control room should be manned at all times to allow for the operation of the manual release/ activation control immediately after confirmation of a fire incident in the Guildhall.
- The occupation of the Guildhall with more than 304 audience members is to be supported by an event fire risk assessment. For these events, there should be no fire loading on the stage area.
- The main entrance/ reception area is it to be maintained as a fire sterile area, with limited equipment associated with use of a reception area.
- The final exit from the entrance/ reception area opens against direction of escape; this final exit should be held open in a fire evacuation to prevent its swing hindering the evacuation process.
- Any access into the electrical switchgear room (ground floor) and comms room (ground floor), accommodation adjacent to the escape stair 9 final exit route, is to be managed such that it will be out of operation hours.
- The exit from escape stair 13, onto the main courtyard, is to be opened and maintained in an open position by staff members during a confirmed fire event.
- Disabled person evacuation procedures. Adequately trained members of staff are to be provided, when members of the public are in the building, to operate the lifts in a fire emergency to evacuate personnel with mobility impairments.
- Maintaining all fire safety systems.

It is strongly recommended that the client/ responsible person(s) for the premises ensures that the above items (and all other areas highlighted in ‘blue’ text within this report) are adequately defined and are specifically accounted for as part of the premises fire risk assessment(s), as required under the Regulatory Reform (Fire Safety) Order 2005.

3 Building Description

3.1 Introduction

St George's Guildhall is the biggest guildhall that has existed since the medieval period. The oldest recorded performance at the Guildhall was in 1445 making the building the oldest operating theatre in England. It is widely speculated that William Shakespeare performed in the Guildhall in 1453, making the building the only theatre in the world that can reputably claim to have hosted the revered artist.

The building is Grade I listed by Historic England and was built between 1410 and 1430. The location of St George's Guildhall is surrounded by warehouses used by ancient merchants, making the wider setting of the building one of national importance. The building itself is constructed of brick dressed with ashlar limestone.

Figure 1: St George's Guildhall (exterior tom the left and interior to the right)

The site consists of the St George's Guildhall building itself and a group of buildings facing two linear courtyards that extend from King Street and the River Ouse.

The Guildhall building is mainly accessed from an entrance lobby and box Office at ground level from Kings Street on the east side. The Guildhall is abutted on the first floor to 29 King Street on the north side, with an archway leading to the Shakespeare Courtyard and the Shakespeare Barn. The latter is a 20th Century framed structure with painted brick walls.

To the westside of the Guildhall building is the Fermoy Gallery and the Red Barn, providing spaces for exhibitions and rehearsals. At the far end of this building is the restaurant in an area formerly used as historic warehouses overlooking River Ouse.

Towards the southside of the Guildhall and adjacent buildings is a long and narrow courtyard with a raised terrace overlooking River Ouse. Facing the Guildhall buildings to the south side are a range of buildings consisting of the White Barn, the Old Warehouse and some workshops. These buildings are abutted to 27 King Street on the east side (a building which is not part of the scope covered by the proposed works).

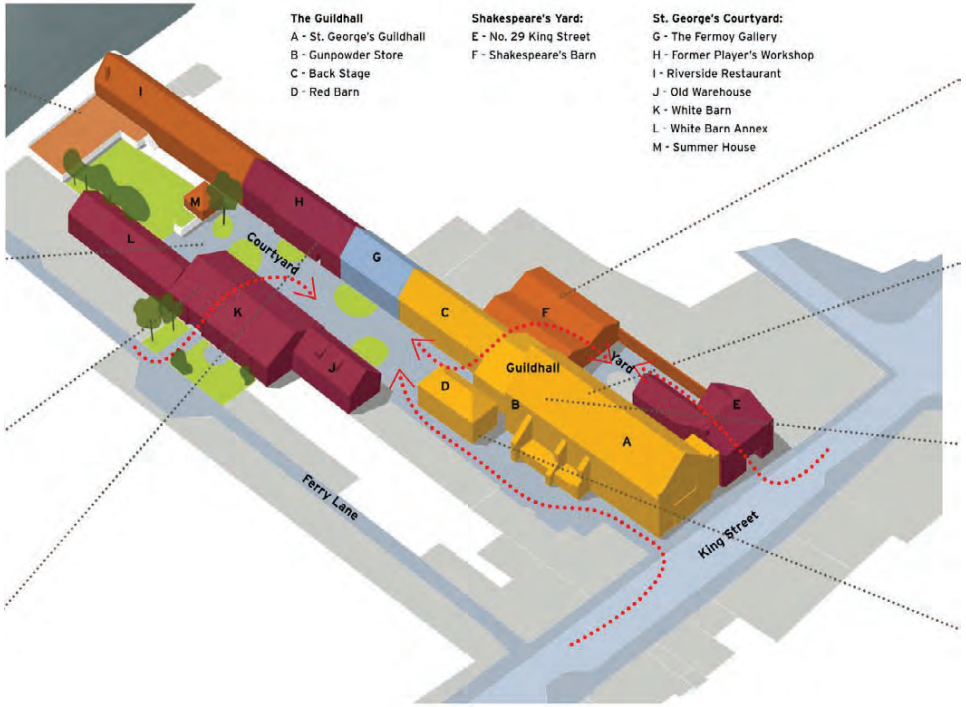


Figure 2: St George's Guildhall site and associated buildings within the scope of the proposed works (courtesy of Forster Wilson Size)

3.2 Scope of works and design brief

The proposed scheme is to redevelop St George's Guildhall to restore and reveal its rich heritage and facilitate for cultural activities to engage the local community and visitors. The aspiration is to provide for a welcoming, accessible and flexible building to serve a wide range of users.

There is a need to improve the existing Guildhall to enhance engagement between the stage and the auditorium to provide for a wide variety of performances and other events. A seating capacity of up to 300 seats is desired for larger capacity audiences. There is an aspiration for the Guildhall to be wheelchair accessible for both audiences and performers.

The Fermoy Gallery currently provides space for visual arts to complement the overall artistic offering for the site. This building is to be improved to provide flexible usage and the current display, access and retail offering. The former Fermoy Gallery is to be provided as café space with the Gallery moved to the White Barn building.

The Red Barn has a generous ceiling height which currently allows for a versatile space. The space within this building is to be used for exhibition for tours or as a retail space and other small functions.

The White Barn, Fermoy Gallery and Players Workshop are to be converted from its current use as a workshop and storage space to provide workspaces for artists, retailers and small creative enterprises.

The proposed works will also improve building services, with the following relevant to the fire strategy:

- Mechanical supply and extract ventilation to auditorium.
- Local mechanical supply and extract ventilation to rooms without opening windows.
- Controls for mechanical plant and equipment.
- Electrical distribution (including power to and containment for general lighting, production lighting and sound equipment; public address, personnel-location and call services; radio and television installations).
- Intruder alarm system and access control.
- Fire detection and alarm.
- Earthing and bonding.
- Passenger lifts and goods lifts (provided to be suitable for evacuation purposes).

As part of the design brief, there is an aspiration for accessibility improvements to the Guildhall. These works include the provision of main public entrances with level thresholds and powered doors and wheelchair positions in the theatre, in accordance with Part M of the Building Regulations, which requires the number of spaces to be 1% of the seating capacity or 6, whichever is the greater.

As part of developing the fire strategy for the proposed works, a design brief request was noted to ensure minimal alteration to historic fabric.

3.3 Building heights

The existing Guildhall (and abutted buildings) building storey heights (top occupied top floor) were measured from the access level as follows:

- 4.5m to the highest back seating level in the Guildhall auditorium,
- 4.0m to the stage level,
- 5.8m to the backstage projection room on the G+2 level,
- 3.0m to the first floor of the backstage area,
- 2.1m to the tunnel vault level (below access level).

The proposed Guildhall building storey heights are measured from the access level as follows:

- 6.4m to the top of the performer's and auditorium gallery levels to be introduced in the Guildhall auditorium,
- 4.0m to the Guildhall and backstage area G+1 floor levels.

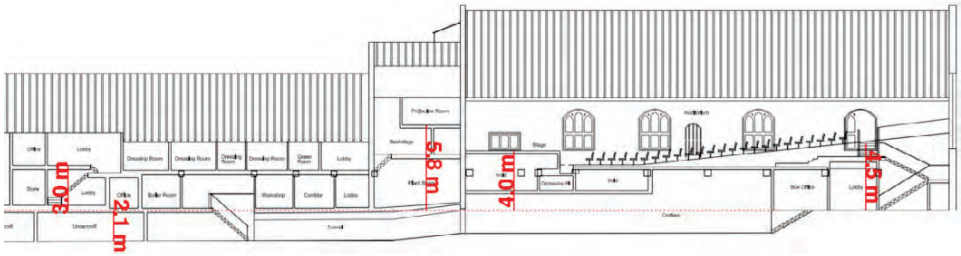


Figure 3: Height of the top occupied level (existing Guildhall and Backstage areas)

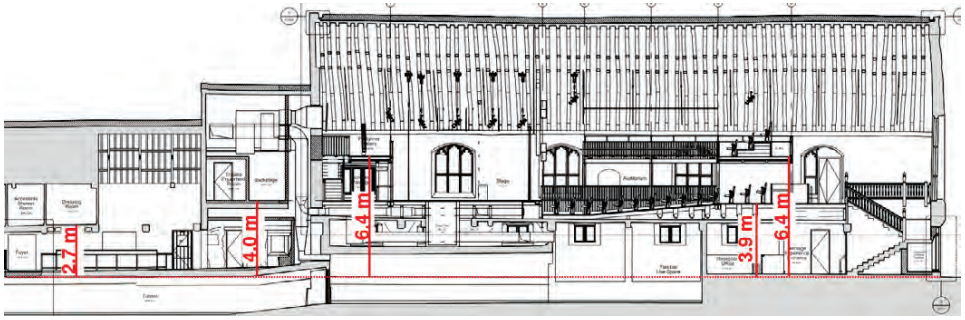


Figure 4: Height of the top occupied level (proposed Guildhall and Backstage areas)

The building structural fire resistance is based on the building height to the top occupied floor. The highest level in the existing Guildhall and adjacent buildings was ca. **5.8m** to the G+2 level (backstage projection room).

The proposed works removes the backstage projection room (G+2 level) and introduces a gallery level at 6.4m above access level. According to BS 9999, a storey is defined as part of a building comprising all the rooms that are on the same level including any gallery having an area of more than half that of the space into which it projects. The proposed gallery floors (auditorium and performer's) are measured to be ca. 27% of the Guildhall (stage, auditorium and antechamber) therefore the storey height can be measured to the lower Guildhall G+1 level at **4.0m** above access level.

The proposed roof level is proposed to consist entirely of plant equipment therefore it can be disregarded as the highest top occupied floor.

All other buildings (Players Workshop, Riverside Restaurant, Red Barn, Old Warehouse and White Barn) have at most one storey above ground, with the highest first floor level being ca. 2.6m above access level.

3.4 Architectural drawings

This report is based on the drawings and information supplied by Haworth Tompkins Architects (refer to Table 2 below).

Drawing Number	Title	Date	Rev
STGG-HTL-ZZ-B1-DR-A-01-00099	Existing basement plan	07/08/23	01
STGG-HTL-ZZ-00-DR-A-01-00100	Existing G+0 plan	07/08/23	01
STGG-HTL-ZZ-01-DR-A-01-00101	Existing G+1 plan	07/08/23	01
STGG-HTL-ZZ-02-DR-A-01-00102	Existing G+2 plan	07/08/23	01
STGG-HTL-ZZ-03-DR-A-01-00103	Existing roof plan	07/08/23	01
STGG-HTL-ZZ-ZZ-DR-A-01-00200	Existing sections	07/08/23	01
STGG-HTL-ZZ-B1-DR-A-00-00099	Proposed Basement plan	28/02/25	11
STGG-HTL-ZZ-00-DR-A-00-00100	Proposed G+0 plan	28/02/25	12
STGG-HTL-ZZ-01-DR-A-00-00101	Proposed G+1 plan	28/02/25	11
STGG-HTL-ZZ-RF-DR-A-00-00103	Proposed roof plan	28/02/25	11
STGG-HTL-ZZ-ZZ-DR-A-00200	Proposed Section AA	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00201	Proposed Sections FF + GG	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00202	Proposed Sections CC + DD	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00203	Proposed Sections HH + BB	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00204	Proposed Sections JJ + EE	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00205	Proposed Sections KK + LL	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00206	Proposed Sections MM + NN	28/02/25	10
STGG-HTL-ZZ-ZZ-DR-A-00207	Proposed Sections RR	28/02/25	03
STGG-HTL-ZZ-ZZ-DR-A-00208	Proposed Sections SS	28/02/25	01

Table 2: Drawing List

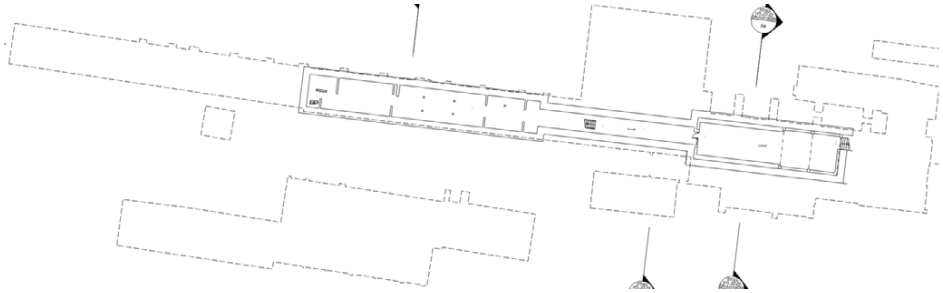


Figure 5: Existing basement plan

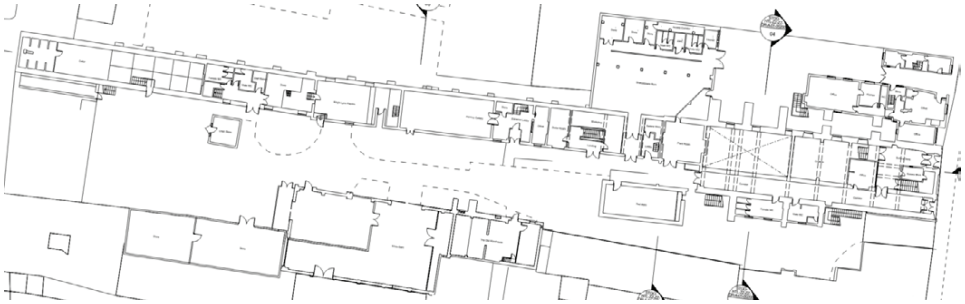


Figure 6: Existing G+0 plan

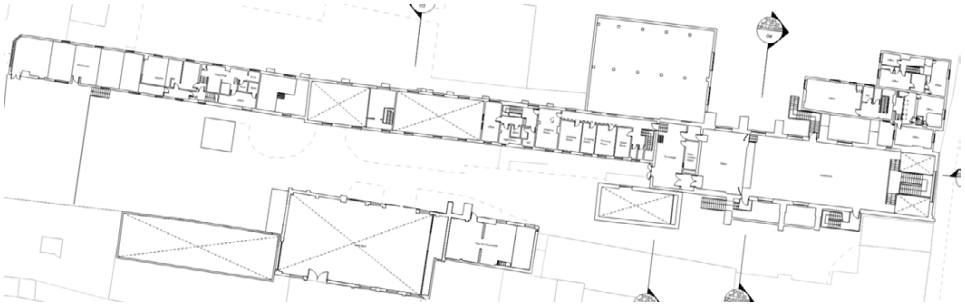


Figure 7: Existing G+1 plan

Figure 8: Existing G+2 plan

Figure 9: Existing roof plan

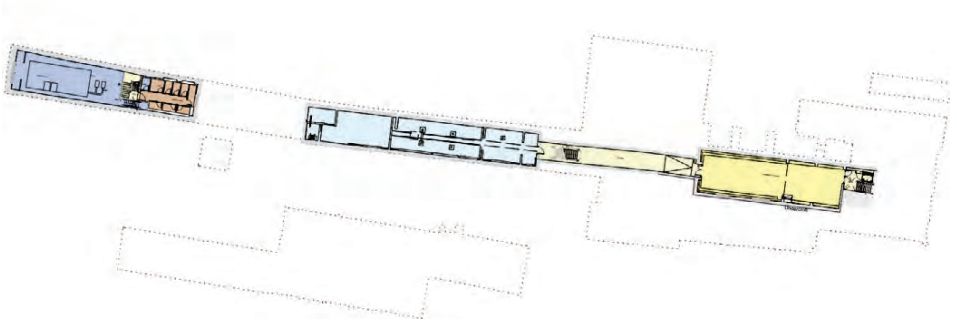


Figure 10: Proposed G-1 plan

Figure 11: Proposed G+0 plan

Figure 12: Proposed G+1 plan

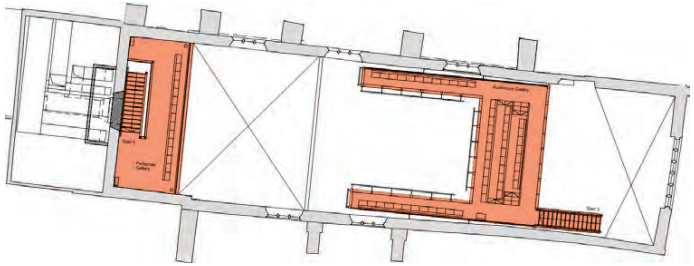


Figure 13: Proposed gallery plan

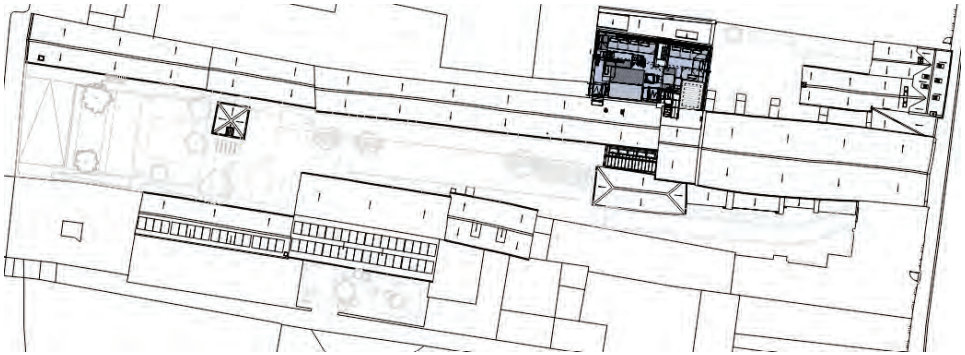


Figure 14: Proposed roof plan

3.5 BS9999: 2017 risk profiles (based on no sprinkler provision)

Under BS9999: 2017, risk profiles need to be allocated to each use/ area within the building, with this then informing the means of escape design.

The following key risk profiles are to be considered:

- Office and administration use
  Occupancy characteristic A – awake and familiar
  Fire growth rate 2 – medium
  Risk profile 'A2'

- Front of house (FOH)/ auditoriums, creative and gallery spaces for public use
  Occupancy characteristic B – awake and unfamiliar
  Fire growth rate 2 – medium
  Risk profile 'B2'

- Back of house (BOH), plant and storerooms, kitchen and bar use
  Occupancy characteristic A – awake and familiar (this is based on the assumption any staff will receive an induction)
  Fire growth rate 3 – fast
  Risk profile 'A3'

- Dressing/ rehearsal rooms
  Occupancy characteristic B – awake and unfamiliar
  Fire growth rate 3 – fast
  Risk profile 'B3'

With the provision of additional fire safety measures/ features, BS9999: 2017 permits the following additional means of escape design criteria to be claimed in for A2 and B2 risk profile spaces in the building:

- The use of a Category L1 fire detection system with live voice alarm: +15% increase in allowable travel distance, and a -15% reduction in door, corridor, and stair width.

As a result of the above, the following key means of escape criteria can be applied for each risk profile present:

- Risk profile 'A2', Office and administration
  Single direction travel distance limit of 25.3m, two-way travel distance limit of 63.3m to nearest storey exit.
  Door/ escape route width allowance of 3.06mm/person.

- Risk profile 'B2', Front of house/ public areas
  Single direction travel distance limit of 23m, two-way travel distance limit of 57.5m to nearest storey exit.
  Door/ escape route width allowance of 3.485mm/person.

- Stair width allowance of 4.08mm/person for the evacuation of a single level.

- Risk profile 'B2', Front of house/ public areas (incorporating a reduction of 25% for the provision of consumption of alcoholic beverages)
  Single direction travel distance limit of 17.2m, two-way travel distance limit of 43.1m to nearest storey exit.

- Risk profile 'A3', BOH, plant and storerooms, kitchen and bar
  Single direction travel distance limit of 18m, two-way travel distance limit of 45m to nearest storey exit.
  Door/ escape route width allowance of 4.6mm/person.

- Risk profile 'B3' Dressing and rehearsal rooms
  Single direction travel distance limit of 16m, two-way travel distance limit of 40m to nearest storey exit.
  Door/ escape route width allowance of 6mm/person.

Auditorium - Areas with seating in rows are subject to the following travel distance restrictions:

- Single direction travel distance limit of 15m, two-way travel distance limit of 32m to nearest storey exit.

4 Means of escape and fire detection / warning

4.1 Evacuation strategy

4.1.1 Site evacuation strategy

All buildings on site are currently designed on a simultaneous evacuation strategy. This means that all buildings are to be evacuated upon confirmation of fire.

There is scope for different buildings/ fire compartments (see indicative fire zones in Figure 15 below) to be operated based on a zoned evacuation strategy. With this arrangement, if there is a confirmed fire in one fire zone, an evacuation signal will only be sounded in the zone of fire origin. All other buildings/ zones will remain in place, with an alert signal sent to the site main fire alarm panel.

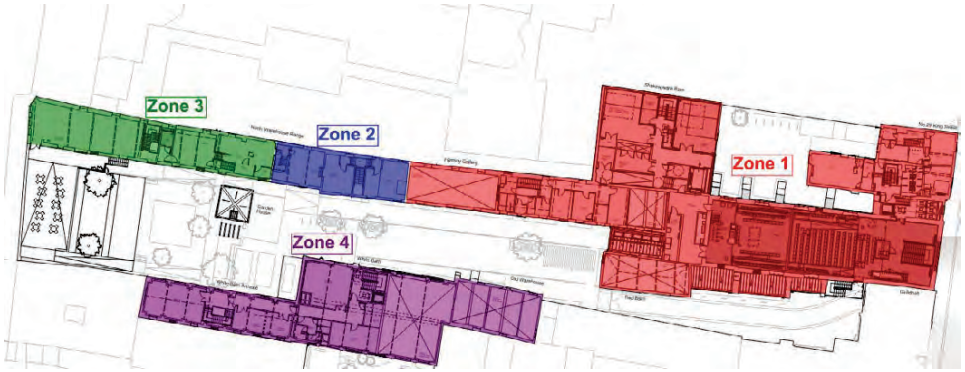


Figure 15: Indicative fire zones for a zoned site wide evacuation strategy

The site wide evacuation strategy is to be confirmed by the client.

4.1.2 Site buildings fire alarm regime

The fire alarm system, for all buildings on site, is to be based on a two-stage fire alarm regime in line with the Yellow Guide recommendations and Section 3.1.10 of the National Trust General requirements for fire alarm systems. This will reduce the disruption from false alarms.

A two-stage fire alarm regime follows the below sequence:

- Stage 1: An alert signal is sent to the fire alarm panel (or relevant staffed management areas) upon activation of a single smoke detector. This alert must be acknowledged by a member of staff within a certain specified time period. After acknowledgement, an investigation period with a certain specified time period is then commenced to allow the source of the fire signal to be explored.
- Stage 2: Initiated by the activation of two or more smoke detectors, a single heat detector and manual call point; or through the elapse of the investigation period/ time delay without acknowledgement from a staff member.

Depending on the site evacuation strategy adopted, the North Range Creative Hubs (zone 2 as shown in Figure 15) could be operated with an independent fire alarm system. In this instance, this building is to be operated based on a single stage fire alarm regime.

4.1.3 Guildhall and Undercroft auditoria (performance mode) guidance recommendations

According to the Yellow Guide, single stage fire alarm systems should not be installed in entertainment premises in any space other than small premises. Areas with auditorium are recommended to be designed according to a two-stage fire alarm system (performance mode) when there are members of the public in the building. The fire alarm should, however, revert to a single stage regime when there no members of the public present. A switch should be provided to facilitate for this changeover.

Evacuation of an audience in a closely seated auditorium should be through an announcement from the duty manager using a microphone and speaking in front of the stage/ screen. Aural signals are to be supplemented by visual signals.

4.1.3.1 Arrangement for the Guildhall and Undercroft auditoria

The fire alarm, for the Guildhall and Undercroft, will be operated under a two-stage fire alarm regime at all times (similar to all other areas on the site), including during daytime Heritage attraction tours. This arrangement is to be adopted to prevent false alarms resulting in the evacuation of all buildings on the site.

This arrangement deviates from the Yellow Guide recommendations for the fire alarm to be reverted to a single stage regime when there are no members of public. This arrangement is deemed to be acceptable for the Guildhall due to the following reasons.

- The recommendation to revert to a single fire alarm regime is for typical theatre premises, where it is expected that there would not be a significant number of staff present in the building when there are no shows. The limited management resource during these times makes it unsuitable for an investigation period to be adopted.
- For the Guildhall, there are other buildings on site that will be operated (with members of the public on site) when there are no shows in the main theatre auditorium. There will therefore be a significant number of staff members present on site during all normal operating hours for the site. This arrangement allows for any smoke detection incidents to be investigated prior to evacuation of the site. The use of a two-stage fire alarm regime for the Guildhall is therefore considered to be acceptable for the Guildhall.
- There is a comprehensive smoke/ fire detection system to be provided for all buildings on site, including the Guildhall. In the unlikely event that a fire alert signal is not immediately investigated, an evacuation signal will be sounded throughout all areas on site, either when the investigation period elapses, or when there is smoke detection from a second device. This arrangement means that it is unlikely for a fire in the Guildhall to develop to an advanced stage, to adversely affect means of escape, before an evacuation signal has been sounded on site. Additionally, the Guildhall is to be enclosed with fire resisting construction, with escape routes from the site that do not rely on passing through the Guildhall enclosure; a relatively more developed fire (accounting for an unattended investigation period) is therefore unlikely to adversely affect the means of escape from the site.

When there are shows in the Guildhall (true performance mode), the first stage is commenced upon activation of a single smoke detector. An alert signal will be sent to staff members to the Guildhall control desk that should be manned at all times (during a performance mode), and also the reception entrance desk. When staff members are not located in permanent positions, mobile forms of communication such as radios, pagers, or phone induction loop systems can be considered (beacons can also be used in adjacent areas to provide alert signals to staff members). *NB. stage one alerts should not be audible in an auditorium or on stage when in the performance mode.*

4.1.4 Smoke detection inhibition for performances with smoke effects

Smoke detection in the Guildhall and lobbies adjacent to the Guildhall will be silenced by a smoke inhibit switch for performances or rehearsals that consist of smoke/ haze effects only.

For the performances with smoke/ haze effects, the mechanical smoke ventilation system (MSVS) will not be activated by smoke detection. In this arrangement, the operation of the MSVS will be activated by a manual release/ activation control located adjacent to the Guildhall control desk. For this arrangement, the Guildhall control desk should be manned at all times to allow for the operation of the manual release/ activation control immediately after confirmation of a fire incident in the Guildhall.

4.2 Means of detection and warning

All buildings at St George's Guildhall will be provided with a category L1/P1 fire alarm system. The systems will be designed to meet the recommendations detailed in BS 5839-1. Manual break glass call points are also to be provided in accordance with BS 5839-1. The provision of a category L1 fire alarm system represents an enhanced early means of detection and warning for parts of the buildings with A2 and B2 risk profiles. *This specification was adopted through collaboration with Max Fordham, who confirmed that there is no practical differences between category L2 and L1 systems*.

4.2.1 Means of fire detection

Most areas of the buildings on site will be provided with smoke point detectors.

Heat point detectors will be provided to kitchens, kitchenettes, tea points and dressing room areas.

Aspirating detection will be provided to the following areas.

- First floor - Guildhall enclosure (stage and auditorium).
- Ground floor - Historic floor/ vault void.

4.2.2 Fire alarm panels

The main fire alarm panel for buildings adjoined to the Guildhall building will be provided in the Heritage Experience Entrance & Orientation room (main entrance to the Guildhall) adjacent to the entrance doors. Fire alarm repeater panels will be provided to other buildings adjoined to the Guildhall building in the following locations.

- Guildhall building – Heritage Experience Entrance & Orientation room.
- Building No. 29 – site porter & operations manager office.

The main fire alarm panel for the White Barn, White Barn Annexe and Old Warehouse buildings will be provided in the final exit corridor on the ground floor (stair 13 of White Barn). The fire alarm repeater panel for these buildings will be provided in the entry foyer & shop (Old Warehouse).

All building fire alarm panels should be interfaced together to allow alert messages and evacuation signals to be shared between the various buildings on the wider site.

4.2.3 Public Address/ Voice Alarm system

The Yellow Guide requires that a public address system be provided to cover all parts of places of assembly buildings including dressing rooms, bars and toilets.

The Guildhall and adjacent dressing rooms, Red Barn/ North Range foyer and Shakespeare Barn (FOH) buildings will be provided with a Public Address (PA) system in the form of a live voice alarm (Type V2) in accordance with BS 5839-8 (the PA system should ideally form part of a live voice alarm system, but it may also be separate). Areas that should be provided with voice alarms are highlighted in Figure 16 to Figure 18 below, however, additional voice alarm devices can be provided to other areas of the site if this is desired (by the Client).

This system can also be used for other emergencies and day-to-day management. Pre-recorded automatic messages can also be provided. Emergency functions should, however, override all other uses.

NB. Fire alarm systems that do not allow live speech to be transmitted, such as voice sounders, cannot be used for public address.

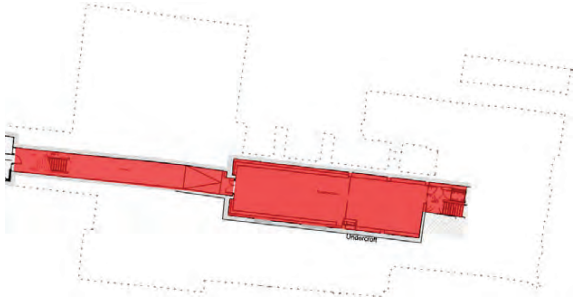


Figure 16: Areas to be provided with a voice alarm system (basement ground)

Figure 17: Areas to be provided with a voice alarm system (G+0 floor)

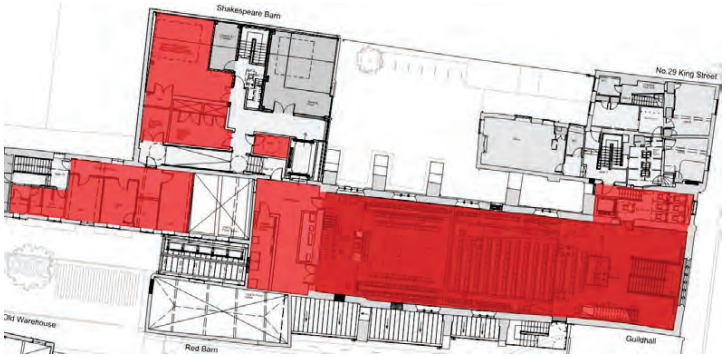


Figure 18: Areas to be provided with a voice alarm system (G+1 floor)

4.2.4 High level fire alarm cause and effect

The cause and effect strategy will determine what systems need to operate for scenarios of fires in various locations. This will be set in principle by the fire strategy but will be designed in detail by the MEP consultant and specialist subcontractors.

Upon activation of the AFDA system, the following procedures are to commence:

- Lift installations will return to the ground floor with doors open,
- Relevant fire and smoke curtains will be deployed (depending on the location of fire detection),
- Mechanical smoke extract fans in the Guildhall:
    - Normal operation (including performance mode): mechanical smoke extract fans are to activate upon smoke detection within the Guildhall enclosure.
    - Performances with smoke/ haze effects: mechanical smoke extract fans are to activate upon manual activation of the manual release/ activation control mechanisms located adjacent to the Guildhall control desk.
- Air handling units are to shut down.

4.3 Occupant Capacity

In order to calculate the overall means of escape requirements, it is necessary to understand how many occupants are on each floor. The drawings provided by Haworth Tompkins Architects are used to provide the expected occupancy of the building by counting the number of seats indicated in each room/ space. In areas where the occupancy is not indicated, floor space factors from BS 9999 are used to provide an estimate. Toilets, shower rooms, plants rooms are not considered to avoid double counting occupants.

The anticipated occupant loading in each part of the building is shown below.

Level	Room	Area m²	Floor space factor m² per person	No. of seats/ people
29 King Street				
Ground	Creative hub unit 1	8	5	1
	Meeting room	24	6	4
	Kitchen	10	7	1
	Operations manager office	-	-	4
G+1	Office 1	-	-	9
	Office 2	-	-	5
	Accessible Office	-	-	3
	Creative hub unit 2	9	5	2
Total for 29 King Street				**29**
Shakespeare Barn				
Ground	Kitchen	36	-	10 Note 1
G+1	Storage and plant rooms	61	30	2
	Flexible room	37	-	30 Note 1
G+2	Plant room	136	30	5
Total for Shakespeare Barn				**47**

Level	Room	Area m²	Floor space factor m² per person	No. of seats/ people
Guildhall, Backstage and Red Barn Buildings				
Basement	Vaulted tunnel	134	30	5
	Flexible performance space	-	-	100
	Flexible exhibition space	47	5	9
Ground	Heritage Experience Entrance & Orientation	-	-	40 Note 2
	Reception Office	9	6	2
	Red Barn (Café)	56	2	28
	Foyer/ café seating	-	-	52
	Flexible performance space	-	-	54
G+1	Guildhall stage	-	-	10 performers
	Guildhall auditorium	-	-	304 audience members plus 5 staff members Note 3
	Back stage	46	30	2
	Dressing room 1	-	-	5
	Dressing room 2	-	-	4
	Acc dressing room	-	-	4
	Plant room	13	30	1
Gallery	Performer gallery	-	-	30
	Auditorium gallery	-	-	60
Total for Guildhall, Backstage and Red Barn Buildings				**710**
Former Players Workshop				
Ground	Creative hub unit 1	21	5	4
	Creative hub unit 2	32	5	6
G+1	Creative hub unit 3	57	5	11
	Creative hub unit 4	29	5	6
Ground	Restaurant office	8.5	-	1
	Teapoint/ creative hub unit	8.7	-	10
Total for Former Players Workshop				**38**
Riverside Restaurant				
Ground	Cellar	42	30	1
G+1	Restaurant	-	-	60
	Kitchen	68	7	10
Total for Riverside Restaurant				**71**
White Barn, Annexe and The Old Warehouse				
Ground	Entry foyer and shop	43	2	22
	Fermoy Gallery	27	2	14

Level	Room	Area m²	Floor space factor m² per person	No. of seats/ people
	Flexible space	-	-	83
	Creative hub unit 1	42	5	8
	Creative hub unit 2	40	5	8
	Storage and plant rooms	39	30	1
G+1	Breakout & kitchen	-	-	11
	Creative hub unit 3	43	5	9
	Creative hub unit 4	28	5	6
	Creative hub unit 5	45	5	9
Total for White Barn, Annexe and The Old Warehouse				**171**

Note 1: Indicating the desired occupancy.

Note 2: Indicating the maximum expected occupancy e.g. occupants arriving and queuing for tours.

Note 3: This is the maximum occupancy for audience members when there is a fire loading on the stage, limited by the ASET/ RSET analysis. There is scope to have a maximum occupancy of 510 people (limited by the exit capacity) if there is no fire loading on the stage area. This arrangement will have to be supported by an event fire risk assessment.

Table 3: Occupant capacity

The occupant loading of the wider site buildings when they are all occupied is estimated to be ca. 1020 people.

4.4 Vertical escape

4.4.1 Guidance recommendations

According to BS 9999, every internal escape stair should be a protected stair. Unprotected stairs, i.e., accommodation stairs, may form part of an internal route to a storey exit subject to an appropriate fire risk assessment (distance of travel and number of people are very limited).

Single escape stairs are permitted in a building with no storey exceeding 11m above the exit level. Escape stairs that serve one storey above or below the exit level are permitted not to be provided with lobby protection.

In parts of a building provided with a single escape stair, the occupancy on every storey should be limited to 60 occupants. Where two or more stairways are provided, it should be assumed that one of them might not be available due to fire or smoke.

Escape stairs should be free of potential sources of fire. Certain facilities may be incorporated into protected escape stairs consisting of the following:

- sanitary accommodation or washrooms, provided that the accommodation is not used as a cloakroom. A gas water heater or sanitary towel incinerator may be installed in the accommodation but not any other gas appliance;
- a lift well, provided that the stair is not a fire-fighting stair;
- a reception desk or inquiry office area at ground or access level, provided that it is not in the only stair serving the building or part of the building. The reception or inquiry office area should be not more than 10 m² in area;
- cupboards enclosed with fire-resisting construction, provided that they are not the only stair serving the building or part of the building;
- gas service pipes and associated meters.

  NB. Service shafts enclosed with fire-resisting construction with FD 30S doors may be accessed from a protected stairway provided that it is not the only stairway serving the building or part of the building.

Where more than one escape route is available from a storey or part of a building, one or more of the escape routes from the storey or part of the building may be by way of an external escape stair, provided that there is at least one internal escape stair from every part of each storey (excluding plant areas) and that the external stair(s) meet the following recommendations.

a. All doors giving access to the external stair should be fire-resisting and self-closing, except that a fire-resisting door is not needed at the head of any stair leading downwards where there is only one exit from the building onto the top landing.
b. Any part of the external walls within 1800 mm of (and 9m vertically below), the flights and landings of an external escape stair should be of fire-resisting construction, except that the 1 800 mm dimension may be reduced to 1 100 mm above the top level of the stair if it is not a stair up from a basement to ground level.
c. Any part of the building (including any doors) within 1800 mm of the escape route from the stair to a place of relative or ultimate safety should be provided with protection by fire-resisting construction.
d. Glazing in areas of fire-resisting construction should also be fire-resisting to meet the criteria for both integrity and insulation and should be fixed shut.
e. Where a stair is more than6minvertical extent it should be protected from the effects of adverse weather conditions.

The width of escape stairs:

- Should not be less than the width of any exits affording access to them,
- Should not reduce at any point on the way to a final exit,
- Should not be less than 1000mm for downward travel and 1200mm for upward travel.

Handrails that protrude no more than 100mm can be ignored on either side.

According to Table 13 of BS 9999: 2017, if a stair and storey exit at the final exit level share common final exit door, the total number of floors served by the stair should include the storey at final exit level. This approach can be used in lieu of conducting a merging flow assessment.

Where existing stairs are sub-1000mm, alternative guidance is sought from Approved Document B (2019 incorporating 2020 and 2022 amendments). Under this guidance, a stair with a minimum clear width of 800mm is permitted to provide exit capacity for 50 occupants.

4.4.2 Arrangement for St George's Guildhall

Buildings at St George's Guildhall are to be provided with escape and accommodation stairs as shown in Figure 19 to Figure 23 below.

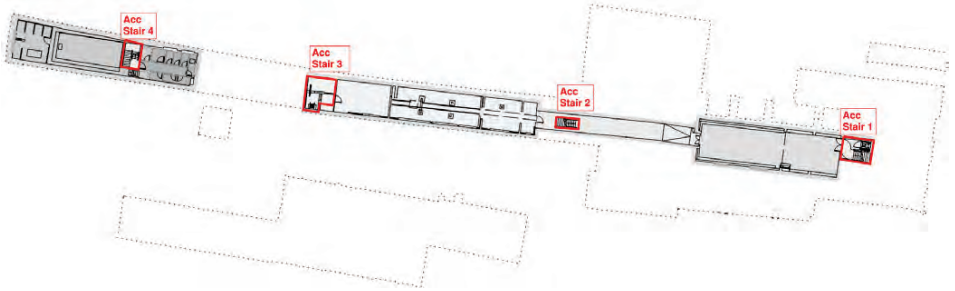


Figure 19: Escape stairs from the basement floor

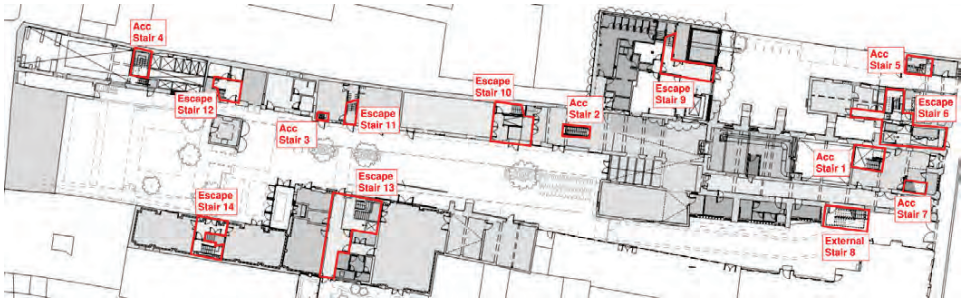


Figure 20: Escape stairs from the G+0 floor

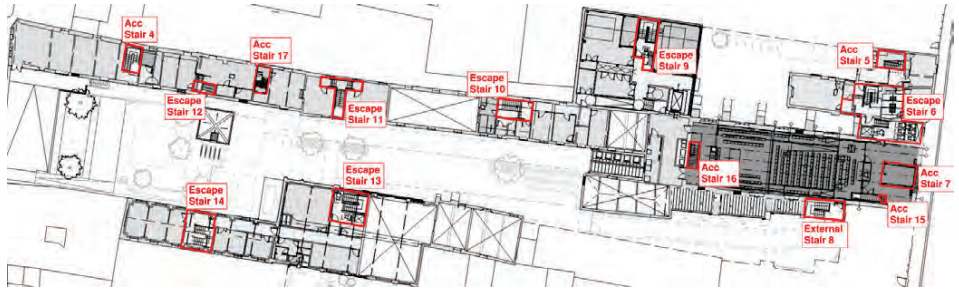


Figure 21: Escape stairs from the G+1 floor

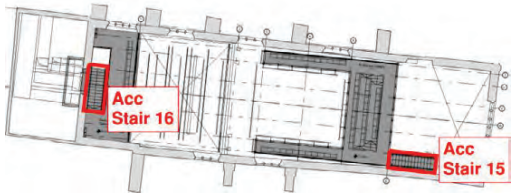


Figure 22: Escape stairs from the Gallery floor

Figure 23: Escape stair from the roof

Some of the proposed stairs have final exits that pass through accommodation therefore they are considered as accommodation stairs. As all of these stairs serve a single floor, it is considered acceptable to assess the exit capacity based on horizontal means of escape i.e. travel distances and exit capacity.

Some of the stairs are to be provided with clear widths that are sub-1000mm in an arrangement that deviate from guidance recommendations. The maximum clear width of that can be provided to these stairs is limited by existing constraints. Alternative guidance is sought from Approved Document B (2019+ 2020 and 2022) where sub-1000mm stairs with a clear width of at least 800mm are considered to have an exit capacity of 50 occupants. Where the stair clear width is sub-800mm, its exit capacity will be assessed based on a risk-based approach where the occupancy expected to use the stair is assessed and expected to be limited to less than 50 occupants.

Other stairs are to have final exits widths less than the stair in an arrangement that deviates from guidance recommendations. Similar to the reasons provided above, it is considered acceptable to assess their capacity based on exit width factors outlined in section 4.5. In arrangements where the final exit is proposed to open against direction of escape, the stair escape route is to be limited to a capacity of 60 occupants.

The proposed stairs for the redevelopment works are described in Table 4 below.

Reference	Building/ area served	Extent	Stair width (final exit width)	Compliance description
Acc. stair 1	Guildhall	Basement to ground	1200mm (1440mm)	This is an accommodation stair that extends from the Undercroft and has its final exit through the Heritage Experience/ Entrance & Orientation space. Since the stair extends across a single floor level, this stair is to be regarded for horizontal evacuation where one exit from the space it serves will be discounted and its stair capacity is to be limited by the smaller final exit.
Acc. stair 2	Guildhall and Foyer/ Cafe	Basement to ground	1000mm	This is an accommodation stair that extends from the Undercroft tunnel and has its final exit through the foyer space. Since the stair extends across a single floor level, this stair is to be regarded for horizontal evacuation where one exit from the space it serves will be discounted.
Acc. stair 3	Vaulted tunnel	Basement to ground	640mm	This is an existing companion ladder (accommodation stair) that extends from the Undercroft vaulted tunnel and has its final exit directly to outside. This stair only provides a clear width of ca. 640mm and this arrangement does not meet current guidance. This arrangement is deemed to be acceptable as this is an existing stair, extends across one floor level and the means of escape from the Undercroft vault tunnel is to be considered from horizontal evacuation where one exit from the space will be discounted. Additionally, the vault tunnel will not be accessible to the public and only accessible to management staff and maintenance personnel.
Acc. stair 4	Riverside restaurant	Basement to ground	1000mm	This is an accommodation stair that extends from the basement WCs provided for the riverside restaurant. The stair has its final exit through the restaurant area, and since it extended across a single floor level, this stair is to be regarded for horizontal evacuation.
Acc. stair 5	29 King Street	Ground to G+1	820mm (560mm)*	This stair clear width is sub-1000mm therefore does not meet current guidance recommendations. Its final exit is through a creative hub unit on the ground floor. The final exits from this stair are even smaller than the non-compliant stair clear width and they open against direction of escape. The stair capacity of this stair is therefore to be limited to a very small occupancy.
Escape stair 6	29 King Street	Ground to G+1	900mm (805mm)*	This is to be an escape stair that extends from ground to the office spaces, and Guildhall on the G+1 floor. This stair is proposed to provide a clear width of ca. 900mm and this arrangement deviate from BS 9999 guidance. The clear width of this stair can be provided to meet guidance recommendations as it is limited by existing site constraints (heritage features). This arrangement is deemed to be acceptable as this escape stair was provided mainly to provide an alternative egress route for people with mobility impairments in case of failure of the adjacent evacuation lift. The escape capacity of this stair is to be limited to a maximum of 50 people in line with alternative guidance from Approved Document B.
Acc. stair 7	Guildhall	Ground to G+1	1300mm (1250mm)	This is an existing stair that is open to the Guildhall therefore it is considered as an accommodation stair. This stair provides a clear width of ca. 1300mm, with a smaller exit of 1250mm, and consist of a reception area on the ground floor. As this stair consist of the main egress route from the Guildhall, the reception area it to be maintained as a fire sterile area, with limited equipment

Reference	Building/ area served	Extent	Stair width (final exit width)	Compliance description
				associated with use of a reception area. A fire is therefore unlikely to break out from the reception area which would render it unusable for egress. In the unlikely event of a fire from the reception area, the stair landing is to be separated from the former with fire resisting construction and a fire door, occupants from the Guildhall will therefore evacuate through alternative escape routes from the G+1 floor. The final exit from the reception area opens against direction of escape; this final exit should be held open in a fire evacuation to prevent its swing hindering the evacuation process. From the provisions outlined above, escape using this accommodation stair is deemed to be acceptable.
External stair 8	Guildhall	Ground to G+1	1000mm	This is an existing external stair that extends from the Guildhall and has its final exit to outside.
Escape stair 9	Shakespeare Barn	Ground to G+2	1200mm (820mm)	This stair is to extend from the plantroom on the G+2 floor and have its final exit on the ground floor through the Shakespeare courtyard. As it serves more than one storey above the final exit level, it is recommended to be provided with lobby protection on the ground and G+1 floors according to BS 9999 guidance. Its final exit is indicated to be smaller than the stair clear width hence its stair capacity is to be limited based on the final exit width. The arrangement to access the electrical switch gear room, staff change and drinks store (ground floor) and comms room (first floor) directly into its enclosure deviate from guidance recommendations as it is the only stair serving the roof plant room. The doors to these plant rooms are to be provided as fire resisting doors with smoke seals. They will be provided with ‘‘Fire Door, Keep Shut’’ signage and are to be maintained in a closed position. Any access to these rooms is to be managed such that it will be out of operation hours.
				This stair is to be provided with a fire rated partition and fire door (with a vision panel) on the ground floor landing, prior to access into the final exit corridor. This arrangement ensures that if there is fire and smoke spread to the stair final exit, occupants from the G+2 plant room will become aware of the fire and use the alternative egress route through escape stair 10. The omission of lobby protection to this stair on the ground floor is therefore deemed to be acceptable as there will be an alternative egress route from the G+1 floor.
Escape stair 10	Guildhall and Backstage	Ground to G+1	1400mm (860mm)*	This is to be an escape stair that extends from ground to the G+1 floor. The final exit is smaller than the stair clear width and it opens against direction of escape. The capacity of this stair is therefore to be limited to an exit capacity of 60 occupants.
Escape stair 11	Creative hub units	Ground to G+1	1370mm (910mm)	This is to be an escape stair to extend from ground to G+1 floor. The final exit will provide a smaller clear width that the stair. As the stair only extends to one upper floor, the escape capacity from the G+1 creative hub units will be considered through horizontal evacuation with the final exit clear width used to calculate the evacuation capacity.
Escape stair 12	Riverside restaurant kitchen	Ground to G+1	954mm (900mm)*	This is to be an escape stair to extend from ground to G+1 floor. This stair clear width is sub-1000mm therefore does not meet current guidance recommendations. The final exit is also to be provided with a smaller clear width that the stair and opened against the direction of escape. As the stair only extends to one upper floor, the escape capacity from the G+1 kitchen area will be considered through horizontal evacuation. The capacity of this stair is therefore to be limited to an exit capacity of 60 occupants.

Reference	Building/ area served	Extent	Stair width (final exit width)	Compliance description
Escape stair 13	White Barn	Ground to G+1	1200mm (890mm)	This is to be an escape stair that extends from the White Barn creative hubs on the G+1 floor and is to have its final exit on the ground floor to outside. Its final exit is indicated to be smaller than the stair clear width hence its stair capacity is to be limited based on the final exit width. The arrangement to open plant rooms directly into its final exit route on the ground floor is acceptable as there is an alternative escape stair 14 from the White Barn Annexe.
Escape stair 14	White Barn	Ground to G+1	1200mm (860mm)*	This is to be an escape stair that extends from the White Barn Annexe creative hubs on the G+1 floor and is to have its final exit on the ground floor to outside. One of its final exits is indicated to be smaller than the stair clear width and another is proposed to open against direction of escape. The capacity of this stair is therefore to be limited to an exit capacity of 60 occupants. The arrangement to open a store cupboard room directly into its enclosure on the ground floor is acceptable as there is an alternative escape stair 13 from the White Barn.
Acc. stair 15	Auditorium gallery	G+1 to Auditorium gallery	1150mm	This is an accommodation stair that extends from the new auditorium gallery within the Guildhall and discharges onto the antechamber area on the G+1 floor where there will be alternative escape routes. This stair is to be regarded for horizontal evacuation.
Acc. stair 16	Performers gallery	G+1 to Performers gallery	1230mm	This is an accommodation stair that extends from the new performers gallery within the Guildhall and extends to the backstage area on the G+1 floor where there will be alternative escape routes. This stair is to be regarded for horizontal evacuation.
Acc. Stair 17	Mezzanine plant area in attic space	G+1 to roof	800mm (700mm)	This is an accommodation stair that extends from the roof and has alternative exit routes through the kitchen or creative hub on the G+1 floor. This stair only provides a clear width of ca. 800mm with exits providing smaller clear widths of ca. 700mm, this arrangement does not meet current guidance. This arrangement is deemed to be acceptable as this stair will not be accessible to the public and only accessible to maintenance personnel. The roof plant area will be accessed infrequently and by a limited number of people. The stair is to be enclosed with fire resisting construction and fire doors. Considering a single accidental fire incident, there will be safe egress from either the kitchen area, or the creative hub.

** Stair capacity to be limited to 60 occupants as final exit opens against direction of escape*

Table 4: Provision of escape stairs

4.4.3 Stair capacity

The following stair width factors are used to calculate the stair exit capacity:

- A2 risk profile – 3.83mm/ person and 2.89mm/ person over one and two floors, respectively.
- B2 risk profile – 4.08mm/ person and 3.4mm/ person over one and two floors, respectively.
- A3 risk profile – 5.4mm/ person, 4.6mm/ person, and 4.0mm/ person over one, two and three floors, respectively.
- B3 risk profile – 7.0mm/ person and 6.0mm/ person over one and two floors, respectively.

For risk profiles A2 and B2 above, the prescribed stair width factor is reduced by 15% due to the provision of an enhanced means of detection and warning system.

The stair capacities from the different sections of the building are outlined below. When stairs share final exit routes with a storey exit on the ground floor, the estimated occupancy to use this stair will incorporate the occupant loading on the ground floor.

Stair no.	Stair width (smaller final exit width)	Width factor, mm/ person (exit width factor as outlined in section 4.5)	Stair capacity (exit capacity based on exit width factor applied to the final exit)	Anticipated worst case occupancy
Acc. stair 1	1200mm (1440mm)	N/A	Evaluated for horizontal evacuation.	100
Acc. stair 2	1000mm	N/A	Evaluated for horizontal evacuation.	100
Acc. stair 3	640mm	N/A	Based on a risk-based approach. Note 2	5
Acc. stair 4	1000mm	N/A	Evaluated for horizontal evacuation.	8
Acc. stair 5	830mm (560mm)* Note 1	-	Evaluated for horizontal evacuation.	10
Escape stair 6	900mm (805mm)*	-	50	50
Acc. stair 7	1300mm (1250mm)	3.4	367	296 Note 4
External stair 8	1000mm	4.08	245	222
Escape stair 9	1200mm (820mm)	(3.485)	(143)	138 Note 3
Escape stair 10	1400mm (860mm)*	-	60	26
Escape stair 11	910mm (900mm) Note 1	-	50	25 Note 4
Escape stair 12	954mm (900mm)* Note 1	-	50	15 Note 4
Escape stair 13	1200mm (890mm)	(3.485)	(143)	58 Note 4 & 4
Escape stair 14	1200mm (860mm)*	-	60	58 Note 4 & 5
Acc. stair 15	1000mm	N/A	Evaluated for horizontal evacuation.	60
Acc. stair 16	1200mm	N/A	Evaluated for horizontal evacuation.	30
Acc. stair 17	800mm (700mm)*	N/A	Based on a risk-based approach. Note 2	5

** Stair capacity to be limited to 60 occupants as final exit opens against direction of escape.*

Note 1: Sub-1000mm stairs with a clear width of at least 800mm are considered to have an exit capacity of 50 occupants according to guidance of Approved Document B (2019+ 2020 and 2022).

Note 2: This non-compliant stair clear width is deemed to be acceptable due to the stair being already existing and/ or expected to serve a limited occupancy (significantly less than 50 occupants as it is only accessible to management staff and maintenance personnel).

Note 3: This is a combined occupancy of the Shakespeare Barn and from the Guildhall on the G+1 floor.

Note 4: The anticipated combined occupancy incorporates estimated occupants on the ground floor such that a merging flow assessment is not required.

Note 5: Escape stairs 13 and 14 serve the same building and used as alternative escape routes. As both stairs are not provided with lobby protection, one escape stair should be discounted. The use of one escape stair is adequate to accommodate the occupants from the White Barn.

Table 5: Escape stair escape capacity

Where stairs are to provide a clear width of less than 800mm, it is shown that these stairs are not expected to provide exit capacity for more than 10 people. Considering that buildings will be provided with an enhanced means of detection, the evacuation period for these areas is expected to be quick such that this arrangement would not pose a risk to life safety. Cognisant that these stair clear widths are limited by existing constraints of the buildings being grade I listed, these arrangements are deemed to be acceptable.

Where stairs are at least 800mm but less than 1000mm, their exit capacity was determined to be 50 occupants. As shown above, each of these stairs is not anticipated to provide an exit capacity of more than 50 occupants therefore this arrangement is deemed to be acceptable.

Where stairs provide clear widths of at least 1000mm and final exits provide clear widths less than the stair, the exit capacity was based on exit width factors (of the final exit). In the case of escape stair 13, the exit capacity is deemed to be 143 occupants and the maximum anticipated occupant loading to use any of this stair is shown to be 58 occupants. As the exit capacity is more than the anticipated occupant loading using these stairs, this arrangement is deemed to be acceptable.

Where stair final exits are proposed to open against direction of escape, the exit capacity was limited to 60 occupants. In these cases, the maximum anticipated occupant loading to use any of these stairs is shown to be 58 occupants. As the exit capacity is more than the anticipated occupant loading using these stairs, these arrangements are deemed to be acceptable.

All accommodation stairs serve a single floor and they are assessed as part of the horizontal means of escape assessment outlined in sections 4.5 and 4.6 below.

4.5 Exit width

According to BS 9999, when there are two or more storey exits, an assumption should be made that a fire might prevent the use of one exit. The largest exit should therefore be discounted when evaluating the exit capacity from a room.

The required exit width from any room is based on the number of occupants in that room. These will be based on clear width factors as outlined in BS 9999. With the provision of an enhanced means of detection and warning, a 15% reduction of these width factors is applied for risk profiles A2 and B2.

The following exit width factors are used to calculate the exit capacity from various parts of the buildings at St George's Guildhall:

- A2 risk profile – 3.06mm/ person.
- B2 risk profile – 3.485mm/ person.
- A3 risk profile – 4.6mm/ person.
- B3 risk profile – 6.0mm/ person.

In areas where there is a single exit, the maximum occupancy permitted in that space is 60 people. In areas where the exit clear widths are less than 1050mm, the exit capacity is calculated using the equation below:

Number of people = 500/ minimum width per person.

The minimum exit widths required regardless of risk profile and for unassisted wheelchair access are 800mm and 850mm respectively. Notwithstanding this, Approved Document M accessibility guidance may call for larger door widths. Door widths should be measured as effective clear width (door stop to door stop, or door stop to projecting door hardware, whichever is narrowest). The width of a door in a corridor should be not less than the corridor width minus 150 mm.

The width of a corridor or escape route should be not less than the greater of:

a) the exit width based on the calculation; or

b) 1200 mm (where the corridor is not accessible to wheelchair users, this width may be reduced to 1000 mm).

All escape routes should have a clear headroom of not less than 2000mm, with no projections below this height (except for door frames).

The indicated storey exits were measured, and their exit capacity was assessed as outlined below. Where there are at least two exits, the largest exit was discounted as indicated by the ~~slashed~~ text.

Level	Room	Available exit width mm	Minimum exit width mm per person	Exit capacity	Expected occupancy
29 King Street					
Ground	Creative hub unit 1	1 x 750 Note 1 & 2	3.485	60	1
	Meeting room	~~1 x 820~~	3.06	60	9
	Kitchen	1 x 800 Note 2	4.6		
	Operations manager office		3.06		
G+1	Office 1	1 x 770 Note 1 & 2	3.06	60	9
	Accessible Office	1 x 830 Note 1	3.06	60	10
	Office 2				
Shakespeare Barn					
Ground	Kitchen	~~1 x 790~~ Note 2 1 x 740 Note 2	4.6	60	10
G+1	Storage and plant rooms	1 x 850 Note 1	4.6	60	32

Level	Room	Available exit width mm	Minimum exit width mm per person	Exit capacity	Expected occupancy
	Flexible room		6.0		
G+2	Plant room	1 x 760 Note 1	4.6	60	5
Guildhall, Backstage and Red Barn Buildings					
Basement	Vaulted tunnel	~~1 x 850~~ 1 x 640	3.485	143	5
	Flexible performance and exhibition space	~~1 x 1600~~ 1 x 1250	3.485	358	100
Ground	Heritage Experience Entrance & Orientation	~~1 x 1400~~ Note 2 1 x 1300 Note 2	3.485	60	40
	Reception Office	1 x 780 Note 1 & 2	3.06	60	2
	Bar/ café foyer	~~1 x 1500~~ 1 x 1500 1 x 1300 Note 2	3.485	490	80
	Café seating				
G+1	Dressing room 1	~~1 x 860~~ 1 x 710 Note 2	6.0	60	13
	Dressing room 2				
	Acc dressing room				
	Guildhall stage	~~1 x 1240~~ 1 x 1070 1 x 870 1 x 1070 Note 2	3.485	510	319
	Performers gallery				
	Back stage				

Level	Room	Available exit width mm	Minimum exit width mm per person	Exit capacity	Expected occupancy
	Guildhall auditorium				
Gallery	Guildhall gallery				
Former Players Workshop					
Ground	Creative hub unit 1	1 x 920 Note 1	3.485	60	21
G+1	Creative hub unit 3				
	Creative hub unit 4				
Ground	Creative hub unit 2	1 x 910 Note 1	3.485	60	6
Ground	Flexible performance space	~~1 x 1250~~ 1 x 860	3.485	143	54
Ground	Restaurant office	1 x 910 Note 1 & 2	3.06	60	5
	Creative hub break out & Teapoint	1 x 1010 Note 1 & 2	3.485	60	10
Riverside Restaurant					
Ground	Cellar	1 x 780 Note 1	4.6	60	4
G+1	Restaurant	1 x 1320 Note 1	3.485	60	60

Level	Room	Available exit width mm	Minimum exit width mm per person	Exit capacity	Expected occupancy
	Kitchen	~~1 x 860~~ Note 2 1 x 700 Note 2	4.6	60	10
White Barn, Annexe and The Old Warehouse					
Ground	Entry foyer and shop	~~1 x 1900~~ 1 x 1300	3.485	516	119
	Flexible space	1 x 860			
	Creative hub unit 1	1 x 1370 Note 1	3.485	60	8
	Creative hub unit 2	1 x 1500 Note 2	3.485	60	32
G+1	Creative hub unit 4				
	Creative hub unit 5				
	Creative hub unit 3	1 x 900 Note 1	3.485	60	20
	Creative hub break out & Kitchen				

Note 1: Limited to 60 occupants as there is a single escape route.
Note 2: Limited to 60 occupants as exit opens against direction of escape.
Table 6: Exit widths

Some of the indicated exits are to provide sub-800mm clear widths and this arrangement does not meet current guidance. The maximum clear width that can be provided is limited by existing constraints of the buildings being grade I listed. With these arrangements, the exits are shown to be expected to provide exit capacity for a limited number of people, with the maximum expected occupancy loading estimated for 13 occupants (Shakespeare Barn dressing rooms). Considering that buildings will be provided with an enhanced means of detection, the evacuation period for these areas is expected to be quick such that this arrangement would not pose a risk to life safety. These arrangements are therefore deemed to be acceptable.

Some of the exits are to be provided to open against direction of escape as it would not be practical to open them in the opposite direction. In these arrangements, the exit capacity was limited to 60 occupants in accordance with guidance recommendations. As the exit capacity in all these areas is more than the anticipated occupant loading, these arrangements are deemed to be acceptable.

The horizontal evacuation from the Guildhall enclosure and backstage areas was considered concurrently; if a fire breaks out from the backstage area, occupants from the performers gallery and screen passage would use the escape routes from the Guildhall auditorium. Conversely, if a fire breaks out from the Guildhall auditorium, occupants from this area would use the alternative escape route through the backstage area. The clear widths provided from the Guildhall and backstage area are adequate to provide the exit capacity for the anticipated occupant loading therefore this arrangement is acceptable.

4.6 Travel distances

The minimum number of exits needs to meet the criteria set out in Table 10 of BS9999: 2017:

Minimum number of escape routes and exits from a room, tier or storey	
Maximum number of persons	**Minimum number of escape routes/exits**
60	1
600	2
More than 600	3

Figure 24: Minimum escape route requirements

Where areas are served by more than one exit, it is recommended in BS 9999 to discount an exit due to blockage by fire. If one exit is blocked there should be adequate exits remaining. In order for multiple escape routes to be considered truly independent from one another they must be 45° or more apart or be separated by fire resisting construction if less than 45°, as per Figure 7 of BS 9999 shown below.

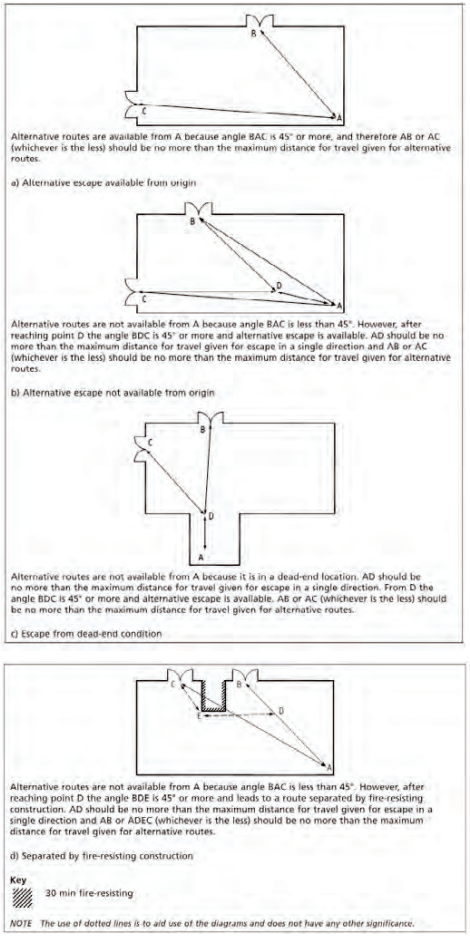


Figure 25: Definition of alternative escape routes

Travel distances are to be limited according to risk profile as outlined below. Where the internal layout is not indicated, direct distance limits (3rd of the actual prescribed limit) are used to assess the proposed design. The travel distances for areas with risk profiles A2 and B2 are increased by 15% due to the provision of an enhanced means of detection and warning. In the bar/ café area where there could be alcohol served to occupants, travel distances are reduced by 25% according to recommendations of Table of BS 9999: 2017.

	One direction of escape		More than one direction of escape	
Risk profile	**Direct**	**Actual**	**Direct**	**Actual**
A2 - Administration	17.3m	25.3m	39.1m	63.3m
A3 – BOH areas	12m	18m	30m	45m
B2 – FOH areas	15m	23m	38m	57.5m
B2 (Bar/ Café)	11.3m	17.3m	28.5m	43.1m
Auditorium (seated areas)	-	15m	-	32m
Auditorium (open floor areas)	12m	18m	30m	45m

Table 7: Travel distance limits

All travel distances for the proposed design are indicated on the fire strategy drawings to be read as part of this report (see Appendix B of this report). All travel distances are measured to be within the prescribed limits therefore the proposed layouts are acceptable.

In areas provided with accommodation stairs, the travel distances were measured to the storey exit on the final exit floor.

The single direction travel distance from WC areas on the basement floor to the restaurant storey exit would be extended. The arrangement to provide an alternative storey exit in the façade adjacent to accommodation stair 4 was explored but this was deemed not to be feasible. In a scenario where a fire breaks out in the restaurant space preventing the use of the main storey exit, the alternative escape route from these WCs is to be provided through the kitchen area and into the protected enclosure of escape stair 12. Although escape routes should not pass through kitchen areas, this arrangement is deemed to be acceptable due to the following reasons.

- This alternative escape route will be used by a maximum of ca. 8 people.
- There will be a short travel distance within the kitchen to escape stair 12 exit measured to be ca. 6m.
- As the area used for this escape route is along a circulation space from equipment in the kitchen to the dining area, it is reasonable to expect this area to be clear of obstructions.

4.7 Inner rooms

Where inner room arrangements are proposed, under BS 9999: 2017 the following requirements apply;

- the occupant capacity of the inner room does not exceed 60 (30 where the occupants require assistance escaping);

- the inner room is entered directly from the access room;
- the escape route from the inner room does not pass through more than one access room;
- the travel distance from any point in the inner room to the exit(s) from the access room does not exceed the allowable one-way travel distance;
- the inner room is not a bedroom;
- the access room is not a place of special fire hazard and is in the control of the same occupier as the inner room;
- the enclosures (walls or partitions) of the inner room are stopped at least 500 mm below the ceiling; or
- a suitably sited vision panel not less than 0.1 m^2 is in the door or walls of the inner room, to enable occupants of the inner room to see if a fire has started in the outer room; or
- the access room is protected by an automatic smoke detector that either operates an alarm that is audible in the inner room, to a sound pressure level in accordance with the minimum recommended in BS 5839-1, or gives a visual indication in the inner room if the ambient noise levels are so great as to make an alarm inaudible.

The inner rooms from the proposed design consist of:

Floor	Building	Inner room	Access room
First	Red Barn	Dimmer room	Backstage

Table 8: Inner and access room arrangements

The access rooms will be provided with automatic smoke detection and the arrangements meet the requirements listed above. The inner room arrangements are therefore acceptable.

4.8 Emergency lighting

Emergency escape lighting designed and installed to BS 5266-1 will be provided throughout the building; including on locations of fire safety equipment, escape signage and external areas. This will be provided to prevent the public going into a state of panic in case of failure of the main lighting system. The primary lighting power source is usually from the mains electrical supply. Secondary back-up power supply is required and will be provided from integral battery packs for each luminaire, and a central battery system for emergency lighting in the Guildhall.

The Yellow Guide recommends that emergency lighting be powered continuously; a concept known as maintained emergency lighting. However, it also requires that non-maintained emergency lighting, arranged to switch on automatically in the event of the failure of the normal supply, be provided on stage and technical areas (including fly galleries, lighting bridges and grids).

4.9 Emergency signage

Emergency escape routes and other relevant fire safety related provisions will be provided with signage in accordance with the Health and Safety (Signs and Signals) Regulation 1996. This will include the signing of exit doors/ routes in accordance with BS ISO 3864-1, BS EN ISO 7010 and BS 5499-4.

Signs are to be provided within stairways to identify floor levels and the final exit route from the stair. Refuge points are also to be clearly identified by appropriate signage.

In closely seated areas (auditorium, cinema and studio), evacuation of people especially is to be managed. Specialist signs for wheelchair users could cause confusion from these areas, therefore it should not be used.

In open areas (antechamber), specific signage should be provided to indicate escape routes suitable for wheelchair users i.e. to escape stair 7 where refuge points for the Guildhall are provided.

Escape signage should be fixed at a head height of not less than 2100mm and generally not more than 2500mm above the floor level, measured to the base of the sign.

Escape signage should be adequately illuminated to ensure they are always visible. Areas provided with non-maintained emergency lighting should have maintained internally illuminated escape signage. Within the Guildhall auditorium, light emitting signage is to be provided to assist with wayfinding in case of a fire on the stage.

4.9.1 White Barn roof photovoltaic panels

'PV on the roof' signage is to be provided and clearly visible for the Fire and Rescue Service upon arrival at the building, in particular a prominent sign measuring at least 100 mm x 100 mm displayed at the consumer units or supplier's cut-out.

4.10 Door opening direction, door fastenings, and headroom

All escape doors should open in the direction of travel unless there are 60 people or less using the door (or an alternative managed approach is adopted).

All doors and gates on escape routes (including final exits to external) should be fitted with simple fastenings and hardware that allow them to be easily and readily opened from the side approached by people making their escape. The gate to the Shakespeare courtyard is to be used as an escape route from escape stair 9. This gate should either,

a. Not fitted with a lock, latch or bolt fastenings, or
b. Fitted only with simple fastenings that are all of the following.
    i. Easy to operate; it should be apparent how to undo the fastening.
    ii. Operable from the side approached by people escaping.
    iii. Operable without a key.
    iv. Operable without requiring people to manipulate more than one mechanism.

Additional guidance relating to the appropriateness and choice of door fastenings and furniture can be found in the Door & Hardware Federation '*Code of practice: hardware for fire and escape doors – Issue 4*'.

All escape routes should have a clear headroom of not less than 2m and there should be no projection below this height (except for door frames).

4.11 Escape for mobility impaired persons

Where access is provided for those in wheelchairs or with mobility impairments, a suitable means of escape strategy should be provided. The design should be explicit as regards the provisions of means of escape for disabled people. According to BS 9999, it is not acceptable to omit such detail and state simply that management procedures should/ will be developed to cater for these occupants.

The designer should be able to describe how means of escape in the event of fire is to be achieved from all accessible locations in the premises, whether or not it is intended that disabled people have frequent access to those locations.

The design for wheelchair user evacuation is therefore a balance between the active and passive systems provided and the resource and training of staff to support escape.

Refuge points are to be provided to allow personnel with mobility impairments to wait for assistance from the effects of fire and smoke. Each refuge point is to measure at least 900mm by 1400mm to allow wheelchair users to manoeuvre into position. Each refuge point is to be provided with an emergency voice communication (EVC) system, linked to a master station.

The EVC master station for the buildings adjoined to the Guildhall is to be provided in the main entrance and orientation area. EVC repeater panels are also to be provided in the operations manager office in No. 29 building and in the reception office in the entrance and orientation area.

The EVC master station for the White Barn building is to be provided in the final exit corridor from escape stair 13. The EVC repeater panel is to be provided in the entry foyer and shop in the old warehouse building.

Where refuge points are provided, they should not obstruct or reduce the clear width of the escape routes provided.

According to BS 9999, the preferred means of evacuation for people with mobility impairment from upper floors is by a lift with enhanced fire safety features that allow it to be used safely in the event of a fire. If these are not available, then it might be necessary to carry a person with limited mobility up or down the escape stair. Alternatively, evacuation chairs can be provided to aid their vertical evacuation. Adequate staff and training should be provided to allow safe egress through the adopted approach.

4.11.1 Evacuation arrangements for people with mobility impairments

Accommodation for people with mobility impairments will mainly be in areas that have level access from outside. People with mobility impairments will therefore be able to self-evacuate from these areas.

People with mobility impairments (wheelchairs users) are reasonably not expected to be accommodated in areas with stepped access and no lift installation. Occupants in these areas are expected to be fully ambulant people that will not require assistance to evacuate the building.

For areas with stepped access and provided with a lift installation, the lift installations are to be provided to be suitable for evacuation as outlined in 4.11.2 below. They will be primarily used to assist with the evacuation of mobility impaired personnel in a fire event. Carry up/ down procedures using evacuation chairs are to be used as a secondary means to assist the evacuation of people with mobility impairments.

In areas with stepped access and provided with a lift installation, refuge points will be provided in the fire protected enclosures, with access to an escape stair or lift for evacuation without re-entering accommodation. Each refuge point is to measure at least 900mm x 1400mm and provided with EVCs linked to a master station to a staffed area.

Evacuation of people with mobility impairments from the Guildhall

All wheelchair users are proposed to be seated in the auditorium on the G+1 floor. All refuge points for people with mobility impairments are to be provided in the protected enclosure of escape stair 6, where they can be evacuated from the building with the assistance of member of staffs using the lift installation. In case of the lift installation not available for evacuation, people with mobility impairments are to be assisted to evacuate from refuge points (down escape stair 6) through carry down procedure using evacuation chairs.

From the indicated seating positions for wheelchair users, the storey exit is measured to be within a travel distance of 16m from the furthest wheelchair seating, which marginally exceeds the single direction travel distance for seated areas. As this travel distance will be in areas without any seating, the arrangement for a single escape route for wheelchair users is deemed to be acceptable.

4.11.2 Lifts for evacuation

A lift that is suitable for evacuation purposes should:

- be designed in accordance with BS 9999 (Annex G), BS EN 81-20 and BS EN 81-70,
- be situated within a protected enclosure,
- be associated with a refuge,
- be provided with secondary back up power.

For the proposed redevelopment works, all three lifts are to be provided in accordance with BS EN 81-20 and BS EN 81-70 to allow them to be used for the evacuation of personnel with mobility impairments in a fire emergency. Initially, the lifts will ground with doors open. They are then operated by the fire safety manager or a delegated representative, trained and authorized in the use of the lifts. The lifts can then be used on specific floor levels to assist with evacuation.

All three lift installations are to be provided within the protected enclosure of the escape stair they are situated, there is therefore no need to enclose the lift shafts in fire resisting construction or fire doors. For lift 3 which is proposed to be a dual entry installation, a fire and smoke curtain is to be provided to enclose the lift shaft from the backstage area on the G+1 floor.

As the platform lift adjacent to accommodation stair 1 will be open to accommodation on the ground floor, this stair will not be used for evacuation if a fire breaks out in the entrance & orientation space. The evacuation of wheelchairs users from the basement floor in this scenario will be through carry up procedures through accommodation stair 2 using evacuation chairs.

The primary electrical supply should be obtained from a sub-main circuit dedicated to the lifts and independent of any other main or sub-main circuit.

An alternative power supply to all lifts is to be provided either from a life safety generator.

Adequately trained members of staff are to be provided, when members of the public are in the building, to operate the lifts in a fire emergency to evacuate personnel with mobility impairments.

4.12 External escape routes

All external routes from St George's Guildhall eventually lead to King Street. From the various buildings at the site, occupants arrive at along King Street as outlined in Figure 26:

- 29 Kings Street – directly to King Street.
- Shakespeare Barn – accessed via Shakespeare Courtyard with escape adjacent to external walls to 29 Kings Street.
- Guildhall – some escape routes are directly to Kings Street and others to the Backstage building and through the Shakespeare Courtyard.
- Backstage, Former Fermoy Gallery, Players Workshop and Riverside Restaurant and White Barn Annexe buildings – accessed via the Main Courtyard.
- White Barn – accessed either through the Main Courtyard or through Ferry Lane.

External escape routes through the Main Courtyard and Ferry Lane maintain a distance of more than 1.8m from external walls. A portion of the external escape route through the Shakespeare Courtyard provides a clear width of 0.5m after allowance of a distance of 1.8m from external walls to 29 King Street. This arrangement is deemed to be acceptable from the following arrangements.

- The external walls consist of masonry construction which can be reasonably expected to provide an adequate inherent fire resistance for means of escape.
- Although openings are not fire rated, they are provided at a height range of 0.9-1.4m above walking level. This arrangement allows for occupants to slouch below the opening thresholds whilst they pass across the small sections where the external walls are adjacent to the external escape routes.
- The openings adjacent to this external escape route are likely to be affected (in terms of their integrity) by a well-developed fire. The building is provided with an enhanced means of detection system that will allow for a relatively quick evacuation period, therefore the evacuation of the building can be reasonably expected to have been complete before any potential fire reaches an advanced stage to adversely affect means of escape.

Norfolk Fire and Rescue raised a query regarding contraflow between evacuating occupants and firefighting personnel along the main entrances to the building site. The main entrance point to buildings on site is through the Main Courtyard. To mitigate against contraflow in this area, an alternative escape route for occupants will be provided through the White Barn building and onto Ferry Lane. The exit from escape stair 13 (onto the main courtyard) will not be provided with appropriate hardware for it to be openable from outside. During a confirmed fire event, this exit is to be opened and maintained in an open position by staff members.

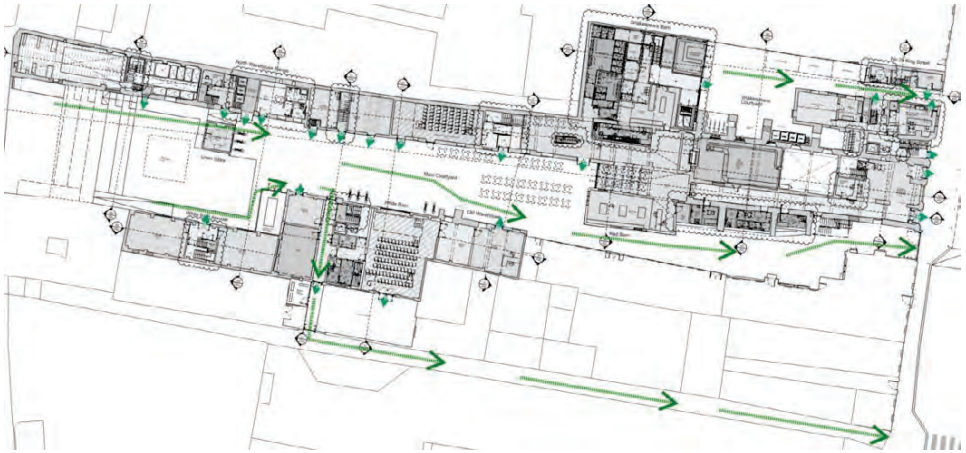


Figure 26: External escape routes on the site

4.13 Assembly points

Consideration should be given to areas outside the building that would be capable of accommodating occupants of the building. The assembly point should be remote enough from the building to minimise the hazards of falling debris. It should also be located such that the arrival of the Fire Service is not obstructed. The designated assembly point should follow the guidelines below:

- Located at a minimum distance of *1.5 x the building height (m)* away from the building.
- Visible from the Fire Service access road.
- Suitably identified either by fire drills, induction or signage to and at the assembly point.
- Sized to accommodate the maximum occupancy of the building.

A preliminary assembly location has been identified by the client at RIBA Stage 4; this is proposed to be located at Tuesday Market Place.

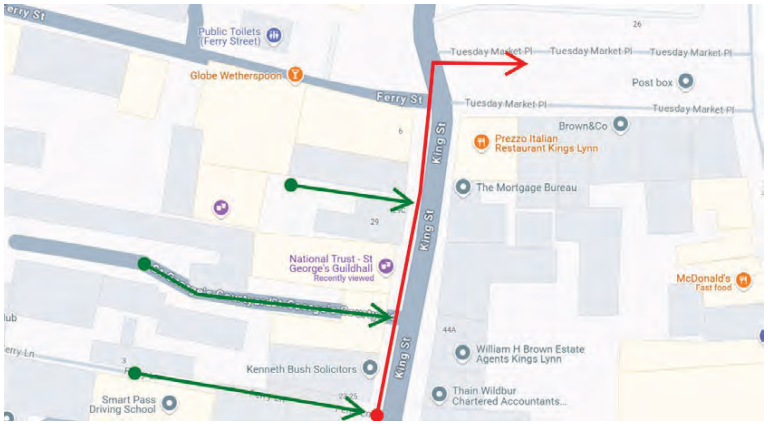


Figure 27: Preliminary proposed assembly location

5 Compartmentation

5.1 Load bearing elements of structure

In order to prevent premature collapse of the building during means of escape and firefighting, the structure will provide specified minimum periods of fire resistance.

According to BS 9999, for a building less than 5m in height (measured to the topmost floor), with a risk profile of B2, the load bearing elements of structure require a minimum of 30 minutes fire resistance. For a building more than 5m but less than 18m in height (measured to the topmost floor), with a risk profile of B2, the load bearing elements of structure require a minimum of 60 minutes fire resistance. Structural fire resistance is specified according to relevant parts of BS 476: 1997 or BS EN 13501-2: 2023.

In the existing building, the projection room on the G+2 floor is measured to be ca. 5.8m from ground level outside the Guildhall building. The Guildhall G+1 level will be at a height of 4.0m for this scheme. The Guildhall elements of structure are therefore permitted to be protected to a period of 30 minutes fire resistance. All other buildings have heights of less than 5m therefore structural elements can also be protected to a period of 30 minutes fire resistance.

The building consists of various elements of structure including timber joists. The period of fire resistance to existing elements of structure is unknown.

The existing buildings are not provided with a fire suppression system. The proposed works will incorporate sprinkler protection to all buildings except the Guildhall and No. 29 King Street buildings. A sprinkler system is recognised to control a fire in its early stages such that its eventual heat release rate will be maintained at a relatively low level. The introduction of sprinkler protection to most buildings on site will therefore provide benefits to protect existing elements of structure. The retention of existing protection to elements of structure is therefore considered to be acceptable, cognisant that remedial structural works would be impractical due to the grade I listed status of the Guildhall building, and the proposed works will not increase the massing of the existing building.

5.1.1 Existing floor structure

Floors (except roofs) are considered as structural elements therefore they should be provided with a period of fire resistance as the building. Floors structures in existing buildings do not always meet this requirement. Even though remedial works could be provided to existing floor structures to improve life safety and property protection, this approach may not be practical in buildings of heritage.

The approach adopted for St Georges' Guildhall is to conduct a risk-based approach to assess whether deficiencies in floor structures would pose a life safety risk and for remedial works to be provided to these areas.

Guildhall buildings

Floor structures (G+0 and G+1) to the Guildhall consist of the following arrangements.

- Brick vaults above the crofters café/ bar western room.
- Existing exposed joist floorboards on beams above the crofters café/ bar eastern room.
- Existing exposed joist floorboards to box office.
- New exposed joist floorboards on beams above the entrance lobby.
- Existing exposed joist floorboards on beams above the St Georges' entrance circulation space.

Masonry construction is widely recognised to provide an inherent level of fire resistance. The brick vaults above the crofters are therefore deemed to maintain an adequate level of fire separation from the upper floors.

New exposed joist floorboards and beams are to be protected from the underside by fire rated ceiling providing a period of 30-minute fire resistance to enhance the floor structural fire resistance.

The fire resistance of exposed timber beams (most onerous condition) was determined from char rate calculations by Momentum Engineering (structural engineers). The following commentary was provided by Momentum Engineering.

> ''The approximate section loss after 60 minutes results in a section width of about 220mm, so with the upstand walls being 125mm wide and in the centre of the beams, there should still be enough uncharred timber around the oak planks to continue to provide a loadpath from the stud walls through to the beams even after 60 minutes.''

The char rate calculations shows that the existing timber beams achieve a period of at least 30 minutes structural fire resistance and could potentially maintain their integrity up to a period of 60 minutes. The existing timber beams are therefore considered to provide adequate structural fire resistance.

Other buildings

Sprinkler protection is to be provided as part of these works to all areas except the Guildhall buildings. The effect of sprinklers will be to control a fire in its early stages such that it would not pose an undue risk to the floor structural integrity. This arrangement is considered to provide an adequate mitigation measure to existing floor structures such as exposed historic timber beams and joists. In most buildings, the existing floor structural fire resistance will be enhanced by the provision of 2 layers of fire boarding, underneath timber beams and joists, to provide a period of at least 30 minutes fire resistance (from underneath).

New floors for the White Barn and White Barn Annexe building will be protected to a period of at least 30 minutes fire resistance, from the underside, with two layers of 12mm plasterboard.

5.1.2 New gallery floors

The new gallery floors are to provide seating at height of a single floor above the Guildhall G+1 floor. These new floors will not be provided with any structural fire resistance; this arrangement was deemed to be acceptable due to the following reasons.

- These floors do not support any structural stability elements to the existing structure and are provided to support floors for seating.
- The Guildhall will be provided with an enhanced means of smoke detection, hence any fire incident will be identified during the early stages. The galleries will be occupied by a limited number of people, resulting in quick evacuation periods from these floors. This arrangement is substantiated by the evacuation calculations outlined in the ASET/ RSET analysis report in Appendix C of this report; the evacuation times were calculated to be ca. 105 seconds and 160 seconds for the performer's and auditorium galleries, respectively,

with an overall evacuation time of 170 seconds from the Guildhall enclosure. Any occupants on these galleries are therefore reasonably expected to have evacuated from the Guildhall by the time a fire reaches an advanced stage to adversely affect the structural integrity of these floors.

5.2 Compartmentation

Compartmentation is to be provided throughout the building to protect escape routes, aid firefighting and to separate different buildings.

Compartmentation is a complete barrier to fire and smoke including the junctions with other walls and floors. The performance of compartmentation is usually taken from the load bearing structural performance unless specified differently according to Table 29 of BS 9999: 2017.

Under current guidance, compartmentation for St George's Guildhall should be provided as outlined in Table 9 below.

Part of the Building	Load bearing capacity Note 1	Integrity Note 2	Insulation Note 3	Method of Exposure
Structural (frame, beam or column)				
All buildings	30	N/A	N/A	All exposed faces
Floors				
Separating a basement from upper floors.	60	60	60	From underside
Separation between G+0 accommodation and the Guildhall. Note 4	60	60	60	From underside
Roofs Note 5				
Any part forming an escape route.	-	30	30	From underside
External walls				
Party wall abutting adjacent building.	-	60	60	Each side separately
Any part adjacent to an external escape route.	-	30	N/A	From inside the building
Compartment walls				
Limiting the extensive areas in the roof to maximum distance of 20m.	-	60	60	Each side separately
Separating buildings into smaller compartments Note 6	-	120	120	Each side separately
Enclosure				
Plant containing life safety equipment	-	120	120	Each side separately
Plant containing normal equipment	-	60	60	Each side separately
Theatre (stage, auditorium and screen passage)	-	60	60	Each side separately
Riser Note 5	-	60/ 30	60/ 30	Each side separately
Escape stair	-	30	30	Each side separately
Subdivision of escape corridors	-	30	30	Each side separately
Kitchen Note 7	-	60	60	Each side separately
Server rooms Note 7	-	60	60	Each side separately
Dressing rooms	-	30	30	Each side separately
Storerooms Note 8	-	30	30	Each side separately
Protected escape routes	-	30	30	Each side separately
Lifts for evacuation	-	30	30	Each side separately
Cavity barriers	N/A	30	15	Each side separately

General note: Outlined numbers are minimum provisions when tested to the relevant part of BS 476 (minutes).

Note 1: The ability of the element to continue to support an imposed load when subject to a fire.

Note 2: The ability of the element to withstand the formation of holes, cracks etc. through which hot gases and flames can pass.

Note 3: The ability of the element to resist the transfer of heat from the exposed face across the thickness of the element to the unexposed face.

Note 4: Two layers of 12mm plasterboard are to be provided above historic floorboards to provide the required 60-minute fire resistance separation between the G+0 accommodation and the Guildhall.

Note 5: Any element of structure supporting a section of the roof, which does not form the function of a floor, is not required to be fire rated.

Note 6: Should be the same as the period of fire resistance for the compartment floor that it penetrates through.

Note 7: Insurer's requirement for the building to be separated into smaller compartments for property protection.

Note 8: National Trust Design Standards requires that kitchen areas be enclosed in 60 minutes fire resisting construction.

Note 8: Storage cupboards with a floor area of less than 1.0m² do not have to be enclosed with fire resisting construction.

Table 9: Compartmentation recommendations for St George's Guildhall

Indicative compartmentation recommendations are outlined on the fire strategy drawings that should be read in conjunction with this report (see Appendix B of this report).

According to BS 9999 guidance, kitchen areas should be separated from other accommodation with 30-minute fire resisting construction. For the proposed design, the kitchen and adjacent drinks store and staff change are proposed to be enclosed within the same fire resisting enclosure to rationalise the provision of fire dampers to service ducts between these enclosures. This consolidated enclosure will be to a period of 60 minutes fire resistance to meet the requirements of the National Trust Design Standards (see Figure 28 below).

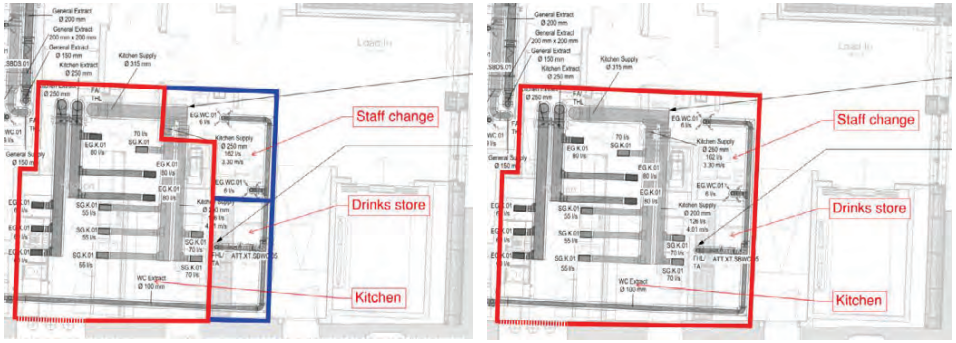


Figure 28: Fire resisting construction to BS 9999 guidance (LHS), and proposed fire resisting construction to consolidate the kitchen and adjacent ancillary accommodation (RHS)

This arrangement was considered to be acceptable due to the following reasons.

- The drinks store and staff change are ancillary accommodation to the use of the kitchen. The ancillary accommodation will be infrequently occupied and associated with a low occupant loading.
- In the event of a fire in the kitchen area, these areas will be evacuated relatively quickly as there is an enhanced means of detection and warning (category L1/P1 fire alarm) and this part of the building will be operated on a simultaneous evacuation strategy. There is therefore a low risk of a fire in the kitchen affecting means of escape from the ancillary accommodation.
- This arrangement will also not affect the fire protection from escape routes, in this instance, the separation between the ancillary accommodation and the adjacent escape route will be upgraded from 30 minutes to 60 minutes fire resistance. Additionally, a fire and smoke curtain will be provided to the adjacent lift lobby, which will provide additional protection between openings into the consolidated kitchen enclosure and the adjacent final exit route from escape 9.

The above arrangement was presented and agreed in principle with Sweco Building Control.

As the building is already existing, some its fabric may not provide the fire resistance recommended in guidance as outlined on the fire strategy drawings. Where walls and floors are being retained as existing, it is acceptable to retain these elements in their current condition provided that the current arrangement does not represent an undue life safety risk.

Where walls and floors are, however, being altered or their existing condition presents an undue life safety risk, remedial works should be made to provide the recommended fire resistance periods. Areas should be noted where providing retrospective remedial works to comply with current guidance is impractical due to the heritage features of the building. Alternative fire engineered/ risk-based approaches are then to be explored and discussed with the Approving Authorities.

In addition to life safety, retrospective remedial works are also recommended for these works to upgrade the compartmentation provisions at St George's Guildhall for the purposes of asset/ property protection.

5.2.1 Separation between the Undercroft, G+0 accommodation and Guildhall enclosure

According to BS 9999 guidance, floor compartmentation should be provided between a basement and upper floors. Fire resisting floor construction is also recommended between ancillary accommodation and a theatre enclosure.

The Undercroft is separated from the Guildhall by a combination of a brick vault and exposed timber joist floorboards on beams. The brick vaults are considered to inherently provide an adequate level of fire resistance to meet the Part B3 functional requirements.

The exposed timber joist floorboards are to be provided with two layers of 12mm plasterboard to achieve a period of 60 minutes fire resisting construction. Similarly, historic floorboards beneath the Guildhall are to be provided with two layers of 12mm plasterboard to provide the required 60-minute fire resistance separation between the G+0 accommodation and the Guildhall.

5.2.2 Plant room supporting smoke extract fans

The Guildhall smoke extract fans are proposed to be located on the roof of Shakespeare Barn. According to BS 9999 guidance, life safety systems should be enclosed with 120-minute fire resisting construction. The floor supporting the roof plant will not be provided as a 120-minute compartment floor (elements of structure supporting this roof will only be provided to a structural fire resistance period of 30 minutes) and this arrangement deviates from guidance. This arrangement is deemed to be acceptable the following reasons.

- The smoke extract fans support life safety in case of a fire that breaks out in the Guildhall enclosure. These smoke fans are not needed for life safety for a fire that breaks out in other locations. For a fire scenario in the Shakespeare Barn that will affect the operation of these smoke extract fans, occupants from the Guildhall will be remote to adverse effects of the fire and smoke. The arrangement to locate the smoke extract fans on the Shakespeare Barn roof plant will therefore not compromise the life safety of occupants in the Guildhall.

5.2.3 External walls adjacent to external escape routes

The external escape routes through the Shakespeare courtyard are within 1.8m of external walls to of No. 29 King Street building. According to BS 9999 guidance, external walls within 1.8m of external escape routes should be fire rated to a period of 30 minutes fire resistance from inside the building.

The fire rating of these external walls is unknown, however, these walls consist of masonry construction which is reasonably expected to provide a considerable period of fire resistance. The openings within these walls are measured to be located ca. 0.9m to 1.4m above ground level. Evacuating occupants could therefore crouch under whilst passing through short distances where these openings are provided. Additionally, the evacuation process will be initiated in the early stages of a fire (due to the provision of an enhanced means of detection) and these escape routes are expected to be adversely affected in the latter stages of a fire. This arrangement is considered to be

acceptable as this is an existing condition not made worse by the proposed works and deemed not to pose an undue life safety risk, combined with the improvements being made to the means of detection and warning to the building.

5.3 Junction between compartment walls and roofs

A compartment wall should be continued to meet the underside of the roof covering or deck, with fire-stopping provided where necessary at the junction to maintain the continuity of the compartmentation. Compartment walls for the buildings are indicated on the fire strategy drawings in Appendix B of this report.

According to BS 9999, a zone of roof 1.5m wide either side of the wall should have a covering of designation AA, AB or AC (national class) or B_{ROOF}(t4) (European class), on a substrate or deck of material meeting Class A2-s3, d2 (European class).

At the junction between compartment walls and roofs, a zone of 2.5m wide either side of the wall is to have covering of designation AA, AB or AC (national class) or B_{ROOF}(t4) (European class), on a substrate or deck of material meeting Class A2-s3, d2 (European class) in accordance with the National Trust Design Standards. *According to European Commission Directive 89/106/EEC, natural/ stone slates, stone, clay, ceramic or stell roof tiles are considered to meet the equivalent of specification of B_{ROOF}(t4) without further testing.*

5.4 Fire stopping

Any penetrations through compartmentation or areas of high fire risk are to be fire stopped to the same fire resistance in which the penetration passes. According to BS 9999, proprietary fire-stopping and sealing systems (including those designed for service penetrations) are available and may be used provided that they achieve the appropriate level of fire resistance when tested or classified in accordance with BS 476-22, BS EN 1366-3 or BS EN 13501-2.

Pipes that penetrate through compartment walls, floors or cavity barriers should meet one of the following provisions:

- Proprietary seals - provide a proprietary sealing system which has been shown to maintain the fire resistance of the wall, floor or cavity barrier according to BS 476-20, BS 476-21 and BS 476-22 or BS EN 1366-3.
- Restricted pipe diameter - where a proprietary sealing system is not used, fire stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimensions given in Table 10 below.

Situation	Pipe material and maximum nominal internal diameter (mm)		
	Non-combustible Material Note 1	Lead, aluminium, aluminium alloy, uPVC, fibre cement Note 2	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft	160	110	40
Any other situation	160	40	40

Note 1: A non-combustible material (such as cast iron or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.

Note 2: uPVC pipes conforming to BS 4514 and uPVC pipes conforming to BS 5255.

Table 10: Recommendations for maximum nominal diameter for pipes passing through compartmentation

5.5 Fire doors

Fire doors form part of compartmentation required to protect escape routes. All fire doors performance requirements are outlined on the fire strategy drawings attached as Appendix B of this report.

Fire doors should provide the same fire resistance as the fire resisting construction they are provided (except for fire doors to escape stairs, protected shafts and enclosures to life safety equipment which are permitted to provide half the fire resistance as the fire resisting construction). There are existing doors (two fire doors) along fire resisting construction that do not provide the same fire resistance as the former due to heritage reasons. In these instances, these fire doors will provide a nominal period of 30 minutes fire resistance. These fire doors will provide a reasonable barrier to fire and smoke to allow for occupants to evacuate the building, therefore this arrangement is deemed to be acceptable.

5.6 Fire and smoke curtains

Fire and smoke curtains are to be provided to enclose the open kitchen areas and protect escape stair 9 final exit route (see fire strategy drawings for proposed locations).

These fire and smoke curtains are to be designed and installed in accordance with BS 8524-1 and BS 8524-2 to meet the following design specification. Upon smoke detection in specified parts of the building as outlined in Table 11 below, relevant fire and smoke curtains are to fully descend to the floor level in accordance with BS 7273-4.

Location	Enclosing the kitchen area in the Shakespeare Barn	Protecting the lift for evacuation lift on the G+1 floor
General requirements	In accordance with BS 8524-1 and BS 8524-2.	In accordance with BS 8524-1 and BS 8524-2.
Fire resistance	Minimum of 60 minutes (integrity). Note 1	Minimum of 120 minutes (integrity). Note 2
Initiation method	Close upon smoke detection from anywhere in the building.	Close upon smoke detection from the backstage area on the G+1 floor.
Deployment method	Immediate single full deployment.	Immediate single full deployment.
Emergency egress and access controls	No	No
Smoke containment	Yes, maximum leakage 3m³/m/h.	Yes, maximum leakage 3m³/m/h.
Reaction to fire classification	European class C-s3, d2.	European class C-s3, d2.
Deflection zone	The deflection to be measured in accordance with BS EN 1634-1.	The deflection to be measured in accordance with BS EN 1634-1.
Reliability/ durability	Class C1 in accordance with BS EN 14600.	Class C1 in accordance with BS EN 14600.
Obstruction warning	A device giving a warning alarm, and/ or permanent markings should be provided to indicate the area to be kept clear.	A device giving a warning alarm, and/ or permanent markings should be provided to indicate the area to be kept clear.
Inspection, testing and maintenance	As specified by the manufacturer.	As specified by the manufacturer.

Note 1: Increased from 30 minutes to 60 minutes for kitchen areas to meet the National Trust Design Standards

Note 2: Increased from 30 minutes to 120 minutes to meet the property protection measures.

Table 11: Recommendations for the proposed fire and smoke curtains

5.7 Internal linings

Restrictions are placed on the use of wall and ceiling linings within certain areas of buildings. This is to limit the spread of fire and production of smoke.

Although they are unlikely to be the first materials to ignite, the choice of materials for wall and ceilings can significantly affect the spread of a fire and its rate of growth and should be selected carefully. Selecting internal linings for circulation spaces having non-flammable characteristics that can delay the spread of fire is particularly important so that the occupants' means of escape is not compromised.

The internal linings in this building will need to meet the specifications outlined in Figure 29 (Table 33 taken from BS9999: 2017) in accordance with BS EN 13501-1.

Table 33 **Classification of linings**[A]

Location	National class[B]	European class[C, D]
Small room of area not exceeding 4 m² in a residential building and 30 m² in a non-residential building and domestic garages not exceeding 40 m²	3	D-s3, d2
Other rooms (including garages)	1	C-s3, d2
Circulation spaces within dwellings	1	C-s3, d2
Other circulation spaces[D] including the common areas of flats	0	B-s3, d2

NOTE Linings which can be effectively tested for "surface spread of flame" are rated for performance by reference to the method specified in BS 476-7:1987, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest. Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either:

a) *composed throughout of materials of limited combustibility; or*

b) *a material having a Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (i_1) of not more than 6.*

The fire propagation index is established by reference to the method specified in BS 476-6.

European classifications are described in BS EN 13501-1:2007+A1.

[A] Recommendations are given in Clause **33** for linings of concealed voids.

[B] The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.

[C] When a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles.

[D] Large rooms such as open plan offices, shops display areas and factories need not be regarded as circulation spaces even though there are circulation routes in them.

Figure 29: Classification of linings taken from BS9999: 2017

Parts of walls may have a reduced performance than specified above (but never less than National Class 3 or European Class D-s3, d2) provided the total area of those parts in any one room does not exceed one half of the floor area of the room, subject to a maximum area of 60m².

For St George's Guildhall, the requirements are (*NB. Exposed beams and similar narrow member are not considered for this requirement*):

- Stores and plantrooms less than 30 m² in area: Walls and ceilings to achieve European class D-s3, d2.
- Ancillary accommodation and plant rooms exceeding 30 m² in area: Walls and ceilings to achieve European class C-s3, d2.
- Circulation/ escape corridors, stair lobbies, and stair enclosures, **entrance & orientation**, **foyer/ café area and gift shop**: Walls and ceilings to achieve European class B-s3, d2.
- The Undercroft and Guildhall spaces: Walls and ceilings to achieve European class B-s3, d2.

5.7.1 Fabrics and decorative features (drapery)

According to BS 9999, fabrics and decorative features should be non-combustible or should conform to the requirements for classification as type B in accordance with BS 5867-2. Fabrics and decorative features should not be provided within enclosed escape routes (other than foyers) unless made from non-combustible materials. Drapes should not be provided in front of exit doors or across escape routes.

The openings between the stage area and the screen passage are to be provided with drapery for use during shows. This drapery is to consist of non-combustible materials or should be of the specification of type B to BS 5867-2: 2008.

5.8 Concealed spaces and cavities

Concealed spaces or cavities in construction will be provided with cavity barriers or fire stops in accordance with Figure 30 (taken from Approved Document B: 2019):

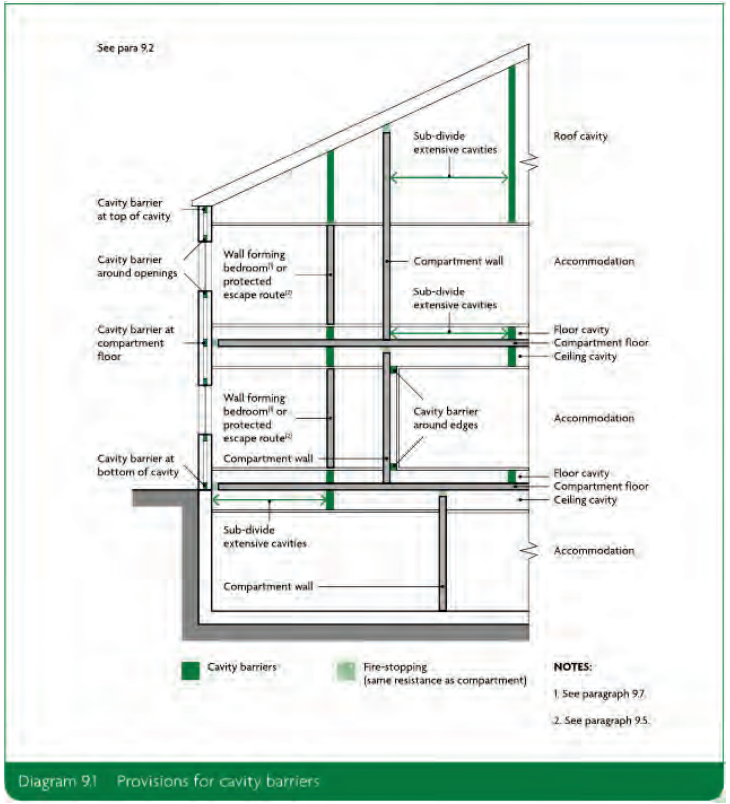


Figure 30: Provisions of cavity barriers (taken from Approved Document B: 2019)

Cavity barriers are to be selected and installed in accordance with clause 33.1 of BS9999: 2017. Cavity barriers are to meet a fire performance of 30 minutes fire integrity and 15 minutes fire insulation, and be positioned to observe the limits given in Figure 31 (taken from BS9999: 2017):

Location of cavity	Class of surface/product exposed in cavity (excluding the surface of any pipe, cable or conduit, or any insulation to any pipe)		Maximum dimensions in any direction
	National class	European class	m
Between a roof and a ceiling	Any	Any	20
Any other cavity	Class 0 or Class 1	Class A1; or Class A2-s3, d2; or Class B-s3, d2; or Class C-s3, d2	20
	Not Class 0 or Class 1	Not any of the above classes	10

NOTE 1 The national classifications do not automatically equate to the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

NOTE 2 When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

Figure 31: Maximum dimensions of cavities

Cavity barriers are to be provided to close the edges of cavities, including around openings. Cavity barriers will also be provided:

a) at the junction between an external cavity wall (except where the cavity wall conforms to Figure 36 of BS9999: 2017) and every compartment floor and compartment wall; and
b) at the junction between an internal cavity wall (except where the cavity wall conforms to Figure 36 of BS9999: 2017) and every compartment floor, compartment wall, or other wall or door assembly which forms a fire-resisting barrier.

NB: Cavities also include those created by rain-screen cladding.

It should be noted from the above that cavity barriers are required to ensure both horizontal (e.g. floor) and vertical (e.g. walls) fire compartmentation.

It is important to continue any compartment wall up through a ceiling or roof cavity to maintain the standard of fire resistance, therefore compartment walls will be carried up full storey height to a compartment floor or to the roof as appropriate. It is therefore not appropriate to complete a line of compartmentation by fitting cavity barriers above the compartment wall.

For a protected escape route, a cavity that exists above or below any fire-resisting construction because the construction is not carried to full storey height or, in the case of a top storey, to the underside of the roof covering, will be either:

a) fitted with cavity barriers on the line of the enclosure(s) to the protected escape route; or

b) for cavities above the fire-resisting construction, enclosed on the lower side by a fire-resisting ceiling which extends throughout the building, compartment or separated part.

Extensive concealed spaces will be subdivided to meet the dimensions in Figure 31 above, with the following exceptions:

a) in a wall which should be fire-resisting only because it is loadbearing;

b) in a masonry or concrete external cavity wall shown in Figure 32 below;

c) in any floor or roof cavity above a fire-resisting ceiling, as shown in Figure 33 below and which extends throughout the building or compartment subject to a 30 m limit on the extent of the cavity;

d) formed behind the external skin of an external cladding system with a masonry or concrete inner leaf at least 75 mm thick, or by over cladding an existing masonry (or concrete) external wall, or an existing concrete roof, provided that the cavity does not contain combustible insulation and the building is not put to a residential or institutional use;

e) between double-skinned corrugated or profiled insulated roof sheeting, if the sheeting is a material of limited combustibility and both surfaces of the insulating layer have a surface spread of flame of at least Class 0 or Class 1 (national) or Class C-s3, d2 or better (European) and make contact with the inner and outer skins of cladding (see Figure 38);

f) below a floor next to the ground or oversite concrete, if the cavity is less than 1 000 mm in height or if the cavity is not normally accessible by persons, unless there are openings in the floor such that it is possible for combustibles to accumulate in the cavity (in which case cavity barriers should be provided and access should be provided to the cavity for cleaning);

g) cavities that are specifically protected by a sprinkler system in accordance with BS EN 12845.

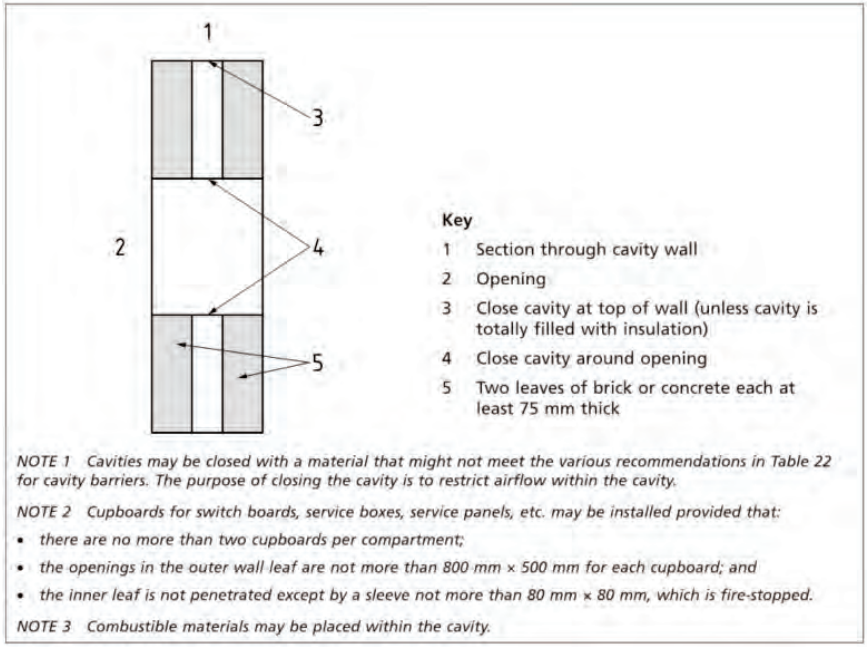


Figure 32: Cavity wall excluded from cavity barrier provision (Figure 36 from BS 9999)

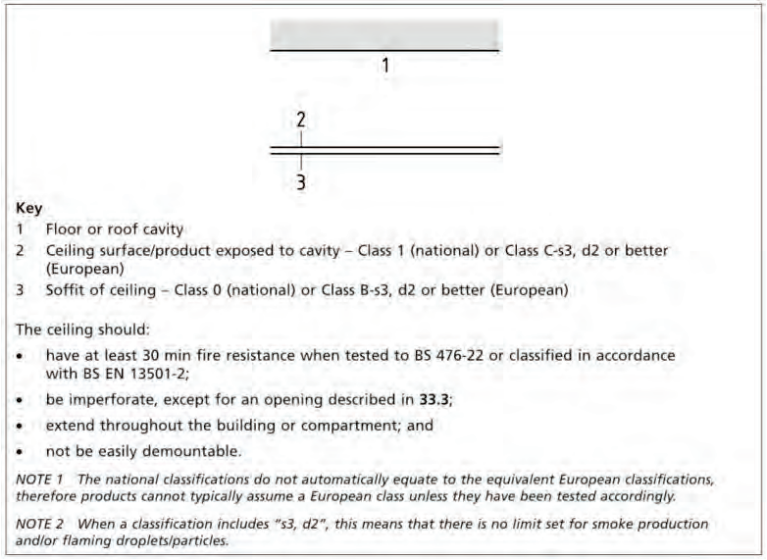


Figure 33: Fire resisting ceiling below concealed space (Figure 37 from BS 9999)

Where any single room with a ceiling cavity or underfloor service void exceeds the dimensions given in Figure 31 above, cavity barriers will be provided on the line of the enclosing walls/partitions of that room, where:

1) the cavity barriers are no more than 40 m apart; and
2) the surface of the material/product exposed in the cavity is Class 0 or Class 1 (national) or Class C-s3, d2 or better (European).

Where the concealed space is over an undivided area which exceeds 40 m (this may be in both directions on plan), the cavity will be limited to the dimensions in Figure 31 above, unless all of the following criteria are met:

a. the room and the cavity together are compartmented from the rest of the building;
b. an automatic fire detection and fire alarm system meeting the relevant recommendations of BS 5839-1:2013 is fitted in the building. Detectors are only required in the cavity to satisfy BS 5839-1:2013;
c. the surface of the material/product used in the construction of the cavity which is exposed in the cavity is Class 0 (national) or Class B-s3, d2 or better (European) and the supports and fixings in the cavity are of non-combustible construction;
d. the flame spread rating of any pipe insulation system is Class 1 or Class C-s3, d2 or better (European);
e. any electrical wiring in the void is laid in metal trays, or in metal conduit;
f. any other materials in the cavity are of limited combustibility or Class A2 or better (European).

5.8.1 Arrangement for St George's Guildhall

Guildhall auditorium

There is a void beneath the Guildhall that extends a length of ca. 32.6m. According to BS 9999, a void in a single room is permitted without cavity barriers if the void does not extend more than 40m, and surfaces facing the void meet at least class C-s3, d2. This void is considered to extend across a single room hence this cavity is permitted not to be provided with cavity barriers as no dimension exceeds 40m. However, there will timber surfaces within this void, hence the surfaces exposed to the void will not meet at least class C-s3, d2. This arrangement is considered to be acceptable for this arrangement as fire detection is to be provided in this void, using an aspirating system. The provision of fire detection resulting in the early evacuation of the Guildhall before extensive unseen fire spread that could adversely affect means of escape remote to location of origin.

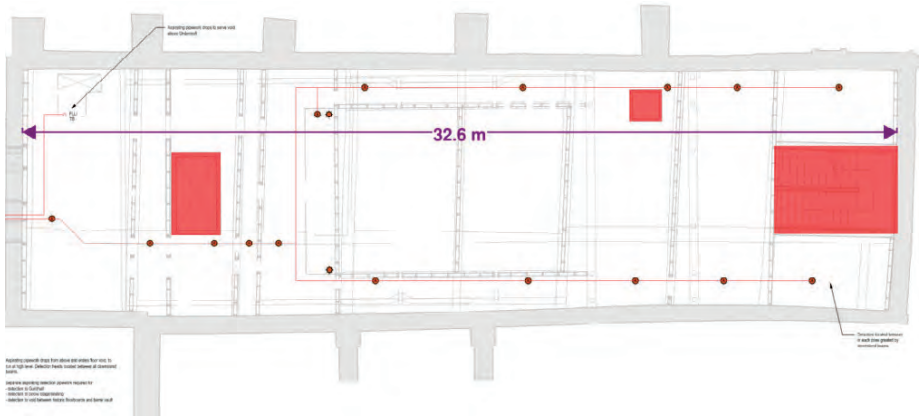


Figure 34: Extent of void beneath the Guildhall, provided with an aspirating fire detection system

Other voids

All other voids in the building will have dimensions less than 20m, hence no cavity barriers will be provided in line with guidance recommendations.

5.8.2 Roof spaces

According to the National Trust Design Standards, roof spaces should be provided with fire compartmentation to a period of 60 minutes fire resistance. Compartment walls should be provided at 20m intervals with the area of roof compartments not normally exceeding 150m^2 – 200m^2.

Some of the 60-minute compartment walls indicated on the fire strategy drawings in Appendix B are to be provided to meet this requirement.

5.9 Building services ductwork

When ductwork systems are installed within a building it is important that the ductwork does not assist in transferring fire and smoke through the building and put at risk the protected means of escape from the accommodation areas.

Measures to aid fire-fighting control should be incorporated, including the following.

a) Ventilation systems serving protected escape routes should not serve other areas and the normal airflow pattern should be directed away from the escape route.

b) Separate ventilations systems that do not allow for the re-circulation of air within them should also be provided for:

1) each protected stairway;

2) plant areas;

3) car parks;

4) non-domestic kitchens; and

5) residential parts of mixed-use buildings.

c) Ducts passing through the enclosure of a protected escape route should conform to the relevant fire-resistance recommendations

d) Ducts passing through compartment walls and floors and other fire separating elements should maintain the fire integrity using one of the following methods given in BS 9999:2017, clause 32.5.2:

1) Method 1 (using thermally actuated fire dampers);

2) Method 2 (using fire resisting enclosures);

3) Method 3 (using fire resisting ductwork);

4) Method 4 (automatically actuated fire and smoke dampers triggered by smoke detectors)

e) Where a ductwork system serves more than one part of a compartmented or fire separated escape route, smoke detector operated fire dampers should be provided. Method 1 as outlined in point d) above is not acceptable with these arrangements.

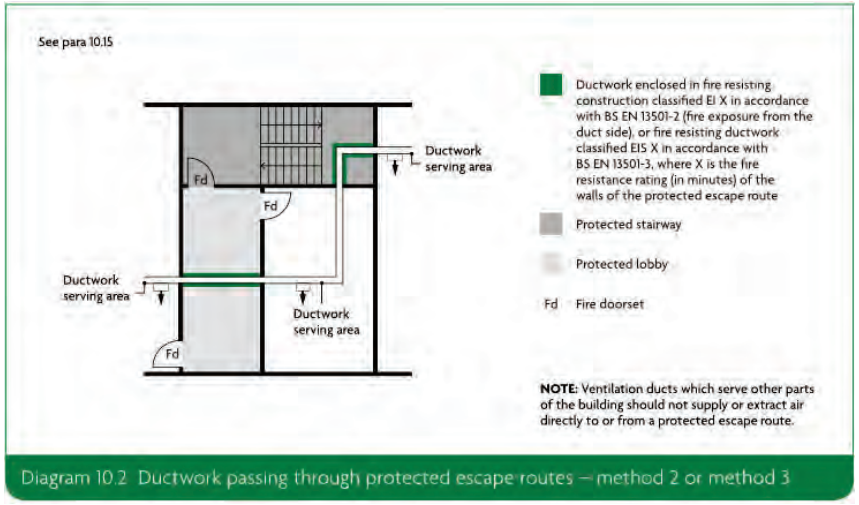


Figure 35: Fire resisting enclosure for ductwork passing through escape routes

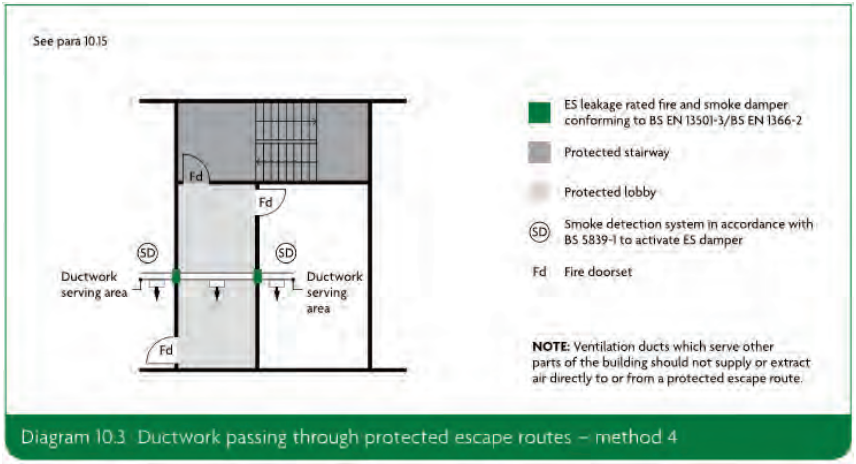


Figure 36: Smoke detector actuated fire dampers for ductwork passing through escape routes

f) The fire resistance of ducts and dampers should be equal to the fire resistance required for the building element being penetrated. All ducts should be fire-stopped where they penetrate compartments and fire-resisting enclosure of escape routes.

g) Systems which re-circulate air should be fitted with smoke detectors in the extract ductwork before the point of separation of the re-circulated air and the air to be discharged and before any filters or other air cleaning equipment. Detection should cause the system to immediately shut down or switch to extract the air to an external location.

h) Systems should be provided with overriding fire-fighting controls in accordance with BS 9999: 2017, clause 32.5.7.

i) Air transfer grills should not be positioned in enclosures to protected stairways, protected lobbies, protected corridors, fire-fighting stairways and lobbies, protected shafts and compartment walls or floors.

j) Exhaust outlets should be positioned such that they:

1) do not discharge products of combustion close to final exits or other parts of escape routes;

2) are not close to any combustible or otherwise vulnerable element of the building construction;

3) do not enable re-entry of exhaust products back into the building or other ductwork.

k) Ducts should be designed and constructed in accordance with BS 8313.

l) Where pressurization or other smoke control systems are installed within a building any ventilation and air conditioning system should be compatible with its operation under fire conditions.

m) Where plant areas are within the building, they should be treated as separate fire compartments in order to isolate any fire source.

Additional detailed guidance relating to the configuration of mechanical ventilation and air-conditioning systems from a fire safety perspective can be found in clause 32.5 of BS9999: 2017.

For the works at St Georges' Guildhall, service ductwork is to be fire stopped according to the following arrangements.

- Thermally actuated fire dampers are to be provided where ductwork penetrate compartmentation that do not enclose protected escape routes.
- Smoke actuated fire dampers are to be provided where ductwork penetrate compartmentation that enclose protected escape routes.
- 60-minute fire rated ductwork is to be provided for the smoke extract system from the Guildhall.
- 60-minute fire rated ductwork is to be provided for the Shakespeare Barn kitchen extract system.
- The kitchen extract system for the riverside restaurant kitchen consists of ductwork that do not penetrate through other fire compartments. It was therefore deemed acceptable for this ductwork not to be fire rated as there is no risk of fire spread to other areas of the Guildhall buildings.

6 Stage areas

6.1 Guildhall Stage

The Guildhall stage is currently provided with a proscenium arch, but no safety curtain is in place. It is proposed to remove the existing proscenium arch as part of the redevelopment works to replicate the original arrangement. New Gallery levels will be provided, accessed via accommodation stairs. This introduces seating at height which could potentially subject occupants to adverse effects of smoke from a stage fire earlier than conditions present in the existing arrangement (where there is only a tiered stalls level).

Both proposed arrangements outlined above represent a worsening of the existing conditions in the Guildhall auditorium. The removal of the proscenium arch means that the Guildhall will consist of an open stage arrangement. According to guidance of BS 9999 and the Yellow Guide, exhaust ventilation, preferably mechanical, should be provided over any open stage. The extract system over an open stage should be sized to keep the auditorium "relatively clear" of smoke during the period of evacuation in the event of a fire on stage.

The proposed open stage arrangement is supported by the provision of mechanical smoke ventilation from above the stage area. The introduction of a gallery levels is justified by way of a fire engineered solution based on an ASET (Available Safe Egress Time)/ RSET (Required Safe Egress Time) analysis. The ASET was acquired from conducting Computational Fluid Dynamics (CFD) fire and smoke modelling; whilst the RSET was deduced from evacuation calculations based on principles outlined in PD 7974-6. The ASET should exceed the RSET (with a reasonable safety margin).

This ASET/ RSET analysis was conducted in RIBA Stage 3 and the report is provided in Appendix C of this report. The input parameters for the CFD analysis and evacuation calculations were agreed with AISCS and NFRS. The results of this analysis are summarised below. The CFD modelling input and output files, and the ASET/ RSET analysis are subject to approval from Sweco Building Control and a third-party reviewer.

Performer's gallery

The RSET for occupants to travel from the performer's gallery to the Guildhall first floor was determined to be 105 seconds. The ASET taken at 2m above this gallery floor was determined from smoke visibility to be 248 seconds. The ASET exceeds the RSET with a 136% safety margin; this was considered to be acceptable.

Auditorium gallery

The RSET for occupants to travel from the auditorium gallery to the Guildhall first floor was determined to be 153 seconds. The ASET taken at 2m above this gallery floor was determined from smoke visibility to be 185 seconds. The ASET exceeds the RSET with a 21% safety margin; this arrangement was considered to be acceptable from a risk-based approach based on the following reasons.

- The ASET was determined from considering an extensive area above the stair landing area. During the latter stages of the evacuation process, a few occupants are expected to be queuing in this area adjacent to the stair landing. As shown by a vertical slice, the visibility conditions of this area are more than 5m up to a simulation period of 200 seconds. The ASET would therefore exceed the RSET by a safety margin of 31% in areas expected for occupants to be queuing in the latter stages of an evacuation.
- Emergency lighting will be provided in close proximity to the stair landing area (as emergency lighting is required in areas of level changes). This emergency light emitting signage will improve visibility conditions for occupants to identify exit signage showing the escape route down the stair (this aspect was not accounted for in the CFD model).
- Smoke toxicity was found to be significantly below the incapacitation levels for the entire simulation time of 250 seconds. This show a safe environment is available for the evacuation of all the occupants from the auditorium gallery floor (the evacuation time being 153 seconds).

The provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate from the auditorium gallery.

Guildhall first floor

The RSET for occupants to travel from the Guildhall enclosure to the ground floor, external stair or adjacent compartments was determined to be 167 seconds. The ASET was determined from smoke visibility to be 235 seconds. The ASET exceeds the RSET with a 41% safety margin; this arrangement is considered to be acceptable from a risk-based approach based on the following reasons.

- The RSET considered the time for occupants to travel down the entire accommodation flight of stairs to the ground floor. In the latter stages of an evacuation, the last occupants to evacuate down the accommodation stair will be able to take temporary refuge on the stair half landing area, which is at a lower level than the Guildhall first floor. This accommodation stair half landing was shown to have visibility conditions of more than 5m for the entire simulation time of 250 seconds. This show a safe environment is available for the evacuation of all the occupants from the Guildhall first floor (the evacuation time being 167 seconds).
- As mentioned above, the provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate to the accommodation stair half landing area.

The mechanical smoke ventilation system is to meet the following specification:

- The system is to be provided with an independent power supply which would operate in the event of failure of the main supply. A power supply in accordance with BS 8519 should be provided to the fans and all actuators and controls. The system will be provided with secondary back up power from a life safety generator. All wiring associated with the fans should be in accordance with BS 8519.
- Fans should be capable of handling elevated gas temperatures of 300°C for a continuous period of not less than 60 min and tested in accordance with BS EN 12101-3. The system should be provided with a standby fan that operates automatically upon failure of the duty fan. Both fans should be in accordance with BS EN 12101-3. Where only a single mechanical extract is provided, the fans should be duty/ standby fans, as fan failure would result in failure of the system.
- The ductwork should be a fire-resisting duct system not less than 60 minutes fire rated BS EN 13501-3.

6.2 Undercroft Stage

Under guidance of BS 9999 and the Yellow Guide, any stage area should be provided with ventilation, with no distinction between full size theatres with large stages capable of staging full theatre productions or smaller studio theatres with restricted stage sizes.

For the flexible performance space in the Undercroft, it is considered that ventilation is not required above the stage. This is based on the following arrangements:

- This performance space is associated with a very small stage by theatre standards, measured to provide an area of ca. 12m^2. By virtue of its size, it is not expected for significant amounts of combustible materials to be present therefore there will be typically a low fire loading on this stage.
- This performance space constitutes of a stalls level only with no seating at height. There is therefore a low risk of occupants to be adversely affected by effects of smoke before they have evacuated from this space.

7 External fire spread

Part B4 functional requirements of The Building Regulations are as follows:

- B4(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.
- B4(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

As the intention is to prevent fire spread between adjacent buildings, performance recommendations for external wall surfaces, roof coverings and unprotected openings are related to the separation distance available between a building and the relevant boundary or opposite buildings.

Guidance of BS 9999 recommends that space separation requirements should be assessed in order to limit fire spread from one building to another and vice versa.

When considering external fire spread recommendations, guidance principles of BS 9999 outlined below should be noted.

- In modifying existing structures, if the new work can be shown not to have a negative impact on the remainder, it is possible that no work will be needed on the remainder, although it might be possible to offer improvement as good practice.

The Fire Surgery's understanding of the scope of works is that there are to be limited alterations to the building envelope (external walls, openings and roof). It is therefore acceptable to retain existing external fire spread conditions based on the fact that there will be no worsening of the existing arrangements. Nonetheless, an external fire spread assessment for the existing buildings, and proposed alterations are assessed in section 0 below.

External walls coincident with or within 1m of the relevant boundary are required to provide a period of fire resistance the same as that of the building (integrity and insulation from both sides). Small openings not exceeding 1m^2 in area are permitted to coincide with the relevant boundary, however, such openings should be separated by a distance of at least 4m.

External walls at least 1m from the relevant boundary are permitted to have unprotected openings if there are adequate separation distances as according to principles of BR 187.

Escape stairs are considered as fire sterile areas. External walls and openings within the protected enclosure of escape stairs can therefore be disregarded external fire spread assessment and can be fully unprotected.

7.1 BR 187 approach

The method used of assessing acceptable unprotected openings in external walls is adopted from BR 187, External Fire Spread: Building separation and boundary distances, 2015. This methodology is based on the number of openings and unprotected areas in the external enclosure of the building.

According to principles outlined in BR 187, for buildings to be provided with sprinkler protection, it is permissible to reduce the minimum boundary distance to 50% relative to the separation distance required for a building without a suppression system.

A radiating surface will be based on individual fire compartments for the building (30 minutes fire resistance). When compartment floors are provided, the fire spread across floors is unlikely therefore fire compartments will be limited to a single floor. On each elevation, the longest external wall surface will be considered as the worst-case scenario.

7.1.1 Relevant boundaries and separation distances

The required separation distance is taken from the building façade to the relevant boundary. The relevant boundary is established as outlined below.

- Where the façade faces a site boundary line, the relevant boundary is taken to the site boundary line.
- Where the façade faces a road, the relevant boundary is taken as a notional boundary to the middle of the road.
- Where the façade faces another building within the site under the same ownership, the relevant boundary is taken as a notional boundary midway between the buildings.

The relevant boundaries and separation distances for buildings at St Georges' Guildhall are shown in Figure 37 and Figure 38 below.

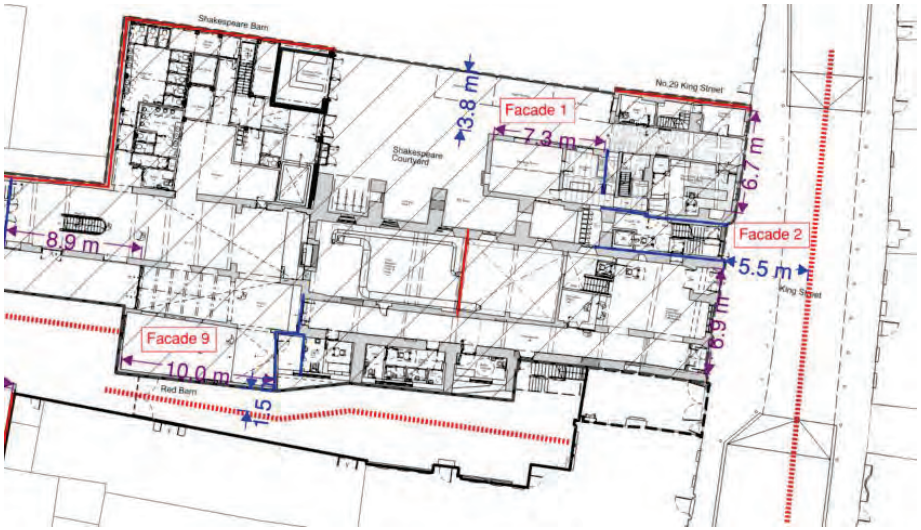


Figure 37: Relevant boundaries, separation distances and façade references (1)

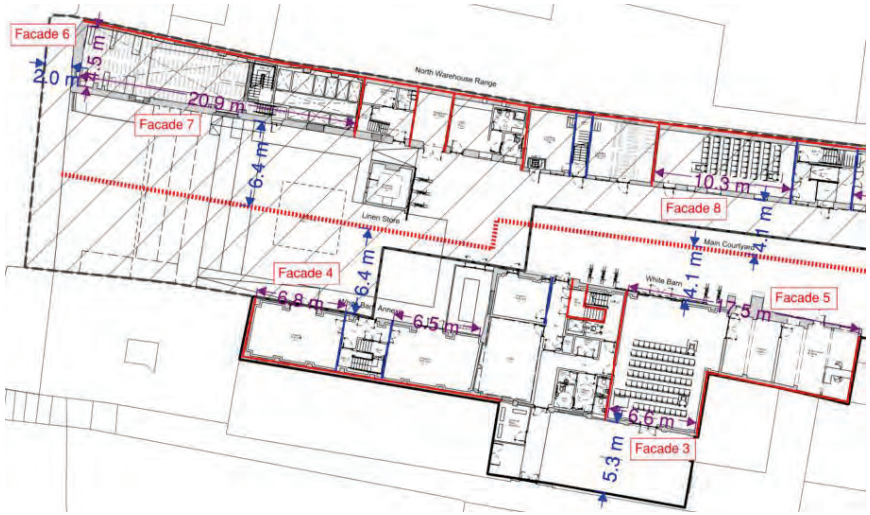


Figure 38: Relevant boundaries, separation distances and façade references (2)

7.1.2 Unprotected opening assessment

The external façade assessment for unprotected openings in external walls is outlined in Table 12 below.

Façade	Façade width (Enclosing rectangle width)	Façade height (Enclosing rectangle height)	Unprotected Area/ Enclosing Rectangle Area (%)	Separation distance required (m)	Separation distance available (m)
1	7.3m (9m)	6m	81	4.5m	3.8m
2	6.9m (9m)	6m	77	4.4m	5.5m
3	6.6m (9m)	4.9m (6m)	60	1.8m	5.3m
4	6.8m (9m)	6m	76	2.2m	6.4m
5	17.5m (18m)	4.9m (6m)	79	2.8m	4.1m
6	4.5m (6m)	2m (3m)	50	0.8m	2.0m
7	20.9m (21m)	2m (3m)	66	1.5m	6.4m
8	10.3m (12m)	4.8m (6m)	69	2.3m	4.1m
9	10m (12m)	4.6m (6m)	64	2.1m	1.5m

Table 12: External fire spread assessment

The separation distances from façade 1 (No. 29 King Street on the north elevation) and façade 9 (red barn on the south elevation) are not adequate for the entire façade areas to be unprotected.

The external walls at St Georges' Guildhall consist of masonry construction. Brick walls are inherently non-combustible and are recognised to provide a considerable period of fire resistance. The external walls (solid construction) are therefore reasonably expected to provide an adequate level of fire resistance.

Assuming that the external wall solid construction provides an adequate level of fire resistance;

- Façade 1 is permitted to have unprotected openings with a combined area of 36m^2. The unprotected openings in this façade are estimated to have a combined area of ca. 10m^2. As the unprotected opening area is less than the permitted maximum area, this arrangement is deemed to be acceptable.
- Façade 9 is permitted to have unprotected openings with a combined area of 29m^2. The unprotected openings in this façade are estimated to have a combined area of ca. 2.2m^2. As the unprotected opening area is less than the permitted maximum area, this arrangement is deemed to be acceptable.

There are adequate separation distances for all other façades (at least 1m away from relevant boundaries) to be fully unprotected.

External walls that coincide with the site boundary

There are existing external walls that coincide with the site boundary lines. Under current guidance, these external walls should be fire rated to a period 30-minute fire resistance (integrity and insulation) from both sides. Small unprotected openings, with a maximum area of 1m^2 are permitted, however, there should be a minimum of 4m between each of these openings in the same fire compartment, and 1.5m between openings in different fire compartments.

The existing external walls consist of masonry construction which will provide a considerable period of fire resistance. The external walls that coincide with the site boundary are therefore expected to provide adequate fire resistance to restrict fire spread to and from neighbouring buildings.

On the north elevation of the North Range, there are existing small openings in the external wall that coincide with the site boundary line. Each of these openings is estimated to provide an area of ca. 1m^2, however, some openings in the same fire compartment (riverside restaurant, kitchen, and performance space) are measured to be within 4m of each other. Although this arrangement deviates from guidance recommendations, this is an existing condition not exacerbated by the proposed works. Additionally, the provision of sprinkler protection to these areas will have the effect of controlling fire and smoke to relatively low temperatures thereby improving on the existing external fire spread condition. The retention of these arrangements is therefore deemed to be acceptable.

On the south elevation of the South Range, there are new openings proposed in the external wall at first floor of the White Barn Annexe that coincide with the site boundary line. Each of these openings provide a maximum area of 1m^2 and are separated with a minimum separation distance of 4m between openings in the same fire compartment. This arrangement meets guidance recommendations.

7.2 External wall construction

External walls should either meet the performance criteria given in BRE Report BR 135 [N1] for cladding systems using full scale test data from BS 8414-1 or BS 8414-2. The performance requirement for the external surfaces of walls (including cladding) must meet the performance shown in Figure 39 below.

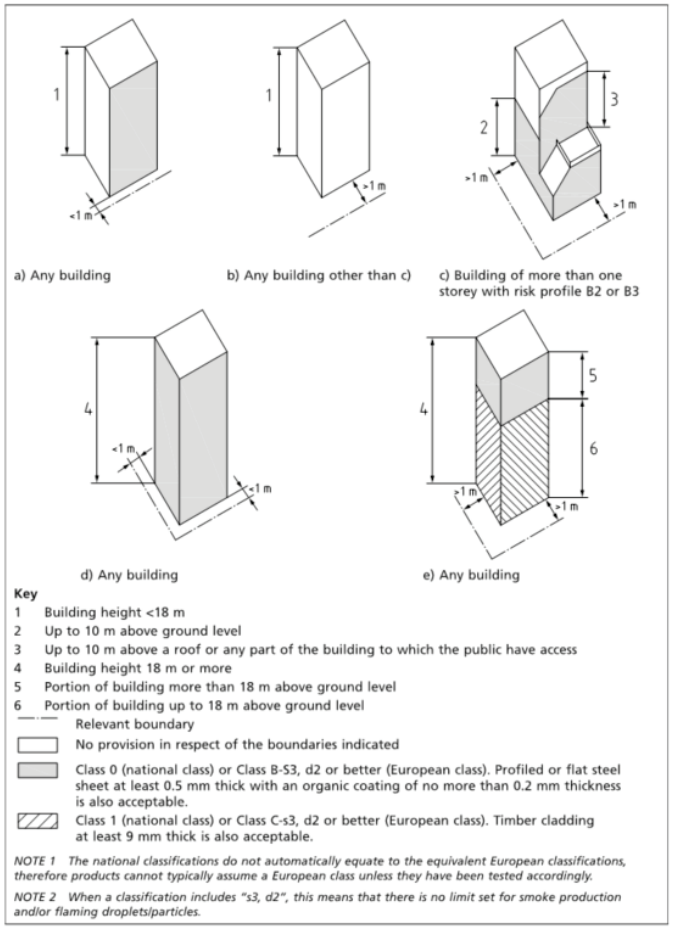


Figure 39: External wall surface recommendations

Most of the building external walls will be retained as existing. For any remedial works to the external wall surfaces, materials used should be similar to the existing or should meet the following specification.

- For external walls that coincide with or within 1m of the site boundary line – class B-s3, d2.
- For external walls at least 1m away from relevant boundaries – no provision.

7.3 Roof coverings

Roof coverings should achieve the performance levels shown in Figure 40 below.

Table 36 **Separation distances for roof coverings**

Designation of covering of roof or part of roof [A]		Distance of roof from any point on relevant boundary			
National class	European class	Less than 6 m	At least 6 m	At least 12 m	At least 20 m
AA, AB or AC	$B_{ROOF}(t4)$	Acceptable	Acceptable	Acceptable	Acceptable
BA, BB or BC	$C_{ROOF}(t4)$	Not acceptable	Acceptable	Acceptable	Acceptable
CA, CB or CC	$D_{ROOF}(t4)$	Not acceptable	Acceptable [B], [C]	Acceptable [B]	Acceptable
AD, BD (or CD [B])	$E_{ROOF}(t4)$	Not acceptable	Acceptable [C]	Acceptable	Acceptable
DA, DB, DC (or DD [B])	$F_{ROOF}(t4)$	Not acceptable	Not acceptable	Not acceptable	Acceptable [C]

NOTE 1 Unwired glass at least 4 mm in thickness has an AA designation.

NOTE 2 See Table 34 for limitations on plastics roof lights.

[A] The performance of roof coverings is designated by reference to the test and classification standards given in BS 476-3 (national class) and BS EN 13501-5 (European class).

[B] Not acceptable on any of the following buildings:
- occupancy characteristic A;
- buildings with a volume of more than 1 500 m^3.

[C] Acceptable on buildings not listed in footnote B, if part of the roof is no more than 3 m^2 in area and is at least 1.5 m from any similar part, with the roof between the parts covered with a material of limited combustibility.

Figure 40: Roof covering performance recommendations

For any new or remedial works to roof coverings, materials used should be similar to the existing or should meet the specification of $B_{ROOF}(t4)$.

According to European Commission Directive 89/106/EEC, natural/ stone slates, stone, clay, ceramic or steel roof tiles are considered to meet the equivalent of specification of $B_{ROOF}(t4)$ without further testing.

Additionally, the following surface finishes listed in the European Commission Decision 2000/53/ EC are stated to meet the equivalent specification of $B_{ROOF}(t4)$.

1. Loose laid gravel with a thickness of at least 50 mm or a mass ≥ 80 kg/m2 (minimum aggregate size 4 mm, maximum 32 mm), or
2. Sand/ cement screed to a thickness of at least 30 mm, or
3. Cast stone or mineral slabs of at least 40 mm thickness.

Most roof coverings will be retained as existing. The existing retained roof coverings consist of concrete tiles (clay tiles, pantiles, slates to No 29 King Street) and these are expected to meet an equivalent classification of $B_{ROOF}(t4)$ as they are inherently non-combustible and similar to the materials listed in the Commission Directives 89/106/EEC and 2000/53/ EC.

7.3.1 Rooflights

There are new rooflights proposed above the foyer area adjacent to the compartment wall enclosing the dimmer room. According to BS 9999 guidance, rooflights should be at least 1.5m from a compartment wall. Unwired glass at least 4mm in thickness is considered to have an equivalent specification of $B_{ROOF}(t4)$.

The compartment wall to the dimmer room is to provide a period of 120 minutes fire resistance from both sides. Although the nearest rooflight will be ca. 0.6m away from this compartment wall, unlike rooflights provided in a roof that is typically not fire rated thereby posing a risk of fire spread across compartment, this rooflight will be adjacent to a fire rated compartment wall with no external openings. This arrangement was therefore deemed to be acceptable as there is a low risk of fire spread between the adjacent compartments through the rooflights.

The new rooflights will not consist of plastic and can be provided to consist of unwired glazing elements at least 4mm thick. This arrangement for the rooflights will be in line with guidance recommendations.

7.3.2 White Barn roof photovoltaic (PV) panels

PV panels are proposed to be provided on the roof of the White Barn buildings. As the prevalence of PV panels on buildings is a recent development, existing fire (life) safety guidance documents do not address the fire risk posed by these systems, apart from guidance recommendations on internal and external fire spread for life safety. Fire safety guidance for PV panels is therefore usually driven by property protection measures, and for this reason, some of the design recommendations for PV will be based on guidance of RC62: Recommendations for fire safety with PV panel installations: 2023 (RC62 guide).

A DC isolator switch (disconnectors that isolate the lines between solar modules and inverters) help to ensure the safety of firefighting personnel. A DC isolator switch is to be provided in a prominent entry location into the building (adjacent to the White Barn main fire alarm panel location) for use by the fire service. Operation of the switch should as a minimum make the DC side of the wiring inside the building voltage-free. The switch should be tested during routine maintenance, with the results being recorded.

'PV on the roof' signage is to be provided and clearly visible for the Fire and Rescue Service upon arrival at the building, in particular a prominent sign measuring at least 100 mm x 100 mm displayed at the consumer units or supplier's cut-out.

The following information is to be provided in the premises information box.

- Locations of the PV panels and control equipment.
- Location of isolation switches for PV panels.

The following additional design fire safety recommendations should be considered in RIBA Stage 4/5:

- Panels should conform to BS EN 61215 (ref 15) or BS EN 61646 (ref 18) in conjunction with BS EN 61730-1 and BS EN 61730-2 (refs 19 and 20) so that they may withstand inclement weather conditions. The panels should be certified by a company with third party accreditation to BS EN 17025 (ref 21).
- The design and layout of the PV arrays is recommended to ensure that the panels will not be subjected to shading or partial shading.
- Guidance of RISCAuthority RC67 Recommendations for electrical safety in the event of fire and BS EN 7671 to be followed to determine if the design is classified as 'low voltage'. If the design is not classified as low voltage, then additional fire protection measures are to be incorporated into the design e.g. use of module level power electronics that switch to 'extra low voltage' when the AC supply is disconnected. Ground fault detection is recommended to be installed as part of the overall system to prevent and detect short circuits (which is a leading cause of fire).

The following management procedures should be considered.

- An emergency plan is recommended to developed by BCKL&WN, or an appointed competent consultant, according to guidance is set out in the RISCAuthority publication Business Resilience: A Guide to Protecting Your Business and Its People.
- If, for justified reasons, hot work is necessary, all such activities should be conducted under an effective Permit to Work system and in strict accordance with RISCAuthority RC7 Recommendations for hot work and the RISCAuthority Hot Works Site Induction Toolkit.
- Windblown litter, leaves, bird/ rodent nests etc should not be allowed to accumulate, especially around or beneath PV panels (to maintain adequate ventilation and cooling of the PV panels).
- Periodic visual inspections are to be made to ensure the system remains in good condition, for signs of damage to cables, or overload and arcing. Additional visual and physical inspections need to be undertaken following extreme weather events, such as high winds, snow or lightning. Periodic cleaning of PV panel surfaces (frequency to be stipulated by the installer) will need to be undertaken to maintain efficiency of the PV panel system and access to the panels is to be maintained for this purpose, with appropriate anchor points provided to ensure the safety of servicing and cleaning engineers. Pressure washing is a permitted technique for cleaning of panels; but to prevent damage, only specially trained contractors should be allowed to utilise this type of cleaning.
- Care should be taken that obstructions and stored materials do not reduce the level of ventilation provided for rooms containing inverters, which can produce significant heat during normal operation. Compartments containing inverter equipment are not to be used for storage.

PV installations shall be serviced and maintained in accordance with the installer's instructions and to BS EN IEC 62446-2 (2020). The schedule of maintenance should (be documented and recorded) follow the service contract, warranty conditions, and/or performance guarantees. Robust on-site controls for staff who access PV installation areas (such as maintenance operatives) should be implemented – e.g. absolutely no smoking (even though the area might be outdoors).

8 Fire Suppression

8.1 Automatic sprinkler system

According to guidance of BS 9999, there is no requirement to provide automatic fire suppression to buildings with a top occupied floor less than 30m. Therefore, from a life safety perspective, there is no requirement for the provision of an automatic fire suppression system to St George's Guildhall.

It should be noted that whilst this system will be provided for property protection, it will also provide considerable benefits for life safety due to the following reasons:

- Automatic fire suppression will intervene in the early stages of fire thereby limiting its growth rate. Under the guidance of BS 9999, the benefits of an automatic fire suppression system are recognised through the reduction of risk profiles with the effect of increasing travel distance limits and reducing exit width factors. Some of the existing exit clear widths in the buildings are below minimum recommended widths. The provision of an automatic fire suppression system will enhance life safety as occupants will be afforded more time for their evacuation before they are threatened by adverse effects of fire and smoke.

- The period of fire resistance to structural elements is unknown and will likely fall short of meeting guidance recommendations (due to the age of the building and the presence of exposed timber joist boards and beams in some buildings). As outlined in section 9.2, there are extended fire service access routes to remote buildings on site thereby limiting their ability to effectively fight a potential fire at the site. Cognisant of these existing site limitations, the benefit of an automatic fire suppression system to limit fire growth to offer some protection to existing elements of structure, thereby offering more protection to the safety of fire and rescue personnel for them to enter remote buildings and conduct non-conventional operations.

During RIBA Stage 2, various fire suppression options were considered and eventually it was decided to provide a sprinkler protection system. Due to the adverse impact on the heritage features of the Guildhall building and reduced effectiveness of sprinkler heads located at a double ceiling height, sprinkler provision to this building was deemed not to be practical. Sprinkler protection will also not be provided to the building at No. 29 King Street. All other buildings will be provided with sprinkler protection.

During the pre-consultation fire service meeting, Norfolk Fire and Rescue indicated that it would be useful for a pump in inlet to be provided to the water storage tank so that the fire service can supplement the water supply. The water storage tank is therefore to be provided with this pump in inlet.

The sprinkler system is to be provided in accordance with BS EN 12845. For an Ordinary Hazard Classification of OH1 for the use of buildings covered on site, a water storage capacity of 55m^3 would be required.

The sprinkler tank and pumps are to be provided in the existing basement cellar rooms. At RIBA Stage 4, an allowance of a water storage with capacity of 55m^3 has been made, and this arrangement is compliant with BS EN 12845. *Previously, there was a limited amount of space available in this area therefore the sprinkler tank was to be rationalised to a volume of 49.4m^3. This amounts to a volume reduction of ca. 11% from that recommended in BS EN 12845. Although this arrangement deviated from BS EN 12845 guidance, this arrangement was deemed to be acceptable as this provision represents a significant improvement on the existing condition. Additionally, the sprinkler tank is to be provided with a pump in inlet for water supply to be supplemented by the fire service.*

The sprinkler system is to be provided with automatically activated electric-motor driven pumps (one duty and one standby). Backup power for the sprinkler pumps is to be provided from a life safety generator.

Rooms with water sensitive equipment are to be provided with a pre-action sprinkler system.

8.2 Kitchen suppression

Cooking areas in kitchens are to be provided with a local fire suppression system under extraction hoods.

9 Access and facilities for the Fire Service

9.1 Vehicle access

The nearest fire station to St George's Guildhall is the Kings Lynn Fire Station which is 1.1 miles away. The carriageway entrances to the courtyards from King Street are not large enough for a fire tender vehicle to enter the site therefore fire service access is available from Kings Street as shown in Figure 41 below.

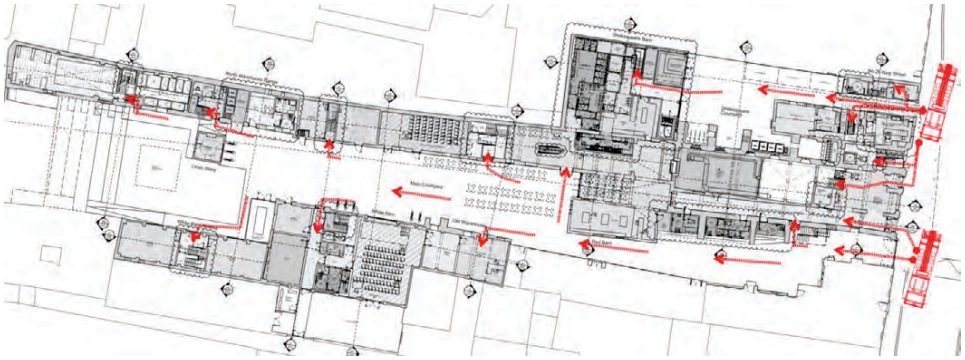


Figure 41: Fire service access to St George's Guildhall via Kings Street

9.2 Fire service access

The proposed buildings on site are measured to have the following parameters:

- Guildhall and adjoined buildings – footprint area of ca. 1480m^2, top occupied floor height of 3.7m.
- White Barn and Annex buildings – footprint area a of ca. 500m^2, top occupied floor heigh of ca. 3.5m

According to BS 9999, there are no dry riser provisions recommended. Buildings up to 2000m^2 with a top storey less than 11m above access level are to be provided vehicle access either:

- to within 45m of every point on the projected area, or
- to 15% of the building perimeter.

The Guildhall (and adjoined) building is measured to have a perimeter of ca. 228m (excluding areas adjoined to neighbouring buildings). Fire service access from King Street is measured to be provided to ca. 65m, which correspond to ca. 28% of the accessible building perimeter. It should be noted that although fire service access to the building based on perimeter access may be in line with current guidance, there is significantly extended travel distances for the fire service from King Street to the most remote sections of this building. Fire service travel distances are measured to be in excess of 139m therefore fire service access is considered not to be adequate, noting that one of the permitted fire service access provision is a distance limit of 45m.

The White Barn, Old Warehouse and Annexe buildings are remote from King Street (where a fire vehicle can be parked) with fire service travel distance to the building measured to be ca. 60m. This building is therefore considered not to be provided with adequate fire service access therefore the existing arrangement is non-compliant with current guidance.

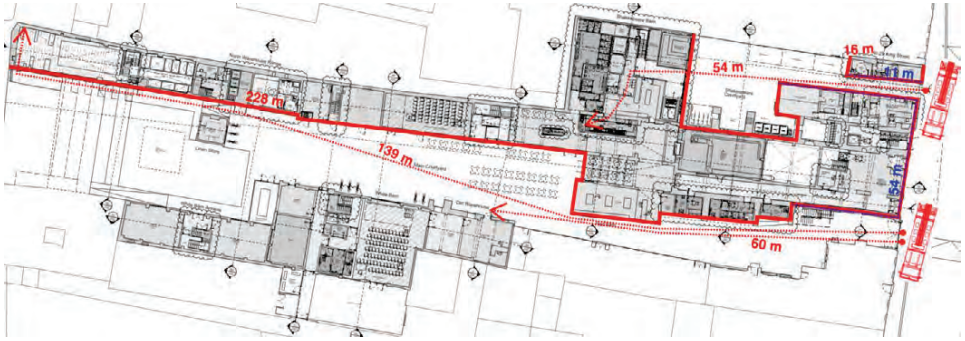


Figure 42: Fire vehicle perimeter access

Whilst is recognised that a non-compliant arrangement can be retained as existing if proposed works do not worsen existing conditions, BS 9999 guidance also recommends for remedial works to be undertaken whenever practical to improve fire safety provisions with the aim of achieving an acceptable standard of fire safety.

During RIBA Stage 2, an option was explored to provide a horizontal dry main with an inlet from King Street and an outlet adjacent to the White Barn building. This dry main was going to have a horizontal run of ca. 60m. Discussion with Norfolk Fire and Rescue indicated that they had concerns with regards to the drainage and maintenance of this dry main (due to a lack of a pressure head). Their judgement was that the system would not provide any substantial benefits to firefighting operations for these buildings. However, they did acknowledge that the provision of a sprinkler system would be a significant improvement for firefighting operations. They recommended for a pump in inlet to be provided to the water storage tank for the fire service to supplement water supply for the system.

For the proposed works at St George's Guildhall, firefighting provisions are therefore to be improved from the provision of an automatic fire suppression system as outlined in section 8 above.

Although firefighting access to some site buildings is non-compliant, this is an existing arrangement, and practical improvements will be made to improve firefighting conditions through the provision of a sprinkler system.

9.3 Fire information and control

If the fire service arrives at main reception during operating hours, it is likely that they will be met by occupants evacuating the building and can be shown to the entrance into the building. If it is out of hours, the fire service should be able to notice the building main fire alarm panel (recommended to be in an area adjacent to the main entrance into the building) and associated fire zone plans to aid them with wayfinding in the building.

9.4 Secondary power Supply

Secondary back up power supply is to be provided to all life safety systems including the following (non-exhaustive list):

- Fire alarm system – Integral battery.
- Emergency lighting system – Central battery to systems in the Guildhall and integral batteries to individual units everywhere else.
- Lifts for evacuation purposes – Life safety generator.
- Guildhall mechanical smoke extract fans – Life safety generator.
- Sprinkler pumps – Life safety generator.

9.5 Venting of heat and smoke from basement level

According to BS 9999, a basement with either a floor area of more than 200m², or a floor below 3m below the ground floor should be provided with a means of smoke ventilation.

On the St George's Guildhall site, there are three area that have spaces akin to a basement.

- The performance and exhibition spaces in the Undercroft are measured to be 1.6m below access level with a combined floor area of ca. 117m^2.
- The Tunnel is measured to be 2.1m below access level with a floor area of ca. 58m^2.
- The Vaulted tunnel is measured to be 2.1m below access level with a floor area of ca. 133m^2.
- The Cellar measured to be 1.6m below access level with a floor area of ca. 83m^2.

All the spaces mentioned above are not provided with a dedicated means of smoke ventilation, however, it is deemed acceptable to retain these arrangements due to the following;

- The exhibition space has windows at high level that overlook to outside. In a fire event, the glazing elements would likely fail, or the fire could break the panels to provide a pathway for smoke to exhaust from this compartment.
- The tunnel is to be provided with an accommodation stair that is to connect to the café of the ground floor. In a fire event, any smoke in this compartment will ascend onto the ground floor where it can be vented to outside through opening of doors and breaking of glazing elements.
- The performance space is connected to the exhibition and tunnel spaces, compartments that are connected to the ground floor to allow for smoke ventilation from the basement. Smoke ventilation from the performance space can be facilitated by opening of doors on both sides to provide for a through draft to drive smoke ventilation to the ground floor.
- The vaulted tunnel is connected to escape stair 3 which has a final exit that goes directly to outside. It is also connected to the tunnel which is provided with a pathway for smoke to ascend to the ground floor. The compartment doors on opposite sides can be opened to provide for a through draft to enable smoke ventilation to outside/ ground floor.
- The cellar is to house the sprinkler water storage tank and the pump room. The use of this area is associated with no fire loading therefore the risk of fire breaking out from this area will be very low. Nonetheless, the sprinkler tank room is connected directly to outside through an accommodation stair. In the unlikely event of a fire breaking out in this area, the storey exit can be opened to provide a pathway for smoke ventilation to outside.

As all areas of the basement will have a pathway for smoke ventilation to outside/ ground floor as outlined above, the existing basement smoke ventilation arrangements are deemed to be acceptable.

9.6 Refuse store ventilation

There are two refuse stores proposed for the site. According to BS 9999, refuse rooms should:

- be separated from other parts of the building by fire resisting construction, and
- not be located within protected stairways or protected lobbies.

Refuse rooms should be approached either directly from the open air or by way of a protected lobby provided with not less than 0.2m^2 permanent ventilation, or suitable mechanical alternative. Access to refuse rooms should not be sited adjacent to escape routes or final exits, or near to windows.

The refuse stores for the site will be accessed directly from outside. These refuse stores will be provided with louvred doors to allow permanent ventilation to outside. This arrangement meets guidance recommendations therefore it is acceptable.

9.7 External water supply (hydrants)

According to BS 9999:

a. For buildings provided with dry fire mains, hydrants should be provided within 90m of dry fire main inlets on a route suitable for laying hose.
b. For buildings not provided with fire mains, hydrants should be provided within 90m of an entry point to the building and not more than 90m apart.

The closest public fire hydrants to the site is located directly in front of 29 King Street. The next public hydrant is provided along King Street and measured (from google.com) to be located ca. 75m away from the closest hydrant. This is an existing arrangement not affected by the proposed works and it is deemed to meet guidance recommendations.

9.8 Portable firefighting equipment

Building Regulations 2010 do not require the provision of portable firefighting equipment for life safety purposes. These provisions are covered under the Regulatory (Fire Safety) Reform Order 2005 and portable firefighting equipment should be provided by the building management where appropriate.

Where fire extinguishers are provided, they should be provided according to BS 5306-8. Various types of fire extinguishers should be provided to cover different type of fire risk sources as outlined in Table 13 below.

Class of Fire	Description	Distance from fire risk
Class A	Fires involving solid materials such as wood, paper, or textiles.	30m
Class B	Fires involving flammable liquids such as petrol, diesel, or oils.	10m
Class C Note 1	Fires involving gases.	30m
Class D Note 1	Fires involving metals.	Case by case basis.
Class F	Fires involving cooking oils such as in deep-fat fryers.	10m

Note 1: Specialist advice to be sought for class C and D fires.

Table 13: High level fire extinguisher guidance recommendation (detailed specification to be provided by others)

Under the guidance of BS 5306-8, at least two 13A fire extinguishers should be provided on each storey with a floor area less than 400m^2. For any storey with a floor area exceeding 400m^2, the number of 13A fire extinguishers should be determined from the following equation:

Fire extinguishers (13A) = Floor area (m^2) x 0.065 / 13……. Equation 1

The use of fire extinguishers should only be by competent persons who have received appropriate training on their use. Typically, fire extinguishers should be located adjacent to fire points, a location that typically include:

- A break glass manual call point,
- Emergency lighting,
- Portable firefighting equipment,
- Information on Assembly point locations,
- Other instructions on what to do in the event of a fire,
- Telephone numbers for Facilities management/control room.

9.9 Premises Information Box

A premises information box should be provided for the fire service.

It is recommended that the box includes:

- Simple plans and /or schematic representations of the building and any relevant information relating to equipment/fixed installations design and operation provided for means of escape or firefighting operations including the following (non-exhaustive list).
    - locations of the building fire alarm and repeater panels,
    - locations of the PV panels and control equipment,
    - location of isolation switches for PV panels,
    - location of the main electrical intake(s).
- Basic operating instructions for fire protection and fixed firefighting equipment. This will include location of the sprinkler pump room.

10 Conclusions

10.1 General conclusions

This is a RIBA Stage 4 report that outlined the required fire safety principles and recommendations necessary to eventually meet the functional requirements of the Building Regulations 2010, referring primarily to BS9999: 2017.

This fire strategy report is a performance specification for fire safety. The detailed design of the active and passive fire systems as laid down in this strategy will be the responsibility of relevant competent consultants/ contractors.

The success of the fire strategy is now subject to the detailed design and construction of the fire safety systems outlined in this report. The fire strategy is to be monitored through construction and a final condition fire strategy report is to be provided at Practical Completion. This is to meet the requirements of Regulation 38 of the Building Regulations and will allow the building users to execute their responsibilities under the Regulatory Reform Fire Safety Order 2005.

This fire strategy report is subject to formal approval from Sweco Building Control under The Building Regulations application.

10.2 Summary of key fire safety systems/ provisions (for M&E and design team co-ordination)

- Category L1/ P1 fire detection and alarm system to BS5839-1: 2017 supplemented by a public address (PA) system in the form of a live voice alarm (Type V2) system to BS 5839-8: 2013.
- Emergency lighting system to BS5266-1: 2016.
- Emergency Voice Communication (EVCs) systems for disabled refuges to BS 5839-9: 2021.
- Emergency signage will be provided throughout the building to BS ISO 3864-1: 2011, BS EN ISO 7010: 2020+A4, A5, A6 and BS 5499-4: 2013. Light emitting signage is to be provided to in the Guildhall.
- Lift installations (4no) to be provided such that they are suitable for evacuation to BS 9999: 2017, BS EN 81-20: 2020 and BS EN 81-70: 2021+A1:2022.
- 120-minute fire and smoke curtain (1no) to enclose the lift for evacuation from the backstage area to BS 8524-1: 2013 and BS 8524-2: 2013
- 60-minute fire and smoke curtain (1no) to enclose the Shakespeare Barn kitchen to BS 8524-1: 2013 and BS 8524-2: 2013.
- Mechanical smoke ventilation from the Guildhall stage, with at least 60-minute fire rated ductwork to BS 13501-3: 2005+A1:2009 and fans provided to BS EN 12101-3: 2015.
- Automatic fire suppression system in the form of a sprinkler system to BS EN 12845: 2015+A1: 2019.
- A DC isolator switch (disconnectors that isolate the lines between solar modules and inverters) for the use by the fire service.
- Secondary back up power supply to life safety systems.

Appendix A – BS9999 'Adequate' management level 2 criteria

The building management for St George's Guildhall is expected to comply with an 'Adequate' Level 2 management regime from BS 9999: 2017. This is a proactive approach to fire safety management with the main provisions explained. The client will therefore need to ensure that the minimum requirements below are delivered for the development.

Level 2 demonstrates good practice in which the organisation's management system is determined to meet the requirements of legislation.

Regardless of the management system level, the fire safety manager or person nominated to monitor, and control management of fire safety should define the organisation's fire risk management system, and method of implementing the overarching policy within a fire risk management strategy.

The following principal factors listed should be taken into account when defining and documenting fire risk management strategy once the building is occupied. More detailed guidance relating to the required fire safety management regime can be found in section 8 of BS9999: 2017.

'Adequate' Level 2 fire safety management regime

Good practice, adequate level of assurance - Conformity with requirements of legislation.

Fire risk assessment

Those responsible for the design and construction of the building should provide fire safety information to the responsible person at the completion of the project or when the building or extension is first occupied.

A pre-occupation fire safety assessment is the process of identifying fire precautions in a newly constructed building, taking into account the approved fire strategy, and deciding whether or not the new or refurbished premises is likely to be fit for occupation. This assessment should be undertaken to ensure a smooth transition from the design and construction phase to the operational phase of new premises.

Resources and authority

The resources necessary to implement, maintain and improve the fire risk management system should be determined. In determining the necessary resources, account should be taken of the organisational hierarchy, the role of the fire safety manager and communication and collaboration with other users of the building. For the management of fire risk to be effective, those with fire safety responsibilities should be empowered and able to command sufficient resources to maintain the system.

Fire safety training

Sufficient numbers of staff should be trained in fire prevention, fire protection and evacuation procedures, and be able to use the appropriate extinguishing equipment (and media), so as to provide full coverage of the building, with provision for contingencies, sickness or holiday absences.

Control of work on site

The means by which the end user or occupier will control work on site should be determined, e.g. repairs to structure, and in particular hot work. A work control system should include clear lines of responsibility communicated to contractors; a permit system which takes into account the risks to relevant persons; logging and work control audit processes; and routine checking and supervision.

Maintenance and testing

An accurate record of fire precautions, and procedures for operating and maintaining any fire protection measures within the building, are necessary to enable the owner or end user to plan, document and implement control processes for maintenance and testing of fire safety systems to ensure that they operate effectively in the event of a fire. Processes should be determined for maintenance and testing of fire safety systems.

Communication

The need for internal and external communication procedures should be determined, to ensure that all of those involved in management of fire risk, or who could potentially be involved in an incident, are provided rapidly and effectively with relevant information. These procedures should include defined lines of communication of significant findings arising from fire risk assessments and should stress the importance of maintaining fire safety information.

Emergency planning

A good relationship with the fire and rescue service has benefits for both the owner/end user and the fire and rescue service. In particular it ensures that the fire and rescue service is able to have an appropriate pre-determined response strategy for the premises concerned, and enables the owner/end user to seek advice where appropriate on:

a) how to prevent fires and restrict their spread in their buildings and other

property;

b) the means of escape from buildings and other property in the event of fire.

Procedures for identifying and responding to unplanned events, potential emergencies or disasters should be established, documented and maintained. Where fire is concerned, liaison with the fire and rescue service should include: emergency shut-down of equipment, effective arrangements for notifying the fire and rescue service of changes to the occupancy, periods of abnormal occupancy, fire growth characteristics, and other relevant factors.

The arrangements should also consider a post-incident plan and contingency plan.

Appendix B – Fire strategy drawings

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

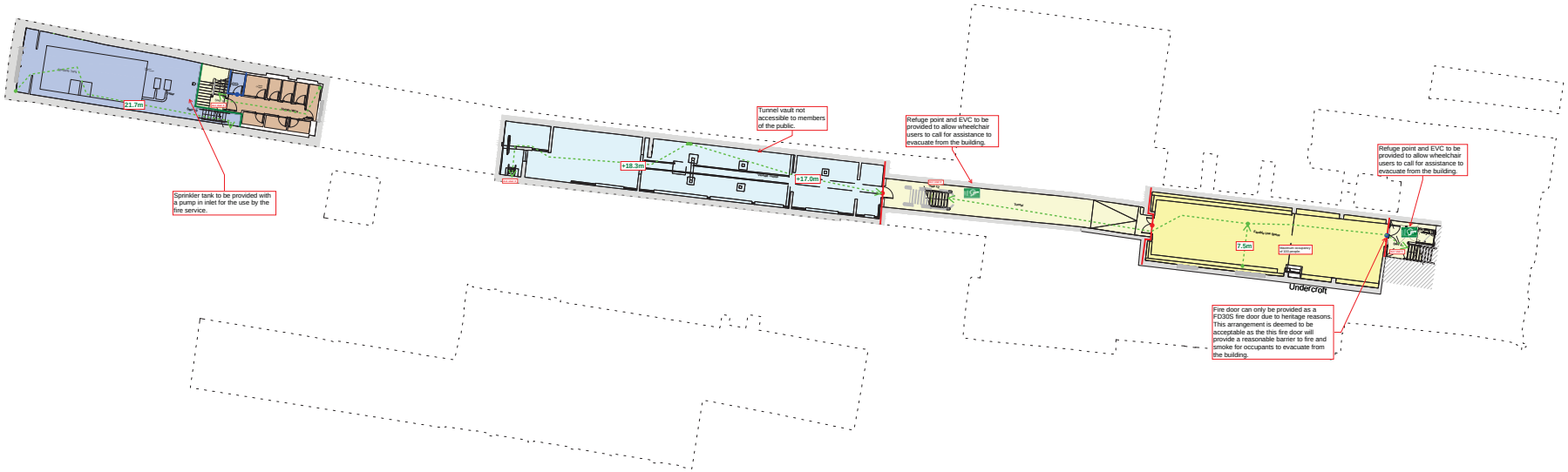
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 01

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



Note 1.

Rooms containing life safety equipment should be enclosed with 120 minute fire resisting construction.

Note 2.

All external walls on or within 1m of the site boundary should be fire rated to a period of 30 minutes fire resistance (from both sides).

Openings in these walls should be limited to a maximum area of 1m2 and there should be a minimum distance of 4m between these openings.

Stair enclosures are considered as fire sterile areas therefore openings within the protected enclosure of an escape stair can be incorporated on the site boundary without restriction.

	One direction of escape		More than one direction of escape	
Risk profile	Direct	Actual	Direct	Actual
A2 Administration	17.3m	25.3m	39.1m	63.3m
A3 – BOH areas	12m	18m	30m	45m
A3 – FOH areas	15m	23m	38m	57.5m
B2 (Bar/ Café)	11.3m	17.3m	28.5m	43.1m
Auditorium (seated areas)		15m		32m
Auditorium (upper floor areas)	12m	18m	30m	45m

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

Area Key

- Performance
- BOH
- FOH
- FOH Circulation
- FOH WC
- Bars

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	25/02/25	GA Issue for Tender Backgrounds
09	16/10/24	Stage 4 GA Freeze
08	16/04/24	Stage 3 Costing
07	18/03/24	Stage 3 GA Freeze
06	16/02/24	GA Updates
05	19/01/24	GA Revisions & Room Numbers
04	20/12/23	Stage 3 Issue GA Revisions
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302: ST GEORGE'S GUILDHALL

DRG: PROPOSED BASEMENT PLAN

DRG No: STGG-HTL-ZZ-B1-DR-A-00099 REV: 11

SCALE: 1:200@A1 1:400@A3 DATE: 25/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

The Fire Surgery Limited
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Reg No. 07713184

THE FIRE SURGERY

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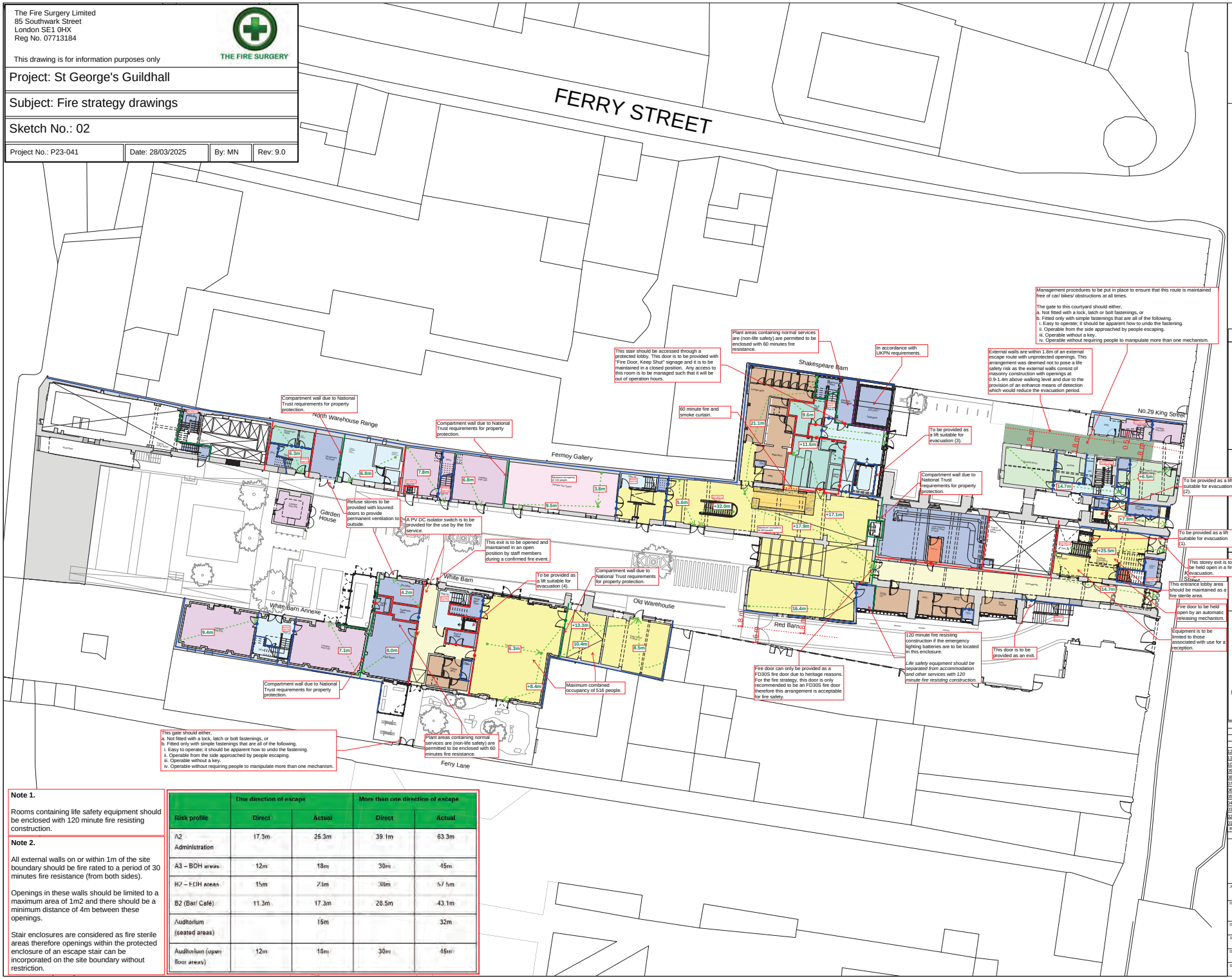
Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 02

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



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NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

Area Key

- Performance
- BOH
- FOH
- FOH Circulation
- FOH WC
- Bars

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
12	28/02/25	Tender
11	19/02/25	GA Issue for Tender Backgrounds
10	17/12/24	Issue for Coordination
09	16/10/24	Stage 4 GA Freeze
08	16/04/24	Stage 3 Costing
07	18/03/24	Stage 3 GA Freeze
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04	20/12/23	Stage 3 Issue GA Revisions
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02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302: ST GEORGE'S GUILDHALL

DRG: PROPOSED G+0 PLAN

DRG No: STGG-HTL-ZZ-00-DR-A-00100 REV: 12

SCALE: 1:200@A1 1:400@A3 DATE: 19/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

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THE FIRE SURGERY

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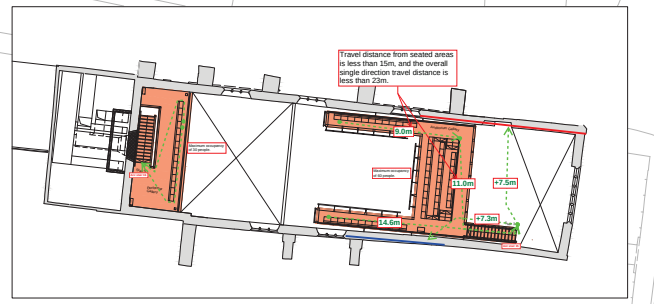
Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 03

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



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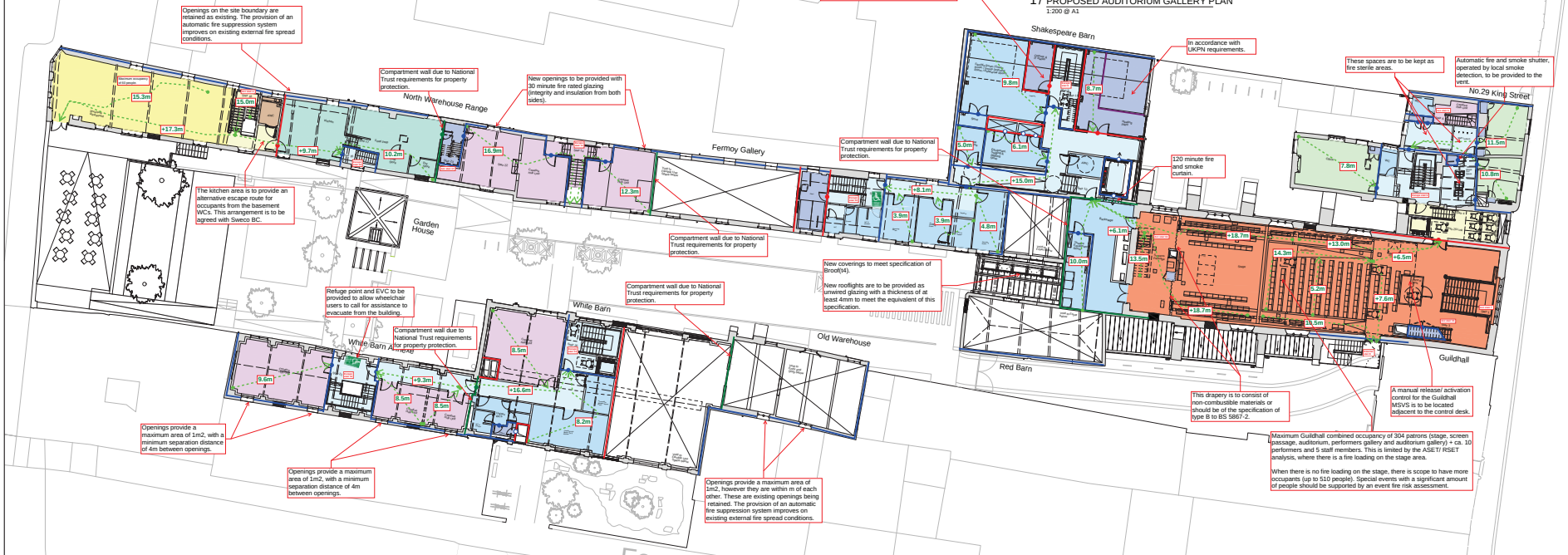
1:200 @ A1



Note 1.

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Risk profile	Direct	Actual	Direct	Actual
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- FOH
- FOH Circulation
- FOH WC
- Bars

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- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
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JOB: 2302: ST GEORGE'S GUILDHALL

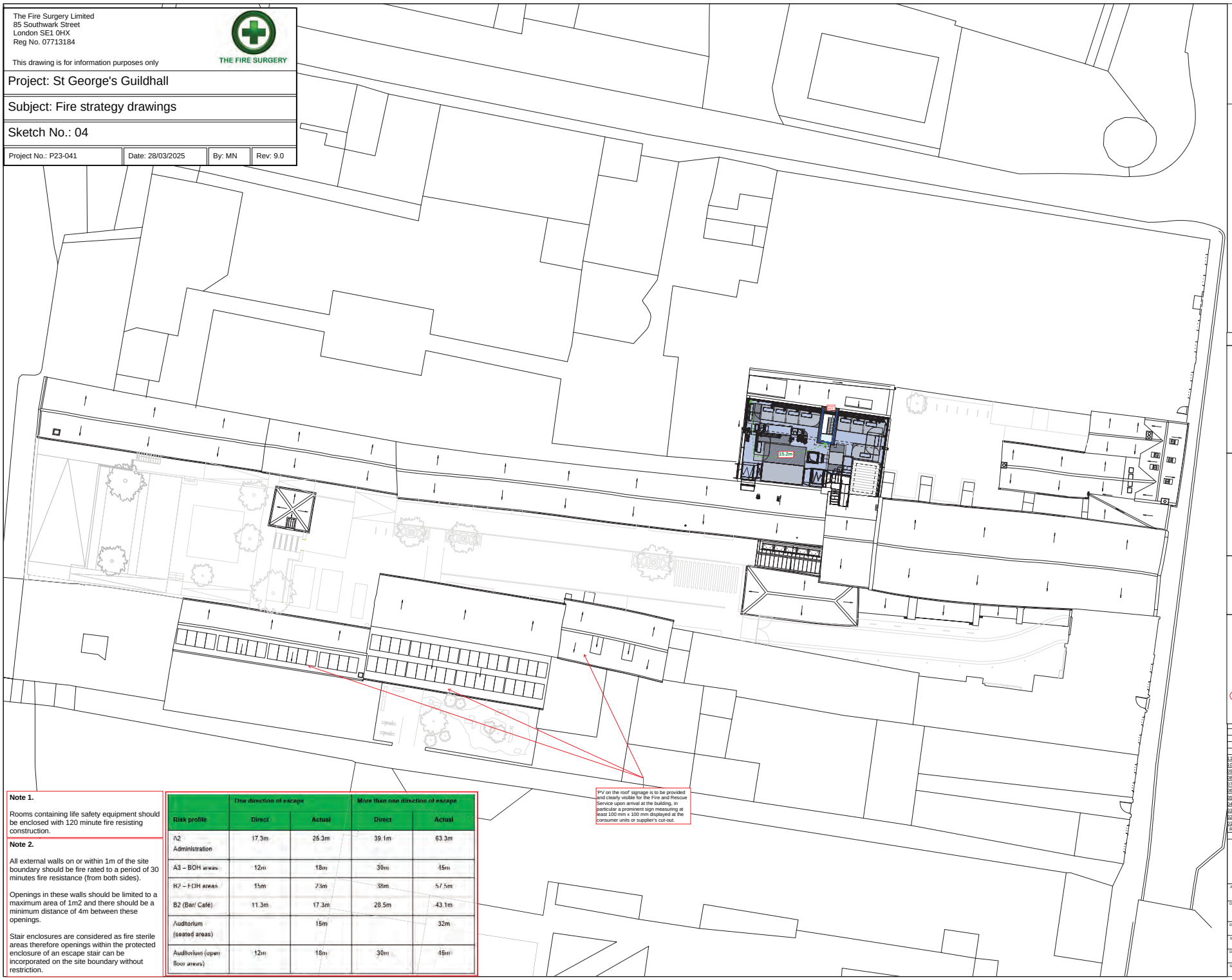
DRG: PROPOSED BASEMENT PLAN

DRG No: STGG-HTL-ZZ-01-DR-A-00101 REV: 11

SCALE: 1:200@A1 1:400@A3 DATE: 19/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER



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THE FIRE SURGERY

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Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 04

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0

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Fire Doors

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- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H — Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
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Risk profile	Direct	Actual	Direct	Actual
A2 Administration	17.3m	25.3m	39.1m	63.3m
A3 – BOH areas	12m	18m	30m	45m
B2 – FOH areas	15m	23m	38m	57.5m
B2 (Bar/ Café)	11.3m	17.3m	28.5m	43.1m
Audtorium (seated areas)		15m		32m
Auditorium (open floor areas)	12m	18m	30m	45m

PV on the roof signage is to be provided and clearly visible for the Fire and Rescue Service upon arrival at the building, in particular a prominent sign measuring at least 100 mm x 100 mm displayed at the consumer units or supplier's cut-out.

REV	DATE	DESCRIPTION
11	28/02/25	Tender
10	25/10/25	GA Issue for Tender Backgrounds
09	16/10/24	Stage 4 GA Freeze
08	16/04/24	Stage 3 Costing
07	18/03/24	Stage 3 GA Freeze
06	16/02/24	GA Updates
05	19/01/24	GA Revisions & Room Numbers
04	20/12/23	Stage 3 Issue GA Revisions
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302: ST GEORGE'S GUILDHALL

DRG: PROPOSED ROOF PLAN

DRG No: STGG-HTL-ZZ-RF-DR-A-00103 REV: 11

SCALE: 1:200@A1 1:400@A3 DATE: 25/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

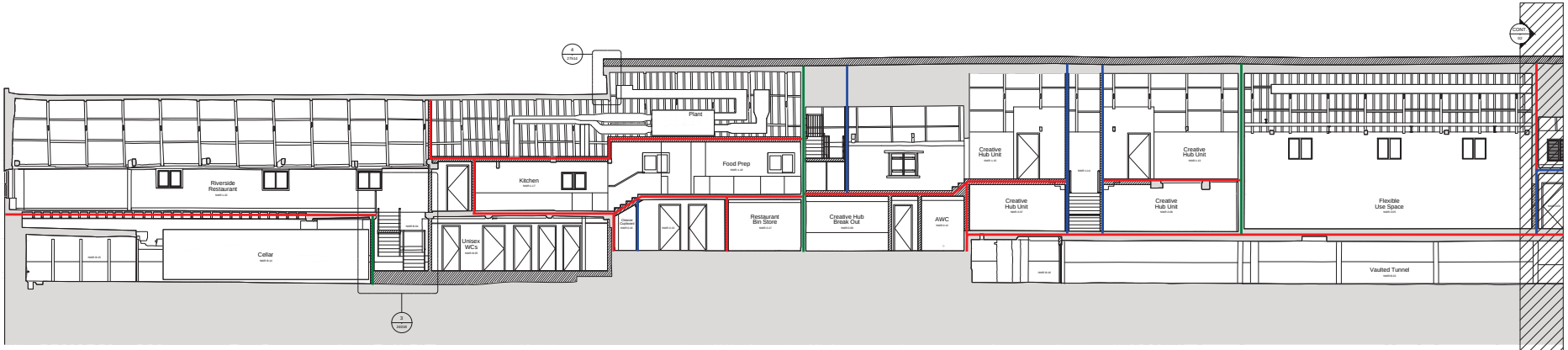
This drawing is for information purposes only

Project: St George's Guildhall

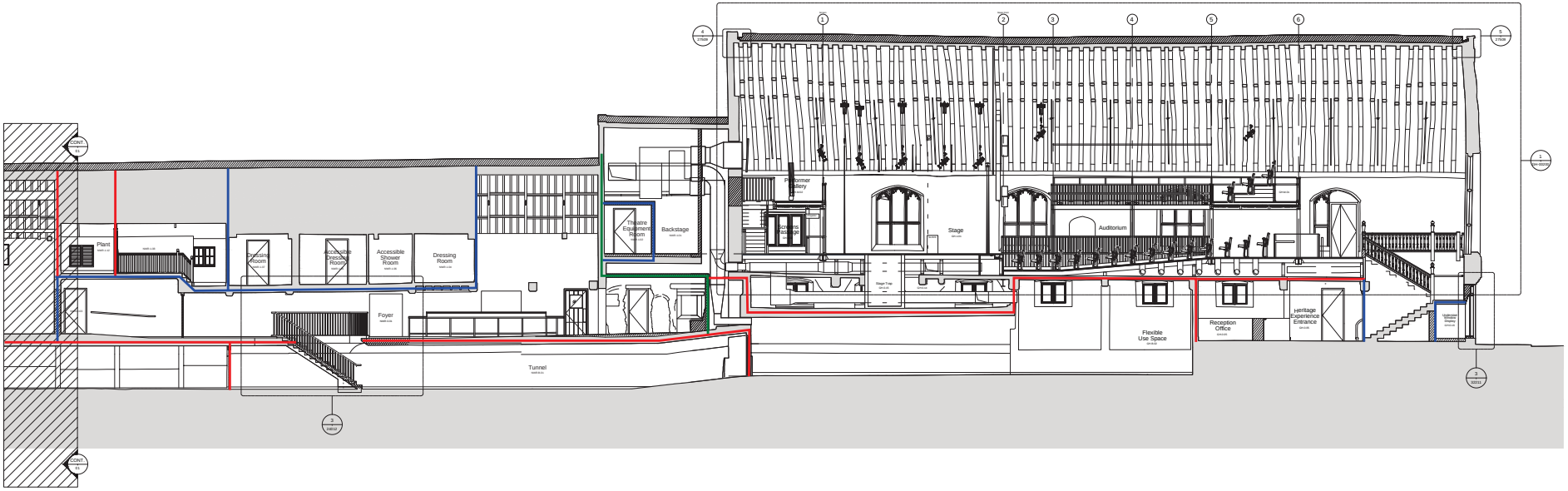
Subject: Fire strategy drawings

Sketch No.: 05

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



1/ PROPOSED SECTION AA (ZONE 2)
1:100



2/ PROPOSED SECTION AA (ZONE 1)
1:100

DO NOT SCALE

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NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m

Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	SA Updates
04	19/01/24	GA Revisions & Room Numbers
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL

DRG: PROPOSED SECTION AA

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00200 REV: 10

SCALE: 1:100@A1 1:200@A3 DATE: 03/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

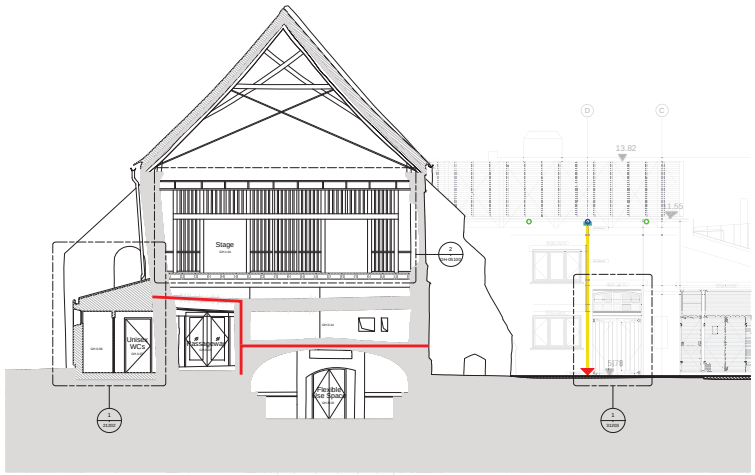
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 06

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



ST GEORGE'S COURTYARD | WC INFILL | GUILDHALL | SHAKESPEARE COURTYARD

1/ PROPOSED SECTION GG
1:100

NO. 29 KING STREET | NO. 29 LINK | GUILDHALL | ST GEORGE'S COURTYARD

2/ PROPOSED SECTION FF
1:100

DO NOT SCALE

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NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m

Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
04	19/01/24	GA Revisions & Room Numbers
03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS FF + GG
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00201
REV	10
SCALE	1:100@A1 1:200@A3
DATE	03/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

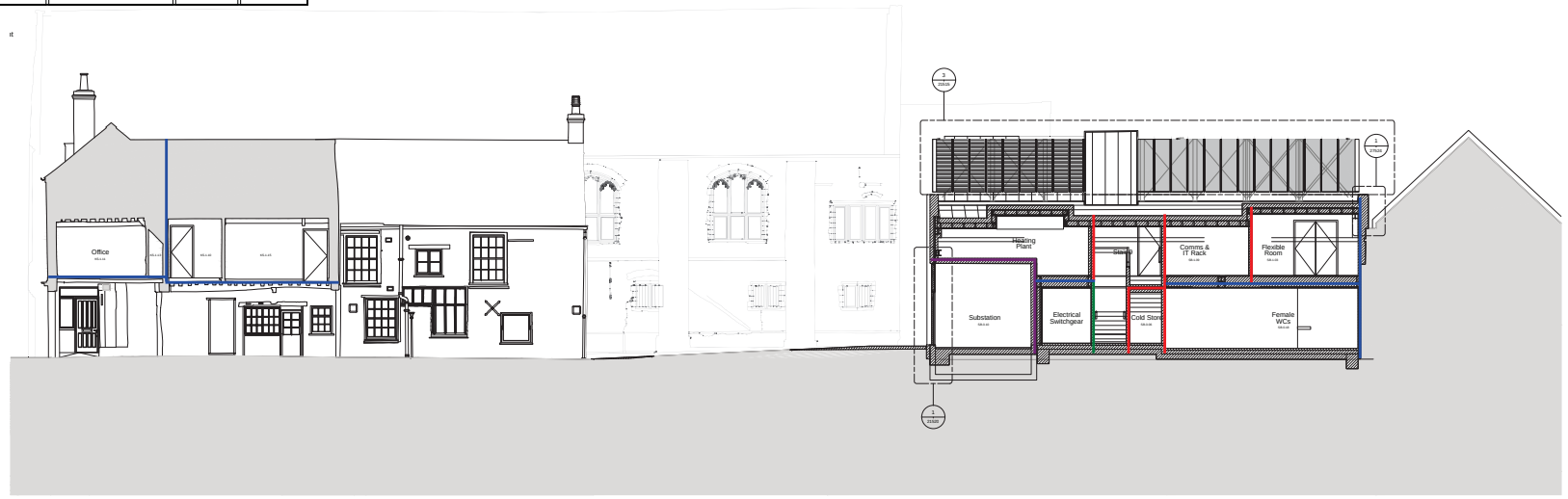
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 07

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



1 / PROPOSED SECTION CC
1:100

2 / PROPOSED SECTION DD
1:100

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

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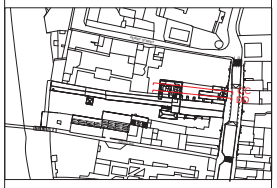
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	15/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
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01	07/08/23	Stage 2 GA Freeze

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JOB: 2302 : ST GEORGES GUILDHALL
DRG: PROPOSED SECTION CC + DD
DRG No: STGG-HTL-ZZ-ZZ-DR-A-00202 REV: 10
SCALE: 1:100@A1 1:200@A3 DATE: 03/02/25
DRAWN: HT TEAM INSPECTED BY: ML
STATUS: TENDER

The Fire Surgery Limited
85 Southwark Street
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Reg No. 07713184

THE FIRE SURGERY

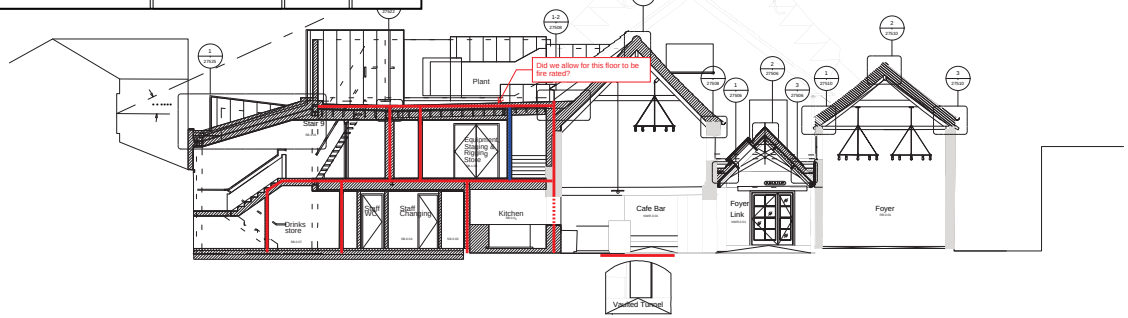
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

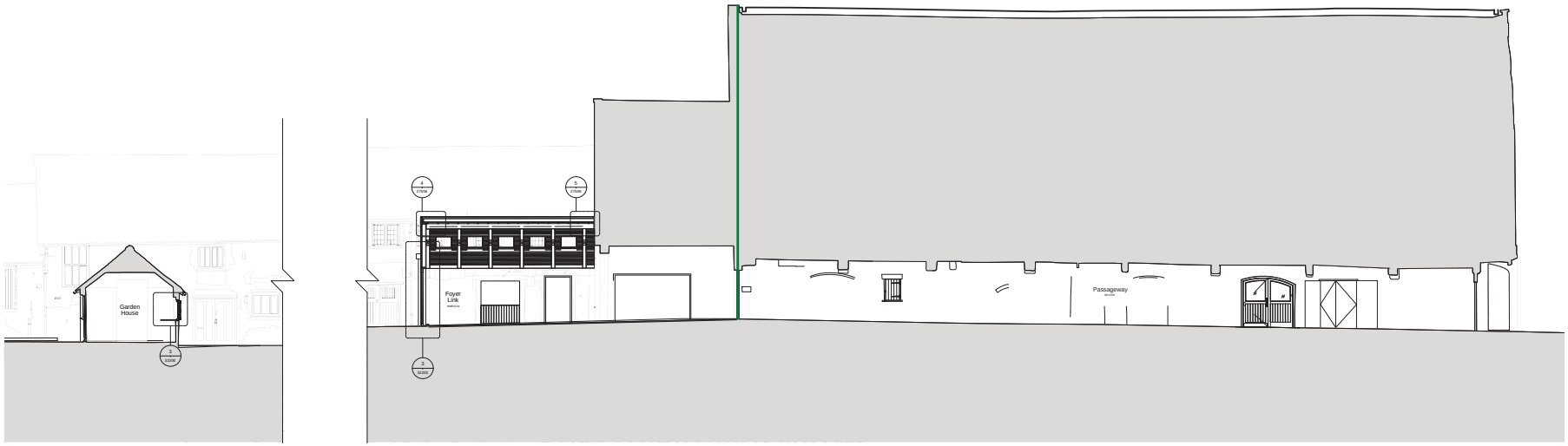
Sketch No.: 08

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



NO. 29 KING STREET | SHAKESPEARE BARN | NORTH WAREHOUSE RANGE | FOYER LINK | RED BARN | ST GEORGE'S COURTYARD | KING'S LYNN OPERATIC & DRAMATIC SOCIETY

1/ PROPOSED SECTION HH
1:100



GARDEN HOUSE | ST GEORGE'S COURTYARD | FOYER LINK | GUILDHALL | KING STREET

2/ PROPOSED SECTION BB
1:100

DO NOT SCALE

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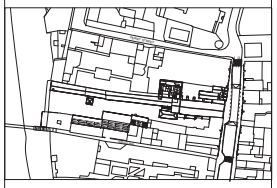
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
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03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS HH + BB
DRG No.	STGG-HTL-ZZ-ZZ-DR-A-00203
REV	10
SCALE	1:100@A1 1:200@A3
DATE	03/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	TEMDER

The Fire Surgery Limited
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London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

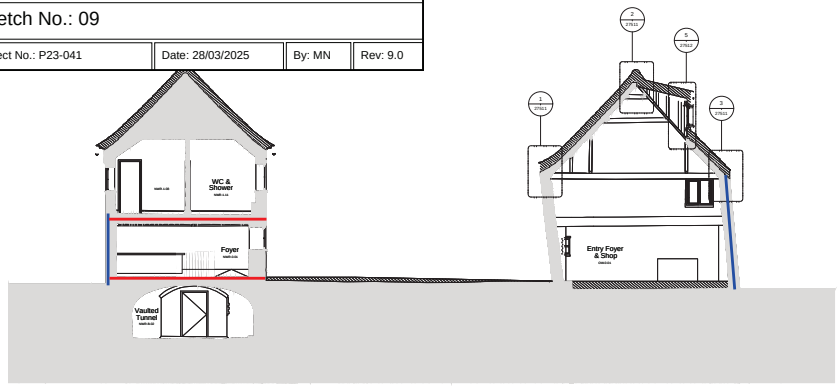
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

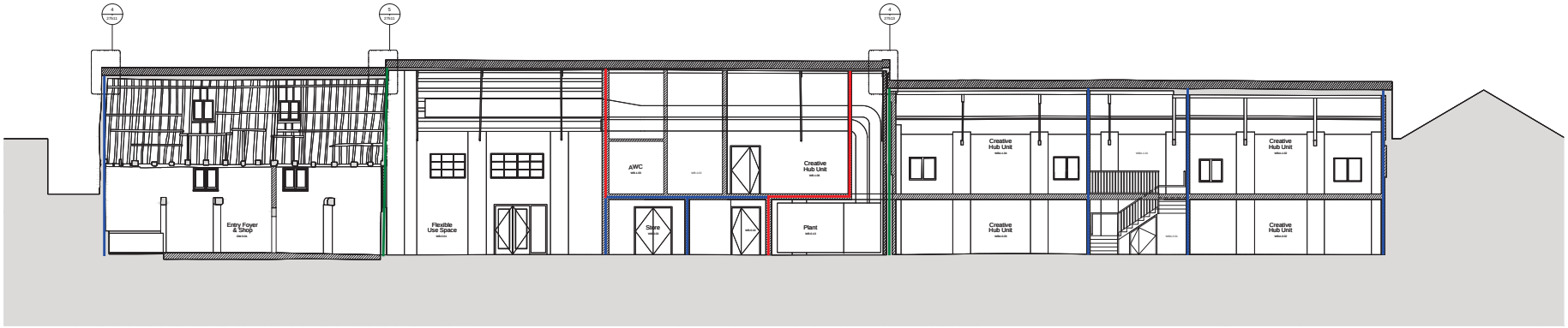
Sketch No.: 09

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



GLOBE HOTEL | NORTH WAREHOUSE RANGE | ST GEORGE'S COURTYARD | OLD WAREHOUSE | FERRY LANE GARDEN

1 / PROPOSED SECTION JJ
1:100



KING'S LYNN OPERATIC & DRAMATIC SOCIETY | OLD WAREHOUSE | WHITE BARN | WHITE BARN ANNEX | FERRY LANE SOCIAL CLUB

2 / PROPOSED SECTION EE
1:100

DO NOT SCALE

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NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m

Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
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03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS JJ + EE
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00204
REV	10
SCALE	1:100@A1 1:200@A3
DATE	03/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

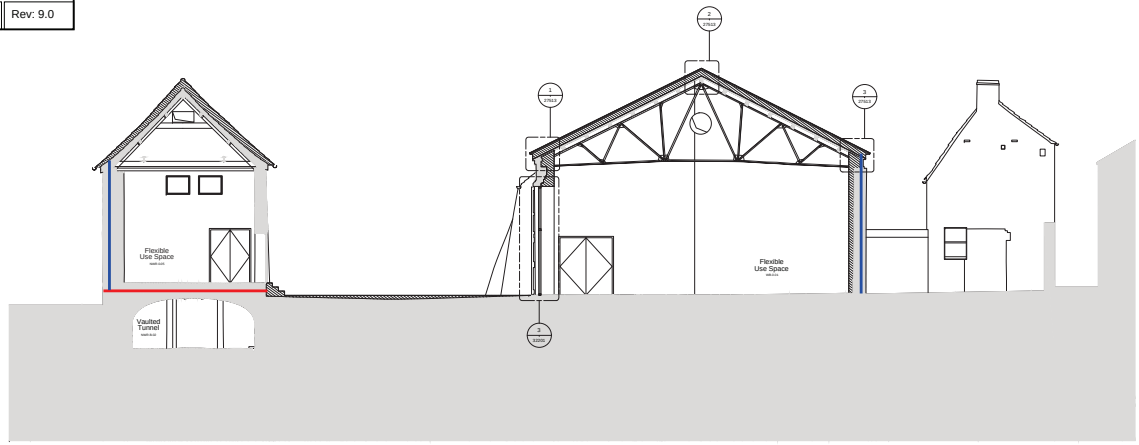
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 10

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



GLOBE HOTEL | NORTH WAREHOUSE RANGE | ST GEORGE'S COURTYARD | WHITE BARN | SCULPTURE GARDEN | FERRY LANE

1/ PROPOSED SECTION KK
1:100

FERRY LANE | SCULPTURE GARDEN | WHITE BARN | ST GEORGE'S COURTYARD | NORTH WAREHOUSE RANGE | GLOBE HOTEL

2/ PROPOSED SECTION LL
1:100

DO NOT SCALE

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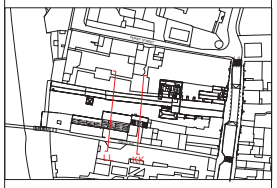
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
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JOB: 2302 : ST GEORGES GUILDHALL

DRG: PROPOSED SECTIONS KK + LL

DRG No: STGG-HTL-ZZ-ZZ-DR-A-00205 REV: 10

SCALE: 1:100@A1 1:200@A3 DATE: 03/02/25

DRAWN: HT TEAM INSPECTED BY: ML

STATUS: TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

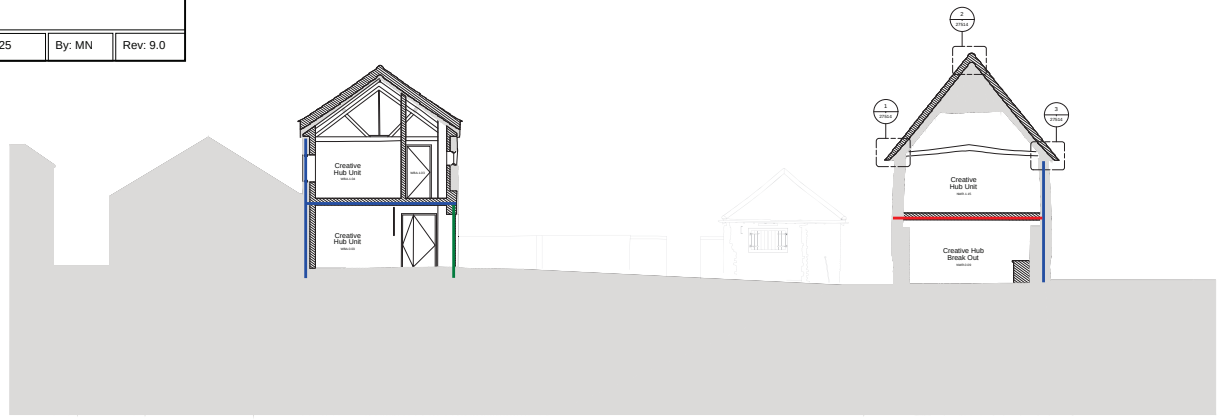
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

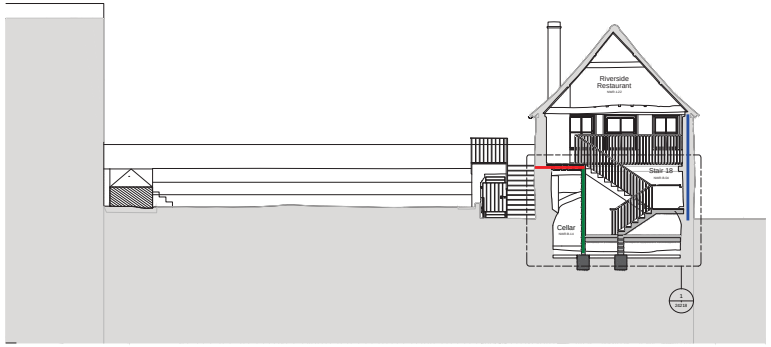
Sketch No.: 11

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



FERRY LANE | FERRY LANE SOCIAL CLUB | WHITE BARN ANNEX | ST GEORGE'S COURTYARD | NORTH WAREHOUSE RANGE | GLOBE HOTEL

1/ PROPOSED SECTION MM
1:100



GLOBE HOTEL | ST GEORGE'S COURTYARD | NORTH WAREHOUSE RANGE | GLOBE HOTEL

2/ PROPOSED SECTION NN
1:100

DO NOT SCALE

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NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m

Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
10	28/02/25	Tender
09	03/02/25	GA Issue for Tender Backgrounds
08	16/10/24	Stage 4 GA Freeze
07	16/04/24	Stage 3 Costing
06	18/03/24	Stage 3 GA Freeze
05	16/02/24	GA Updates
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03	17/11/23	Measured Survey Information
02	18/10/23	Stage 2 Issue GA Revisions
01	07/08/23	Stage 2 GA Freeze

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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS MM + NN
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00206
REV	10
SCALE	1:100@A1 1:200@A3
DATE	03/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	TENDER

The Fire Surgery Limited
85 Southwark Street
London SE1 0HX
Reg No. 07713184

THE FIRE SURGERY

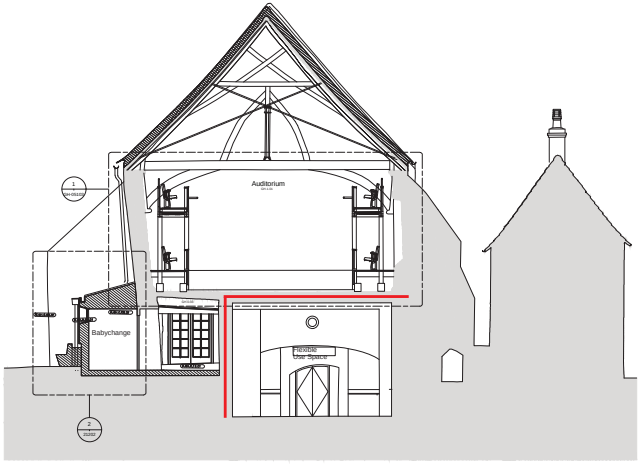
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 12

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



1/ PROPOSED SECTION RR
1:100

DO NOT SCALE

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NOTES

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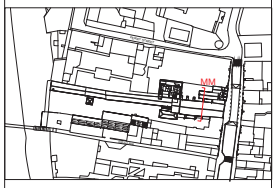

Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- H Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
03	28/02/25	Tender
02	03/02/25	GA Issue for Tender Backgrounds
01	16/10/24	Stage 4 GA Freeze

HaworthTompkins
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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTIONS RR
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00207 REV 03
SCALE	1:100@A1 1:200@A3 DATE 03/02/25
DRAWN	HT TEAM INSPECTED BY ML
STATUS	TENDER

The Fire Surgery Limited
85 Southwark Street
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THE FIRE SURGERY

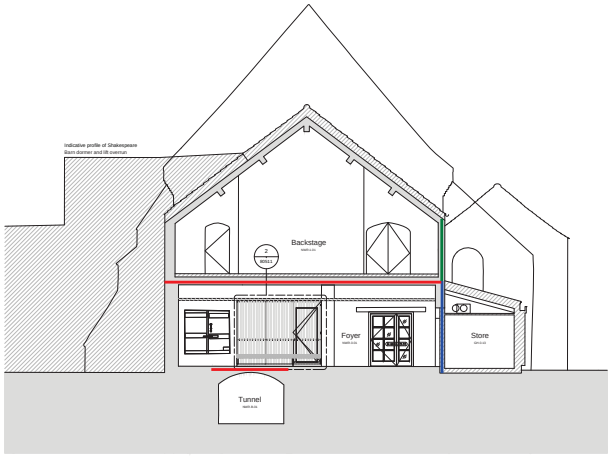
This drawing is for information purposes only

Project: St George's Guildhall

Subject: Fire strategy drawings

Sketch No.: 13

Project No.: P23-041	Date: 28/03/2025	By: MN	Rev: 9.0



SHAKESPEARE BARN | NORTH WAREHOUSE RANGE | BUTTRESS INFILL | ST GEORGE'S YARD

1/ PROPOSED SECTION SS
1:100

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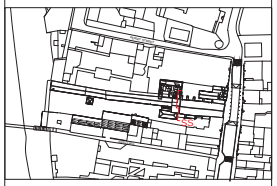
NOTES

TO BE READ IN CONJUNCTION WITH GA PLANS, SECTIONS AND ELEVATIONS.

0 1m 2m 3m 4m 5m



Existing Construction

The Fire Surgery - Strategy Key

Fire Compartmentation

- 240 minutes fire resistance
- 120 minutes fire resistance
- 90 minutes fire resistance
- 60 minutes fire resistance
- 30 minutes fire resistance
- 30 minutes fire rated curtain/ shutter
- 60 minutes firer rated curtain/ shutter

Fire Doors

- FD240s/FD240
- FD120s/FD120
- FD90s/FD90
- FD60s/FD60
- FD30S/FD30
- Indicates Held Open

Means of Escape

- Travel Distance
- Disabled Refuge with EVC
- Fire Exit

Fire Fighting

- Fire Service Access Route
- Hose Coverage
- Firefighting Lobby
- Firefighters Lift
- Fire Main Landing Valve / Inlet Breeching
- Smoke Vent Shaft

REV	DATE	DESCRIPTION
01	28/02/25	Tender

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JOB	2302 : ST GEORGES GUILDHALL
DRG	PROPOSED SECTION SS
DRG No	STGG-HTL-ZZ-ZZ-DR-A-00208
REV	01
SCALE	1:100@A1 1:200@A3
DATE	28/02/25
DRAWN	HT TEAM
INSPECTED BY	ML
STATUS	TENDER

Appendix C – ASET/ RSET Analysis

THE FIRE SURGERY

St George's Guildhall, King's Lynn

Borough Council of King's Lynn & West Norfolk

ASET RSET Analysis Report

Revision 1

Project Number: P23-041

Report Number: 240812R1F1 – P23-041

Date: 12th August 2024

Revision	Revision 0	Revision 1	Revision 2	Revision 3
Author	Marshall Nyamuchiwa	Marshall Nyamuchiwa		
Position	Fire Engineer	Fire Engineer		
Reviewed by	Lakshmi Balakrishnan, Andrew Nicholson	Lakshmi Balakrishnan, Andrew Nicholson		
Position	Senior Fire Engineer, Director	Senior Fire Engineer, Director		
Comment	Issued for design team comment.	Issued for Building Control approval.		
Date	31/07/24	12/08/24		

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Competence of Authors

Marshall Nyamuchiwa MEng (Hon) AIFireE	Marshall is a Fire Engineer with 5 years of experience as a fire safety engineer. He has experience in the use of Computational Fluid Dynamics (CFD) for the modelling of fire and smoke using the Fire Dynamic Simulator software package. Prior to starting his career, Marshall studied Chemical Engineering at the University of Birmingham with modules in Fluid Mechanics, Computational Fluid Dynamics, Thermodynamics and Heat Transfer and has had experience in carrying out CFD modelling with the COMSOL Multiphysics software package.
Lakshmi Balakrishnan MEng (Hon), CEng	Lakshmi holds a Master's degree in Energy Engineering from Anna University, Chennai and is a Chartered Mechanical Engineer in India. She is a Senior Fire Engineer with over 10 years of global experience. She has worked extensively in the Computational Fluid Dynamics (CFD) domain and has expertise in working on various modelling software like FDS, PHOENICS and Ansys Fluent. She has carried out smoke ventilation and radiation analysis for fires in shopping centres with atrium, airports, road and rail tunnels, warehouses and data centres.
Andrew Nicholson BEng (Hons), MSc (Cantab), CEng, MIFireE	Andrew is the founder and Director of The Fire Surgery. He is a Chartered Fire Engineer with 23 years' experience with Fire Engineering design. He has a specialist fire engineering degree from the University of Leeds and a Master's degree in interdisciplinary design from the University of Cambridge. Andrew is a contributing author to the Fire Protection Association publication – Fire Risk Management in Heritage Buildings. He is also a standing committee member of the Association of British Theatre Technicians. He was invited onto the Special Interest Group by the Institution of Fire Engineers on Heritage Fire safety. He was a principal author of BS 9999 2008 and also sits on numerous British Standard committees including BS7974. He is a steering committee member of CIBSE Guide E Fire Engineering and was joint author of section 13 Fire Fighting Access.

Contents

1 Executive Summary

The Fire Surgery has been commissioned by Haworth Tompkins Architects, on behalf of Borough Council of King's Lynn & West Norfolk, to provide an analysis of the available safe egress time (ASET) and required safe egress time (RSET) to support the proposed design of the Guildhall.

1.1 Background information

The Guildhall of the development is undergoing two major changes as listed below under proposed redevelopment works.

- The Guildhall stage on the 1st floor is currently provided with a proscenium arch without a safety curtain is in place. This arch is proposed to be removed as part of the redevelopment works. The removal of the proscenium arch means that the Guildhall will consist of an open stage arrangement.
- Addition of new gallery floors around the stage area namely Performer's gallery and Auditorium gallery is proposed under redevelopment works. Each gallery floor is served with its own accommodation stairs leading onto the guildhall first floor. The new gallery floor introduces new seating at height which could potentially subject occupants to adverse effects of smoke from a stage fire which would worsen the existing conditions.

Both of the proposed changes outlined above represent a worsening of the existing conditions in the Guildhall auditorium.

According to guidance of BS 9999 and the Technical Standards for places of entertainment, exhaust ventilation preferably mechanical, should be provided over any open stage. This extract system over an open stage should be sized to keep the auditorium relatively clear of smoke during the period of evacuation in the event of a fire on stage. The open stage and its impact on the new seating at gallery floors are justified using a fire engineered solution based on conducting an ASET/ RSET analysis shown in this report.

The ASET is deduced from fire and smoke Computational Fluid Dynamics (CFD) modelling whilst the RSET is determined from evacuation calculations based on PD 7974-6 (2019) principles.

The CFD modelling and evacuation calculations presented in this report are based on the principles and parameters formally agreed with AIS Building Control and verbally agreed with Norfolk Fire and Rescue Service.

1.2 ASET/ RSET analysis

The RSET for all areas was based on a detection and alarm time of 30 seconds, and a pre-travel time of the 1st percentile of 30 seconds. The adoption of a pre-travel time of 30 seconds is considered to be a conservative approach as the occupants will be able to see the onset of a fire on the stage combined with the ability of staff members to direct the evacuation process using a live voice/ public address system.

The ASET was deduced from fire and smoke CFD modelling by assessing tenability conditions at head height (2m above finished floor level). The tenability criteria adopted is based on visibility of more than 5m, temperatures of less than 60˚C, and assessment of smoke toxicity (based on carbon monoxide concentration less than 800ppm and overall cumulative fractional effective dosage less than 30%). The ASET used for this analysis is based on results of scenario 1 which produced the most onerous smoke spread to the auditorium.

From the ASET/ RSET analysis outlined in this report, it is demonstrated that the open stage arrangement does not adversely affect the evacuation of occupants from the newly added gallery floors and the Guildhall first floor.

1.2.1 Performer's gallery

The RSET for occupants to travel from the performer's gallery to the Guildhall first floor was determined to be 105 seconds. The ASET taken at 2m above this gallery floor was determined from smoke visibility to be 248 seconds. The ASET exceeds the RSET with a 136% safety margin; this is considered to be acceptable.

1.2.2 Auditorium gallery

The RSET for occupants to travel from the auditorium gallery to the Guildhall first floor was determined to be 153 seconds. The ASET taken at 2m above this gallery floor was determined from smoke visibility to be 185 seconds. The ASET exceeds the RSET with a 21% safety margin; this arrangement is considered to be acceptable from a risk-based approach based on the following reasons.

- The ASET was determined from considering an extensive area above the stair landing area. During the latter stages of the evacuation process, a few occupants are expected to be queuing in this area adjacent to the stair landing. As shown by a vertical slice, the visibility conditions of this area are more than 5m up to a simulation period of 200 seconds. The ASET would therefore exceed the RSET by a safety margin of 31% in areas expected for occupants to be queuing in the latter stages of an evacuation.
- Emergency lighting will be provided in close proximity to the stair landing area (as emergency lighting is required in areas of level changes). This emergency light emitting signage will improve visibility conditions for occupants to identify exit signage showing the escape route down the stair.
- Smoke toxicity was found to be significantly below the incapacitation levels for the entire simulation time of 250 seconds. This show a safe environment is available for the evacuation of all the occupants from the auditorium gallery floor (the evacuation time being 153 seconds).

The provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate from the auditorium gallery.

1.2.3 Guildhall first floor

The RSET for occupants to travel from the Guildhall enclosure to the ground floor, external stair or adjacent compartments was determined to be 167 seconds. The ASET was determined from smoke visibility to be 235 seconds. The ASET exceeds the RSET with a 41% safety margin; this arrangement is considered to be acceptable from a risk-based approach based on the following reasons.

- The RSET considered the time for occupants to travel down the entire accommodation flight of stairs to the ground floor. In the latter stages of an evacuation, the last occupants to evacuate down the accommodation stair will be able to take temporary refuge on the stair half landing area, which is at a lower level than the guildhall first floor. This accommodation stair half landing was shown to have visibility conditions of more

than 5m for the entire simulation time of 250 seconds. This show a safe environment is available for the evacuation of all the occupants from the Guildhall first floor (the evacuation time being 167 seconds).

- As mentioned in section 1.2.2 above, the provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate to the accommodation stair half landing area.

1.3 Building management considerations

The management aspects listed below are key to uphold the principles outlined in this ASET/ RSET Analysis report. The fire loading and characteristics considered for the stage area was as expected for an open stage with non-extensive scenery of limited combustibility (due to a lack of a flytower) as outlined in the ABTT Yellow guide. The theatre management team/ client should review, consider and confirm how the following management aspects are to be maintained for the use of the Guildhall across its life cycle.

- Scenery on the stage area should be limited to materials of limited combustibility as outlined in Figure 26 in section 4.8.2. Drapery used on the stage area is to consist of non-combustible materials or of the specification of type B to BS 5867-2.
- The use of plastic materials and any other higher fire risk materials on the stage area should be adopted through a bespoke fire risk assessment of the event (e.g. these materials could be used on the stage if there are no occupants to be accommodated on the auditorium gallery).

1.4 Mechanical smoke extract system considerations

The following aspects (non-exhaustive list) are outlined for the mechanical smoke extract system contractor for their consideration.

- The fans to date have been sized to operate at an extract rate of at least 7.5m^3/s. Smoke ventilation is a CDP element so will be performance specified. The ramp up time included in this analysis is a time period of 30 seconds.
- The mechanical smoke extract system was assumed to operate upon a single stage activation of the smoke detection system. This is to be programmed in the building management system.
- The extract vent was modelled with dimensions of 1.1m wide x 1.5m height, with the lowest edge at 2.2m above the performer's gallery floor. The analysis parameters had to be agreed prior to Stage 3 MEP information being produced; the actual location of the smoke vent will be slightly different to that modelled in the CFD simulations, however, was deemed not to have an adverse impact on the results outlined in this report.
- The actual location of the opening will be slightly different to that modelled in the CFD.
- The inlet air is to be provided by door openings (two storey exits) to outside during the evacuation period. Modulating smoke fans are recommended to be provided such that the system extract rate will be reduced once there is excessive depressurisation in the Guildhall enclosure.
- The ductwork should be a fire resisting duct system not less than 60 minutes fire rated to BS EN 13501-3.
- The fans should be capable of handling elevated gas temperatures of 300°C for a continuous period of not less than 60 minutes and tested in accordance with BS EN 12101-3.
- The system should be provided with a standby fan that operates automatically upon failure of the duty fan, with both fans provided in accordance with BS EN 12101-3.

1.5 Special consideration for means of escape

Light emitting signage is to be provided throughout the Guildhall to assist with wayfinding in case of a fire on the stage. This is especially important for areas adjacent to the auditorium gallery accommodation stair.

2 Introduction

2.1 General

The scheme has currently been developed to RIBA Stage 3. The Fire Surgery supported the scheme by developing a RIBA Stage 3 fire strategy report referenced: *240524R0F0P23-041 - St Georges's Guildhall Stage 3 Fire Strategy Report.* This fire strategy report provides the background fire safety design for the scheme.

For the proposed design for the Guildhall, there is an open stage arrangement with the increased seating height due to the addition of new gallery floors – Performer's gallery and Auditorium gallery. A new mechanical smoke extract system is to be provided at high level above the stage area (above the performer's gallery floor).

2.2 Aims and objectives

The introduction of gallery floors in the Guildhall represents a worsening on the existing conditions (as the increased seating height will subject the occupants to untenable smoke conditions relatively earlier compared to those seated at the stall level).

The objective of this report is to demonstrate that the operation of the mechanical smoke extract system will maintain tenable conditions in the Guildhall for an adequate period to allow for the safe egress of occupants accommodated in it. This objective is achieved through an analysis of the Available Safe Egress Time (ASET) against the Required Safe Egress Time (RSET).

The ASET was deduced from fire and smoke CFD modelling whilst the RSET was determined from evacuation calculations outlined in PD 7974-6 (2019).

This report details the CFD modelling methodology, input parameters and results used to obtain the ASET. It also outlines the evacuation calculations used to acquire the RSET.

2.3 Approvals process

Prior to the CFD modelling process, a Qualitative Design Review (QDR) was conducted with AIS Building Control. The Fire Surgery presented a CFD approach, input parameters and preliminary results in a meeting with AIS Building Control. AIS Building Control verbally agreed with the CFD methodology and input parameters presented.

After the QDR meeting, The Fire Surgery issued a formal QDR design note for approval by AIS Building Control on the 4th of March 2024 referenced: *240304DN1F0-P23-041 St Georges Guildhall ASET_RSET Parameter Proposal*. AIS Building Control acknowledged receipt of this design note and indicated that they considered the principles outlined to be acceptable through their CFD tracker referenced: *P504446 CFDRR - Proposal – 200324*.

The CFD modelling and evacuation calculations presented in this report are based on the principles and parameters outlined in the formally agreed CFD QDR design note referenced: *240304DN1F0-P23-041 St Georges Guildhall ASET_RSET Parameter Proposal*, with consideration of the comments raised by AIS Building Control in their CFD tracker referenced: *P504446 CFDRR - Proposal – 200324*.

2.4 Description of the building

The Guildhall building is mainly accessed from an entrance lobby/ box office at ground level from Kings Street on the east side. The Guildhall is abutted on the first floor to 29 King Street on the north side, with an archway leading to the Shakespeare Courtyard and the Shakespeare Barn. To the westside of the Guildhall building is the Fermoy Gallery and the Red Barn.

The Guildhall comprises of three floors – ground, first floor and gallery level. The components of the guildhall are as follows:

- Ground floor - entrance lobby/ box office.
- (Guildhall) First floor - open stage and stall level seating.
- Gallery floor – performer's gallery and auditorium gallery.

The existing guildhall has a central stage area with a proscenium arch with no safety curtain in place. Under current redevelopment works, this proscenium arch is to be removed making the stage to be considered as an open stage arrangement. There is an existing tiered single stall seating overlooking the stage area and this is retained in the proposed works. The guildhall enclosure has an extensive volume in the roof, concealed by numerous timber joists. The maximum height of enclosure measured from the stalls level to the top of the pitched roof level is 9.7m. The first floor will be at a height of 3.7m above the access ground level. The new performer's and auditorium gallery floors will be at a height of 2.4m above the first floor.

Figure 1: St George's Guildhall (exterior to the left and interior to the right)

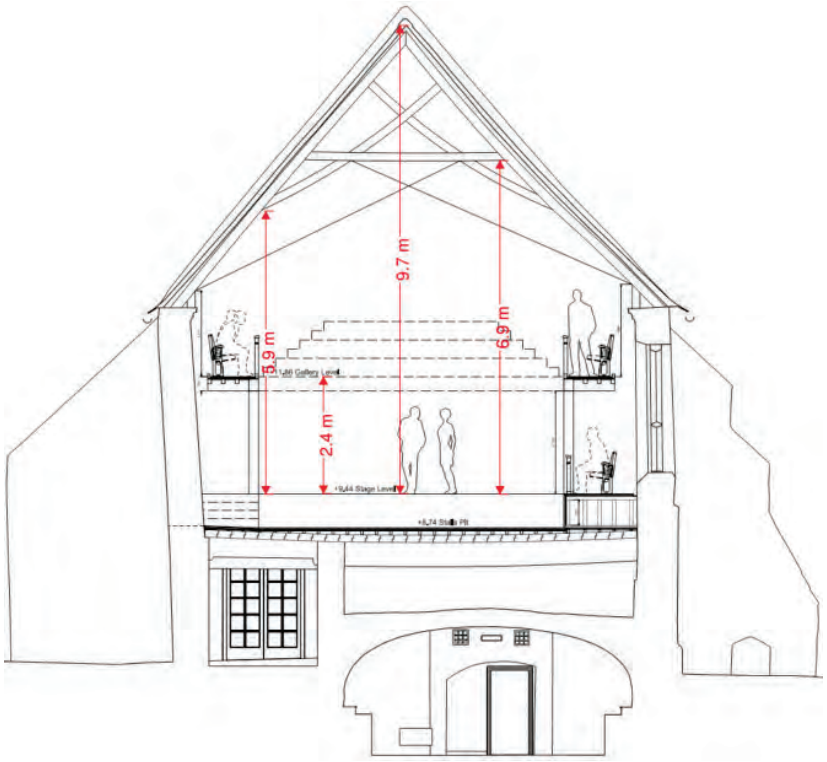


Figure 2: Section drawing showing level heights within the Guildhall enclosure

The following stairs are incorporated within the Guildhall enclosure, all of which are used for escape purposes.

- An accommodation stair connecting Performer's gallery with the Guildhall first floor .
- An accommodation stair connecting the Auditorium gallery with the Guildhall first floor.
- An accommodation stair connecting the Guildhall first floor with to the entrance lobby/ box office area on the ground level which ultimately leads to final exit onto King Street.
- An external exit stair from the Guildhall first floor leading occupants to the St George's Courtyard at south side ground level.

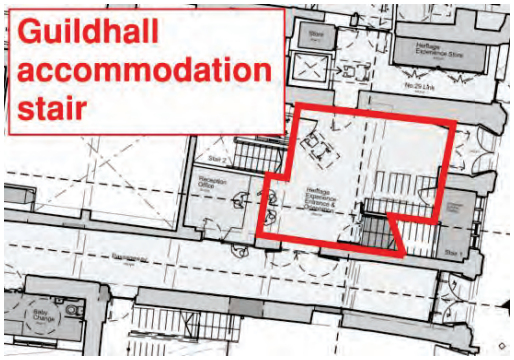


Figure 3: The location of the Guildhall accommodation stair (shown on the ground floor)

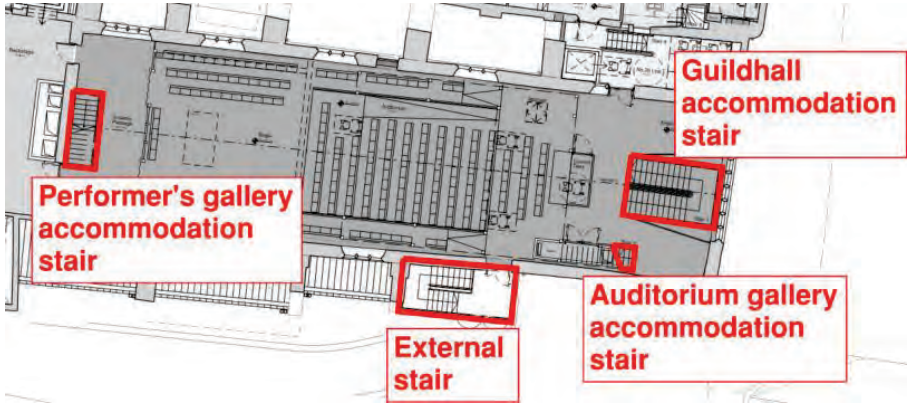


Figure 4: Stairs within the Guildhall enclosure (shown on the first floor)

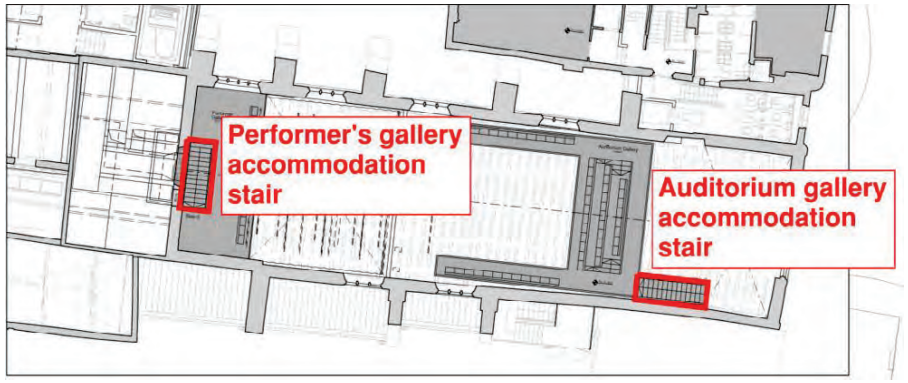


Figure 5: Stairs within the Guildhall enclosure (shown on the gallery floor)

3 Evacuation calculations

3.1 Means of escape

The calculation of the RSET will be based on the calculations outlined in PD 7974-6: 2019. Escape time depends upon detection, warning and a range of parameters related to occupant evacuation behaviour and movement, in a process outlined in Figure 6 below.

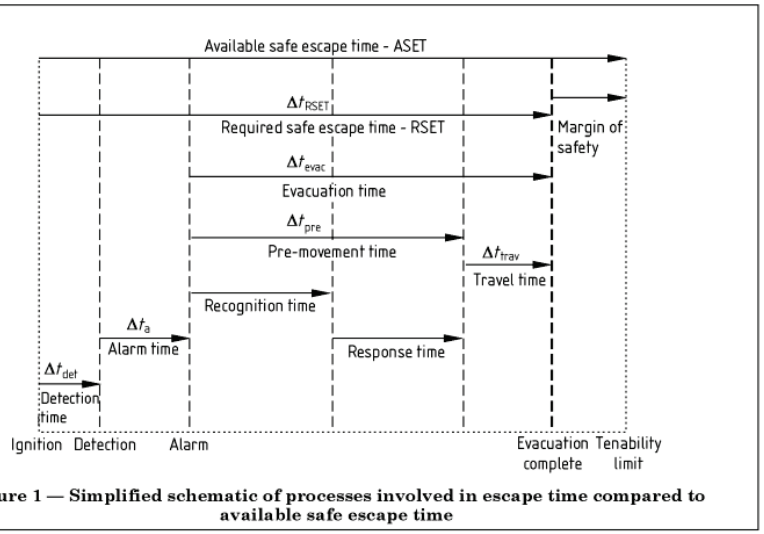


Figure 1 — Simplified schematic of processes involved in escape time compared to available safe escape time

Figure 6: Process variables involved in escape time

The basic formula used for determining the escape time for a building is shown below:

$$t_{RSET} = t_{det} + t_a + t_{evac}$$

$$t_{evac} = t_{pre} + t_{trav}$$

$$t_{trav} = t_{trav\ (walking)} + t_{trav\ (flow)}$$

Where:

t_{det} is the time from ignition to detection by an automatic system or first occupant to detect fire cues

t_a is the time from detection to a general alarm

t_{evac} is the evacuation time from the enclosure

t_{pre} is the premovement time for the enclosure or building occupants

t_{trav} is the travel time of the occupants from the enclosure

$t_{trav\ (walking)}$ is the time required for occupants to walk to an exit leading to a protected escape route

$t_{trav\ (flow)}$ is the time required for occupants to flow through exits and escape routes

The premovement time is based on two criteria, the premovement time of the first few occupants in an enclosure to move (1st percentile of occupants) and the premovement of the last few occupants to move (99th percentile of occupants).

The complexity of interactions between pre-movement time, walking times and exit flow times can be simplified by considering two simple cases:

a. The enclosure is sparsely populated with a population density of less than one third of the design population (no queuing at the exits).

   $t_{evac} = t_{pre\ (99th\ percentile)} + t_{trav\ (walking)}$

b. The enclosure contains the maximum design population.

   $t_{evac} = t_{pre\ (1st\ percentile)} + t_{trav\ (walking)} + t_{trav\ (flow)}$

As the ground/ first floor compartment, fourth floor and escape stair enclosure will have a population density of more than 1/3rd of the design population/ exit capacity, queuing can be expected at the storey exits or within the escape stair. The expression outlined in point (b) above is therefore to be used to account for flow through storey exits and the escape stair.

3.1.1 Evacuation arrangements

Gallery level

On the gallery level, there will be 60 occupants on the auditorium gallery and 30 occupants on the performer's gallery.

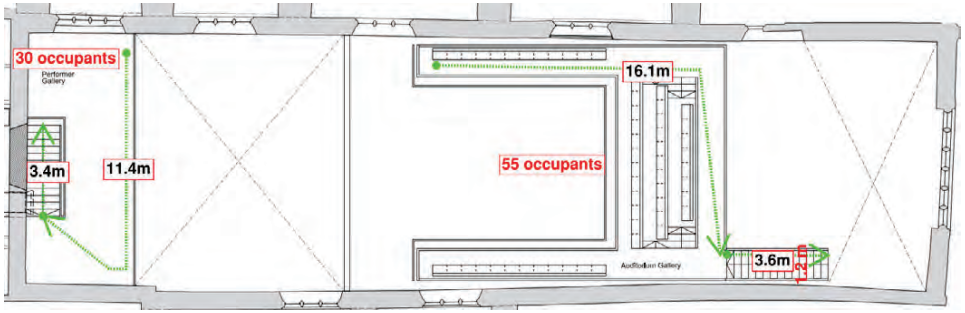


Figure 7: Evacuation arrangement from the gallery level

First floor

On the first floor, the seating indicates a loading of 152 occupants in the auditorium and 61 occupants on the stage area. The stage area is assumed to have a maximum of 10 performers at any one time.

The occupants on the stage area are assumed to use the closest exit through the screen passage and backstage area. Including the occupants from the performer's gallery, the screen passage exit is expected to be used by ca. 101 occupants.

As the exit into the No. 29 link stair opens against direction of escape, this exit is assumed to be used by 60 occupants. The rest of the occupants from the auditorium are assumed to be evenly distributed across the two exits from the back of the Guildhall enclosure such that the accommodation and external stairs are estimated to be used by 74 occupants each.

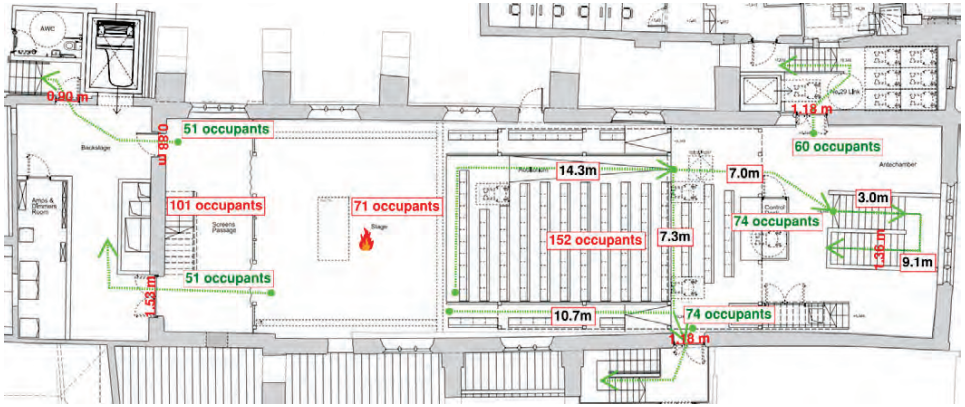


Figure 8: Evacuation arrangement from the first floor

Figure 9: Evacuation arrangement from the ground floor

3.2 Detection and alarm time

According to PD 7974-6 (2019), when automatic detection is provided throughout the building, activating an immediate general alarm to occupants of all affected parts of the building, the alarm time is considered to be effectively zero.

The detection and alarm time are directly associated and will be determined concurrently. This can be achieved in either of two ways. The first instance is detection by occupants who will raise the fire alarm by activation of a manual call point on their way through an exit. The second instance is smoke detection by a second detector which will instantaneously raise the fire alarm. The building is to be provided with an enhanced early means of fire detection and alarm to category L2. A detection time of **30 seconds** is therefore considered to be reasonable, especially for a fire on the stage area that will be clearly visible to occupants in the auditorium.

3.3 Pre-travel time

As the population density will be more than 1/3rd of the exit capacity, the pre-travel time of the 1st percentile is to be used. In a densely populated building, the occupants being awake and unfamiliar with the building, intuitive wayfinding (B1), automatic fire detection and adopting a simultaneous evacuation strategy (A1), and a good level of management (M1), the pre-travel time of the 1st percentile of the occupants is given as **30 seconds**.

Scenario category and modifier	First occupants $\Delta t_{pre(1st\ percentile)}$ [a]	Occupant distribution $\Delta t_{pre(99th\ percentile)}$ [b]
A: awake and familiar		
M1 B1 – B2 A1 – A2	0.5	1.5
M2 B1 – B2 A1 – A2	1	3
M3 B1 – B2 A1 – A3	*>15*	*>30*
For B3, add 0.5 for wayfinding		
M1 would normally require voice alarm/PA if unfamiliar visitors likely to be present		
B: awake and unfamiliar		
M1 B1 A1 – A2	0.5	2.5
M2 B1 A1 – A2	1.0	4.0
M3 B1 A1 – A3	*>15*	*>30*
For B2, add 0.5 for wayfinding		
For B3, add 1.0 for wayfinding		
M1 would normally require voice alarm/PA		

Figure 10: Pre-travel times as outlined in Table E.2 of PD 7974-6: 2019

The adoption of a pre-travel time of 30 seconds is considered to be conservative as the fire alarm will incorporate a live voice alarm/ public address system which would be expected to reduce the pre-travel time.

3.4 Travel time

The following average walking speeds are used to estimate the travel time:

- Level surface – 1.2m/s (PD 7974-6: 2019).
- Stair steps (level changes) – 0.6m/s (taken as half the level surface walking speed).

3.4.1 Travel time from the performer's gallery

The furthest location from the storey exit is measured to be ca. 11.4m away along level walking surface. Using an average walking speed of 1.2m/s, the travel time along level walking surface is calculated to be 9.5 seconds.

The distance from the performer's gallery level to the first floor along the accommodation stair is measured to be ca. 3.4m. Using an average walking speed of 0.6m/s, the travel time down the stairs is calculated to be 5.7 seconds.

Adding the level walking surface and stair travel times, the furthest person is calculated to reach the storey exit after 15.2 seconds.

The closest seated location to the accommodation stair landing area is measured to be ca. 4.5m away along level walking surface. Using an average walking speed of 1.2m/s, the travel time for the first percentile to reach the accommodation stair landing is calculated to be 3.8 seconds.

3.4.2 Travel time from the auditorium gallery

The furthest location from the accommodation stair landing is measured to be ca. 16.1m away along level walking surface. Using an average walking speed of 1.2m/s, the travel time along level walking surface is calculated to be 13.4 seconds.

The distance from the auditorium gallery level to the first floor along the accommodation stair is measured to be ca. 3.6m. Using an average walking speed of 0.6m/s, the travel time down the stairs is calculated to be 6 seconds.

Adding the level walking surface and stair travel times, the furthest person is calculated to reach the first-floor level 19.4 seconds.

The closest seated location to the accommodation stair landing area is measured to be ca. 4.0m away along level walking surface. Using an average walking speed of 1.2m/s, the travel time for the first percentile to reach the accommodation stair landing is calculated to be 3.3 seconds.

3.4.3 Travel time from the auditorium enclosure

The largest travel distance from the Guildhall enclosure will be through the accommodation stair to access the final exit on the ground floor. The furthest location from the accommodation stair landing is measured to be ca. 21.3m away along level walking surface. The travel distance on the ground floor from the stair landing to the final exit is measured to be ca. 8.1m. Using an average walking speed of 1.2m/s, the travel time along level walking surface is calculated to be 24.5 seconds.

The distance from the first floor to the ground floor along the accommodation stair is measured to be ca. 9.1m. Using an average walking speed of 0.6m/s, the travel time down the stairs is calculated to be 15.2 seconds.

Adding the level walking surface and stair travel times, the furthest person is calculated to reach the ground floor final exit at a time of 39.7 seconds.

The closest seated location to the storey exits (and the accommodation stair landing) is measured to be ca. 5.0m away along level walking surface. Using an average walking speed of 1.2m/s, the travel time for the first percentile to reach the accommodation stair landing is calculated to be 4 seconds.

3.4.4 Storey exit opening times

The nearest occupants to storey exits on the first floor will be seated ca. 5m away. Using an average walking speed of 1.2m/s, the travel time for the first occupants to reach the storey exits is calculated to be **4 seconds**. Storey exits on the first floor are therefore to be opened after a simulation time of 64 seconds (detection time + pre-travel time + travel time).

The nearest occupants to the ground floor storey exit will have to travel ca.13.1m along level surface and 9.1m along steeped surface. Using average walking speeds of 1.2m/s and 0.6m/s, respectively, the travel time for the first occupants to reach the ground floor storey exit is calculated to be **26 seconds**. The storey exit on the ground floor is therefore to be opened after a simulation time of 86 seconds (detection time + pre-travel time + travel time).

3.5 Flow capacity

3.5.1 Stair flow capacity

Figure 11 below, from PD 7974-6: 2019, shows the maximum flow capacities through stairs with various stair riser and tread dimensions. For this analysis, the stairs are considered to have the smallest flow factor of 0.94 persons/s/m.

Exit route element		***k***	**Speed**	**Maximum specific flow (F_s)**
mm			m/s	persons/s/m of effective width
Corridor, aisle, ramp,	doorway	1.40	1.19	1.3
Stair – riser	Stair – tread			
191	254	1.00	0.85	0.94
178	279	1.08	0.95	1.01
165	305	1.16	1.00	1.09
165	330	1.23	1.05	1.16

Figure 11: Maximum stair flow capacities as outlined in Table G.2 of PD 7974-6

Using the outlined principles of PD 7974-6: 2019, boundary layers have to be eliminated from the stair clear width to acquire the effective width.

The performer's gallery escape stair and the accommodation stair are each to provide a clear width of 1200mm (the latter is limited by the stair door width on the ground floor). Taking boundary layers of 150mm from both sides, the effective width of each stair is calculated to be 900mm.

The auditorium gallery escape stair is to provide a clear width of 1000mm. Taking boundary layers of 150mm from both sides, the effective width of each stair is calculated to be 700mm.

3.5.1.1 Performer's gallery flow time

The performer's gallery will have a maximum occupant loading of 30 people. With a stair effective clear width of 900mm and using a specific flow of 0.94 persons/s/m, the stair is calculated to provide a flow time of 35.5 seconds.

3.5.1.2 Auditorium gallery flow time

The auditorium gallery will have a maximum occupant loading of 55 people. With a stair effective clear width of 700mm and using a specific flow of 0.94 persons/s/m, the accommodation stair is calculated to provide a flow time of 84 seconds.

3.5.1.3 Accommodation stair flow time

The accommodation stair is assumed to provide egress for a maximum occupant loading of 74 people. With a stair effective clear width of 900mm and using a specific flow of 0.94 persons/s/m, the accommodation stair is calculated to provide a flow time of 88 seconds.

3.5.2 Final exit flow capacity

Figure 12 below, from PD 7974-6: 2019, shows the maximum flow capacities through exits with various clear widths. For exits from the Guildhall, the maximum flow capacity is taken as:

- 0.86persons/s/m for exits with a clear width of at least 850mm.
- 1.4persons/s/m for exits with a clear width of at least 1050mm.

Maximum number of persons	Minimum width	Maximum flow capacity
	mm	Persons/s/m
50	750	0.44
110	850	0.86
220	1 050	1.40
More than 220	5 per person	1.33

Figure 12: Maximum exit flow capacities as outlined in Table G.4 of PD 7974-6

All storey exits from the Guildhall are located on the first floor.

3.5.2.1 No. 29 link building exit flow time

The exit to No.29 link stair is to provide a clear width of 1180mm. With an occupant loading of 60 occupants, this exit is calculated to have a flow time of 36 seconds.

3.5.2.2 External escape stair exit flow time

The exit to the external escape stair is to provide a clear width of 1180mm. With an occupant loading of 74 occupants, this exit is calculated to have a flow time of 45 seconds.

3.5.2.3 Screen passage exits flow times

The smaller exit from the screen passage is to provide a clear width of 880mm. With an occupant loading of 51 occupants, this exit is calculated to have a flow time of 67 seconds.

The larger exit from the screen passage is to provide a clear width of 1530mm. With an occupant loading of 51 occupants, this exit is calculated to have a flow time of 24 seconds.

3.5.2.4 Accommodation stair final exit flow time

The accommodation final exit on the ground floor is to provide a clear width of 1450mm. With an occupant loading of 74 occupants, this exit is calculated to have a flow time of 36 seconds.

3.6 Required safe egress time and summary of evacuation times

A summary of the calculated evacuation times and RSET from the Guildhall are shown in Table 1 below.

Table 1: Summary of evacuation times and RSET

Evacuation aspect	Time
Detection and alarm time	30 seconds
Pre-travel time	30 seconds
RSET from the performer's gallery to the first floor	
Travel time (first percentile to reach the accommodation stair landing)	3.8 seconds
Travel time down the accommodation stair	5.7 seconds
Flow time	35.5 seconds
Total evacuation time (RSET)	**105 seconds**
RSET from the auditorium gallery to the first floor	
Travel time (first percentile to reach the accommodation stair landing)	3.3 seconds
Travel time down the accommodation stair	6 seconds
Flow time	84 seconds
Total evacuation time (RSET)	**153 seconds**
RSET from the auditorium enclosure (limited by travel down the accommodation stair)	
Travel time (first percentile to reach the accommodation stair landing)	4 seconds
Travel time down the accommodation stair	15 seconds
Flow time (largest from the accommodation stair)	88 seconds
Total evacuation time (RSET)	**167 seconds**
Simulation sequence	
Fire starts growing according following t-squared fire curve.	0 seconds
MSVS extract fans are activated upon smoke detection with an assumed ramp up time of 30 seconds.	0 – 90 seconds
All exits from the Guildhall on the first floor open representing the first occupants reaching these exits.	64 seconds
The accommodation stair final exit on the ground floor opens representing the first occupants evacuating from the first floor Guildhall enclosure.	86 seconds

Evacuation aspect	Time
All exits on the first floor close.	204 seconds
Simulation ends.	250 seconds

4 CFD Modelling

4.1 Software

The geometry and CFD models were set up using the PyroSim (version 2023.2.0816) software package. Two-dimensional CAD drawings referenced in Table 2 below were imported into PyroSim and simplified for the purposes of the CFD model.

The Fire Dynamics Simulator (FDS) version 6.8.0 was used to carry out the CFD modelling. The software solves numerically a form of the Navier-Stokes equations appropriate for low-speed, thermally driven flow, with an emphasis on smoke and heat transport from fires. It has developed by the National Institute of Standards and Technology (NIST) of the United States Department of Commerce and is widely used for fire/smoke modelling applications. The software was first publicly released in the year 2000 and has been validated for a wide range of fire scenarios.

Table 2: Drawing list

Drawing Number	Title	Date	Rev
STGG-HTL-ZZ-00-DR-A-00-00100	Proposed G+0 Plan	16/04/24	08
STGG-HTL-ZZ-00-DR-A-00-00101	Proposed G+1 Plan	16/04/24	08
STGG-HTL-ZZ-00-DR-A-00-00101	Proposed Auditorium Gallery Plan	18/03/24	07
-	Guildhall Short Section, Proposed	-	-

4.2 Assumptions

The following assumptions were made for the CFD modelling:

- The domain of the model is assumed to be based on atmospheric conditions with a temperature of 20˚C and a pressure of 101kPa.
- The effects of wind were considered to be negligible as agreed with AIS Building Control (see section 4.5).
- As smoke movement is buoyancy driven with relatively larger door openings to outside, building leakage effects on the movement of smoke is considered to be negligible.
- Assumptions on material thermal properties were made and are discussed in section 4.8.1.
- As the fire will be in its early stages (less than 1MW), the simulated fire was assumed unlikely to be ventilation controlled and carbon monoxide yield was assumed to be on the lower range as discussed in section 4.8.3.
- The mechanical smoke ventilation system was assumed to have a ramp up time of 30 seconds. This assumption is to be confirmed by the mechanical smoke extract contractor.
- The mechanical smoke extract system was assumed to operate upon a single stage activation of the smoke detection system. This is to be programmed in the building management system.
- The Guildhall is to be provided with an aspirating, very early smoke detection system (VESDA). The mechanical smoke extract was specified to be activated by Cleary photoelectric smoke detectors (obscuration threshold of 3.24%/m).
- The guildhall external stair storey exit was measured to provide a width of 1.18m and assumed to have a height of 2m (area of 2.36m^2). This was snipped in the FDS model as a 1.2m x 2m opening (area of 2.4m^2).
- The accommodation stair final exit was measured and specified to provide dimensions of 1.4m and assumed to have a height of 2m (area of 2.8m^2). This was snipped in the FDS model as specified.
- The roof timber joists were specified to have a thickness of 0.4m each, with a separation distance of 0.4m between each joist. This was snipped in the FDS model as specified.

4.3 Limitations

The CFD modelling is based on the chosen scenarios only with reasonable approximations on geometry and input parameters made. The results are dependent on the chosen parameters and acceptance criteria as outlined in this report.

FDS requires the computational mesh to be formed of rectilinear volumes (cells). Therefore, the modelled geometry has been approximated to suit the chosen grid. The accuracy of the resolved fire is limited by the chosen mesh grid. The mesh grid to resolve the fire was determined from a sensitivity analysis to balance between accuracy and computational time (see section 4.9.2).

Accidental fires contain a mixture of fuels. However, FDS models a single reaction, which has been simplified by specifying the combustion products and heat of combustion.

4.4 Geometry of the CFD model

The modelled geometry include the full internal Guildhall enclosure, including the gallery levels. As air movement will influence smoke movement within the Guildhall, the full enclosure of the Guildhall accommodation stair was also incorporated as part of the model. The Guildhall geometry modelled is highlighted in Figure 13 to Figure 15 below.

Figure 13: Model bounds on the ground floor

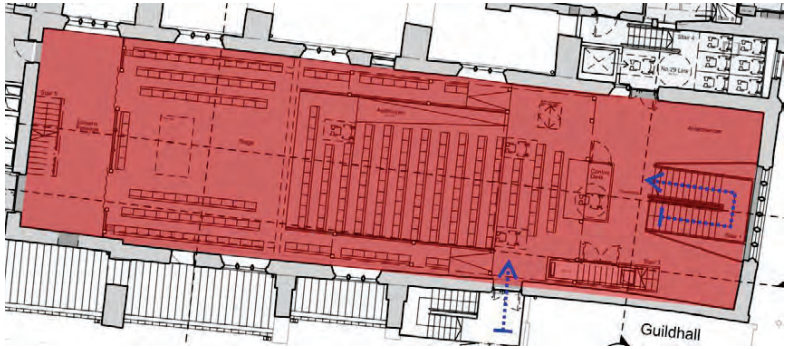


Figure 14: Model bounds on the first floor

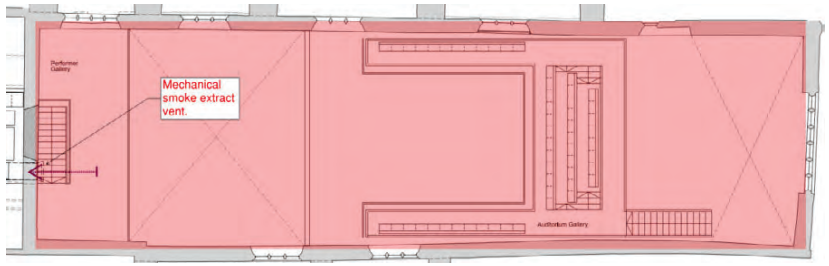


Figure 15: Model bounds on the gallery level

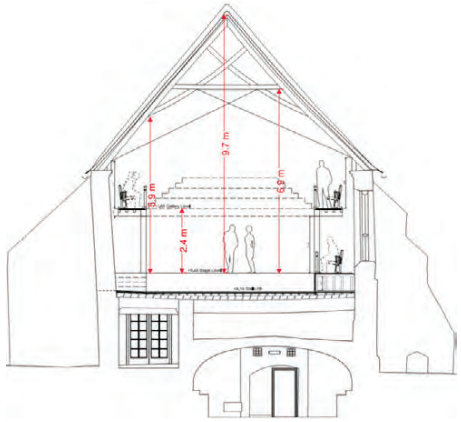


Figure 16: Section drawing showing level heights

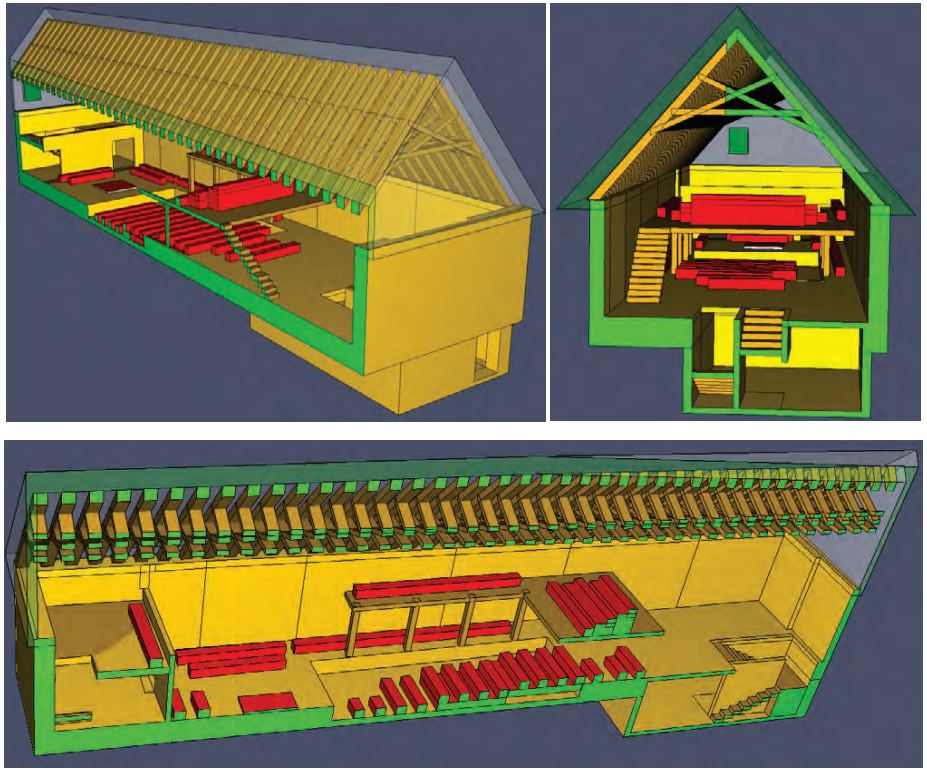


Figure 17: Geometry of the constructed model showing the fire location (Scenario 1), smoke extract vent, gallery and auditorium floors, guildhall accommodation stair to ground floor and roof timber joists.

4.5 Smoke ventilation arrangement

Mechanical smoke ventilation is to be provided from the Guildhall enclosure at high level above the stage area. The mechanical smoke ventilation system (MSVS) is to operate at a minimum extract rate of 7.5m^3/s. The extract fans are assumed to ramp up to maximum speed within 30 seconds and this arrangement is to be confirmed with the system provider.

The model incorporated the ventilation system by specifying the extract rate to a vent at the extract location. The extract vent was specified to have an area of 1.65m^2 with dimensions of 1.1m x 1.5m as confirmed by Max Fordham as part of their Stage 3 design. The design of the ventilation system will be by others.

Air supply for the MSVS will be provided from door openings to outside from the Guildhall enclosure and the ground floor reception area as shown in Figure 13 and Figure 14 above (blue arrows). These doors are expected to be opened during the evacuation phase to allow occupants to evacuate the Guildhall enclosure. After the evacuation phase, the doors are expected to retain to the closed position therefore eliminating air supply to the MSVS. Modulating smoke fans are recommended to be specified by the ventilation designers such that the MSVS extract rate will be reduced once there is excessive depressurisation in the Guildhall enclosure.

Building leakage was deemed to have a negligible effect on results as there are much larger openings from the compartments to outside from door openings. For instance, a double leaf door is stated to have a leakage area of ca. 0.03m^2 (BS EN 12101-6: 2005) whilst the area provided by an open door to outside will providing a free area of ca. 2.0m^2. It was therefore deemed reasonable not to consider building leakage.

4.6 Fire simulation

The stage area presents the most significant fire risk in the auditorium. Three fire scenarios were proposed (and agreed with AISCS) with fire locations shown in Figure 18 below. These locations will produce an axisymmetric smoke plume and an adhered spill smoke plume. The proposed fire locations will provide an adequate sensitivity analysis of the results based on different fire dynamics.

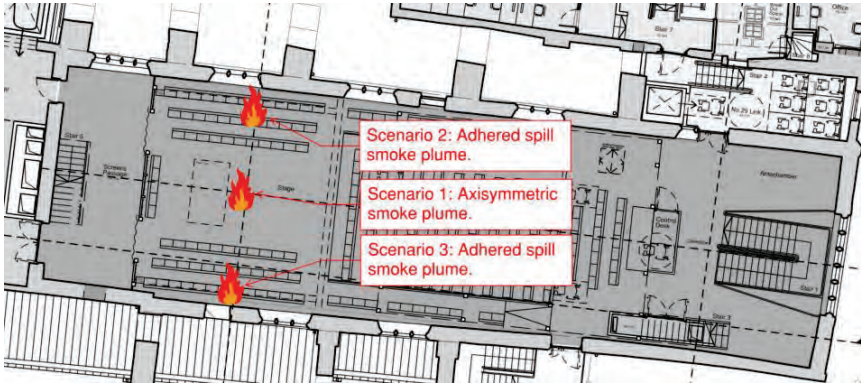


Figure 18: Proposed fire locations

4.7 Performance criteria

The existing design for the Guildhall consists of an open stage, albeit with an open proscenium arch that does not extend to the roof (such that smoke can readily move from the stage area to the auditorium). The proposed design only worsens conditions for means of escape through the introduction of seating at height on the new gallery levels. As the stage area is open to the auditorium as part of the existing condition, the proposed design is not deemed to worsen conditions for firefighting.

The objective of this analysis is therefore solely to demonstrate tenable conditions in the Guildhall enclosure for means of escape.

4.7.1 Smoke visibility factor

CIBSE Guide E (2019) provides some commentary on the use of visibility as a tenability criterion:

> ''The smoke produced from typical building contents will normally cause loss of adequate visibility before debilitating toxic conditions occur.'' **Section 7.4.2**. Typically, a tenability limit for visibility for escape purposes is a visibility distance of 8–10 m. For most fire types, it is likely that smoke at this concentration will cause some eye irritation, but it is unlikely to contain irritants at concentrations high enough to seriously inhibit escape or cause collapse. **Section 10.3.4**.
>
> It is recommended to ''Ensure that the visibility through any smoke will be sufficient for exits to be identified and reached without undue hindrance. (Generally, people are reluctant to proceed through smoke if the visibility distance is less than 10 m.'' **Section 7.4.2**.
>
> ''Where there is a clearly defined escape route, a visibility of 10 m (equivalent to an optical density of 0.1 dB · m^{-1}) is normally considered reasonable. The visibility distance is roughly doubled if back-illuminated signs (i.e. integrally lit escape signage) are provided.'' **Section 7.4.2**.
>
> ''Smoke particles and irritant products can, in sufficient concentrations, reduce visibility. While loss of visibility is not directly life threatening, it can prevent or delay escape and thus expose people to the risk of being overcome by smoke.'' **Section 10.3.1**.

CIBSE Guide E (2019) also states that ''Visibility in smoke is defined in terms of the furthest distance at which an object can be perceived, S (m), the optical density per unit length (m^{-}1), D, and a visibility coefficient, K (m–1). This can be determined from'':

$$S = K/ 2.303D$$

It also provides more guidance as follows:

> ''Light-emitting objects, such as electric lights, are more easily perceived than objects which receive ambient illumination. These differences are reflected in the typical visibility coefficients given below for wood and plastic-based fires:
>
> — for light-emitting signs: K = 8.
>
> — for light-reflecting signs: K = 3.

— for building components in reflected light: K = 3.'' (**Section 10.3.4**)

According to the FDS User guide (McGrattan et al 2019), the light extinction coefficient, *K*, is the most useful parameter for assessing visibility in a space. The light extinction coefficient is acquired by the following equation:

$$K = K_m \rho Y_s$$

where K_m is the mass specific extinction coefficient, which is fuel dependent, and ρY_s is the density of smoke particulate. The visibility through smoke is estimated by the following equation:

$$S = C/K$$

where *C* is a non-dimensional constant characteristic of the type of object being viewed through the smoke. The following values are given for this constant:

- *C* = 3 for a light reflecting sign.
- *C* = 8 for a light emitting sign.

The visibility was assessed using a non-dimensional constant C of 3 as is standard practice. This is the default value used in FDS.

Although light emitting signage will be provided within the Guildhall enclosure, building elements such as stair steps and landing areas will be seen with reflected light. The visibility factor for the simulations will be set as the default value of C = 3, which will be a conservative approach. It was, however, considered accepted to adopt a smoke toxicity tenability criterion in addition to visibility criteria of more than 5m.

4.7.2 Smoke toxicity

According to CIBSE Guide E (2019),

> ''Carbon monoxide (CO) exposure accounts for the majority of fire fatalities, although smoke often includes other toxic gases and factors such as hyperventilation due to high levels of carbon dioxide (CO_2) or hypoxia caused by oxygen (O_2) deprivation will also have an impact. As such, toxicity is often expressed as a fractional effective dose (FED). **Section 10.3.5.**
>
> ''A simple approach is to provide a tenability limit for 5-minute and 30-minute exposure durations based on the concentrations of carbon monoxide, carbon dioxide, oxygen and hydrogen cyanide in the fire effluent. Table 10.2 shows some proposed limiting exposure times for asphyxiants based on a 0.3 FED tenability limit for conditions considered typical for fires in buildings.'' Pg 10-5.

Table 10.2 Design tenability limit exposure concentrations for asphyxiant gases expressed as carbon monoxide for 5-minute and 30-minute exposures (BSI, 2004)

Fuel type	Maximum asphyxiate concentration as CO / ppm	
	5-minute exposure	30-minute exposure
Retail/residential (>2% nitrogen by mass of fuel)	800	125
Offices (<2% nitrogen by mass of fuel)	1200	275

Figure 19: Table 10.2 of CIBSE Guide E (2019)

An alternative method is to compare the concentrations against the concentration that is lethal to 50% of animal subjects (LC_{50}) for a given period of time (usually 30 minutes). Pg 10-5.

The alternative to the method outlined above considers the fractional effective dose (FED), where an FED of 1 (unity) is considered to be fatal and 0.3 represent levels representing incapacitation. The SFPE Handbook (2016) provides a way to quantify the FED as outlined in Figure 20 below.

$$F_{I_{Co}} = 3.317 \times 10^{-5}[CO]^{1.036}(V)(t)/D \quad (63.18)$$

where

[CO] = Carbon monoxide concentration (ppm v/v 20 °C)

V = Volume of air breathed each minute (L)

t = Exposure time (minutes)

D = Exposure dose (percent COHb) for incapacitation

The following values may be taken for V and D. Other data for V may be taken from Table 63.10.

Activity level of subject	V_E (L/min)	D (percent COHb)
Resting or sleeping	8.5	40
Light work—walking to escape	25	30
Heavy work—slow running, walking up stairs	5	20

Figure 20: Quantification of the FED for carbon monoxide (SFPE Handbook 2016)

4.7.3 Agreed performance evaluation criteria

Typically, a visibility criterion of more than 10m is adopted. It is recognised that with a visibility of 10m, the smoke is diluted such that toxic levels of fire products would not pose an undue risk to evacuating occupants.

Tenability conditions within the Guildhall enclosure were quantified as follows:

- Visibility of more than 5m,

- Temperature of less than 60˚C,
- Carbon monoxide concentration of less than 800ppm and fractional effective dose of less than 30%.

A visibility criterion of more than 10m was initially agreed with AISCS. For this analysis, a visibility criterion of more than 5m was adopted as the Guildhall will be provided with light emitting signage (that will improve visibility conditions) and it was demonstrated that the smoke concentration associated with a visibility of 5m consist of toxicity levels that are significantly less than the permitted levels before incapacitation. *It was outlined in section 4.7.1 above that using a visibility factor C of 3 when light emitting signage is provided can be considered as a conservative approach, hence adopting a visibility criterion of 5m is considered to be acceptable. .*

Temperatures and visibility of smoke was measured using output slices placed horizontally at a height of 2.0m (head height) above the first floor and gallery levels. Carbon monoxide concentration and accumulative FED was determined from an average of monitoring devices (at a distance of 1m apart) placed at head height above these levels. Sets of carbon monoxide monitoring devices were placed adjacent to areas where occupant queuing was to be expected (adjacent to the gallery stair landing and storey exits from the Guildhall enclosure).

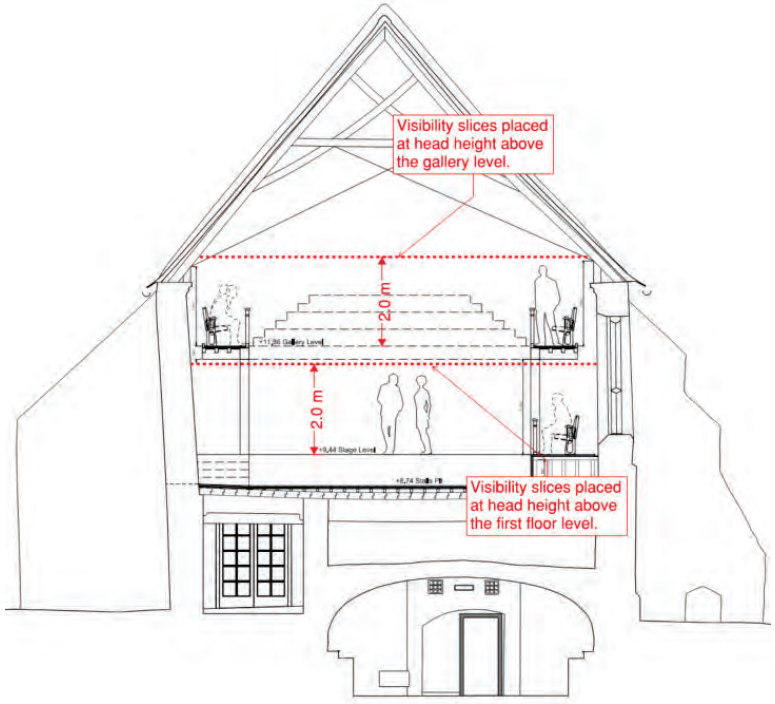


Figure 21: Visibility slice placement on the first floor and gallery level to assess smoke visibility tenability conditions

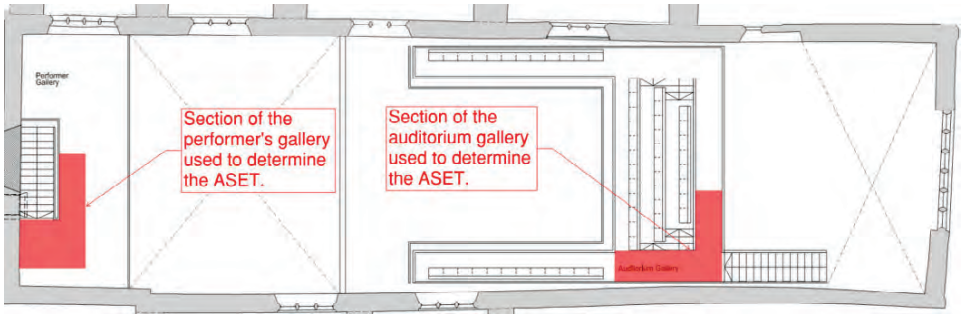


Figure 22: Sections on the performer's and auditorium gallery to assess smoke visibility tenability conditions

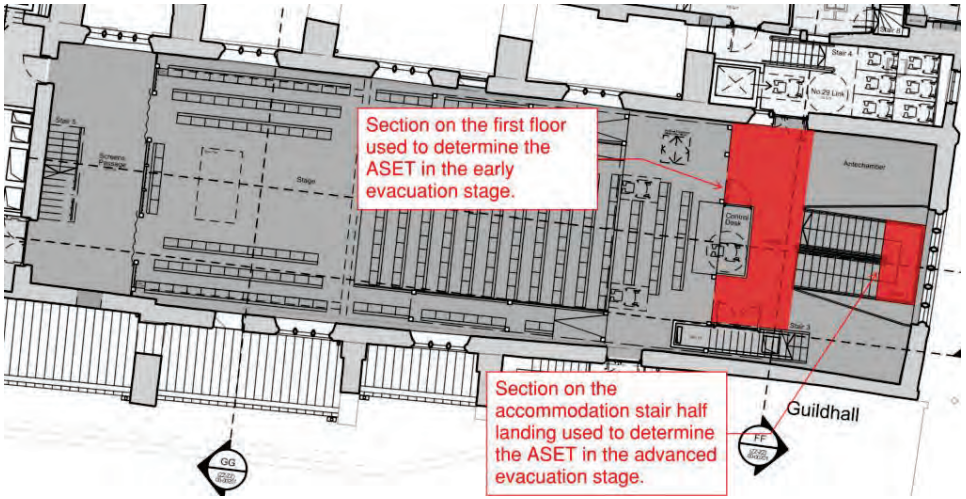


Figure 23: Sections on the first floor to assess smoke visibility tenability conditions

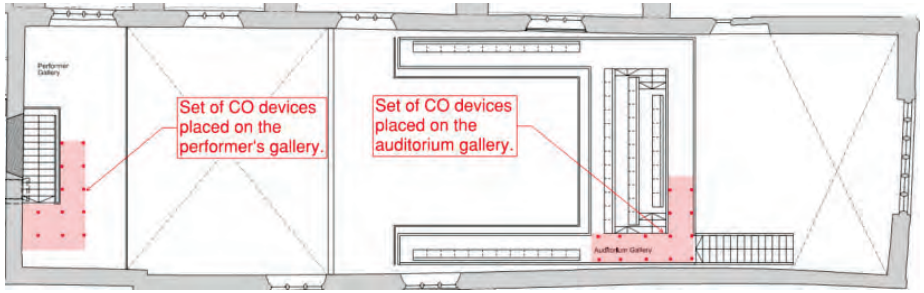


Figure 24: CO monitoring devices placement on the gallery level stair landing areas to assess smoke toxicity tenability conditions

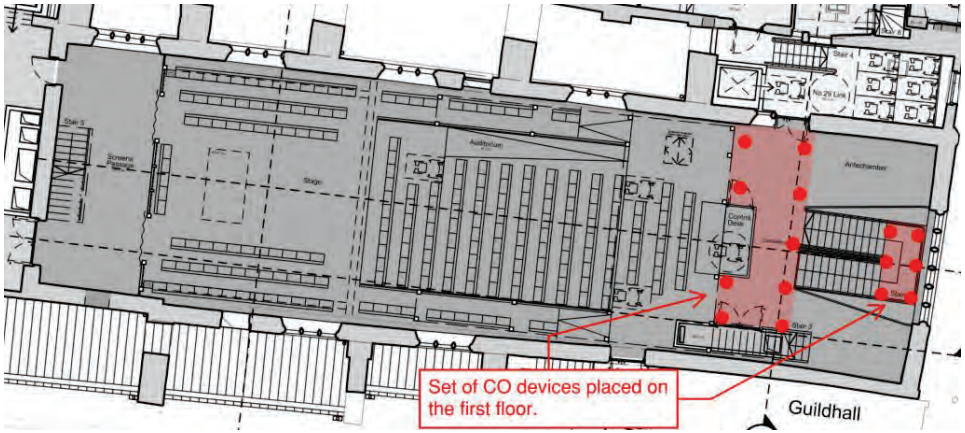


Figure 25: CO monitoring devices placement on the first floor to assess smoke toxicity tenability conditions adjacent to final exits and areas expected to have occupant queuing

4.8 Input parameters

4.8.1 Material properties

Boundaries used to represent obstructions such as walls and floors will be assigned thermal properties corresponding to the materials of these elements. These will include thermal properties of timber, concrete and gypsum plasterboard as outlined in Table 3 below. These materials will need to be confirmed by the architect.

Table 3: Material properties used for the surfaces in the model

Material	Areas applied	Thermal conductivity, k (W/m.K)	Density, p (kg/m^3)	Specific heat capacity, c_p (kJ/kg.K)	Thickness (m)	Backing Note 1
Timber	Roof timber joists, gallery floors and accommodation stairs.	0.14	640	2.85	0.2	Insulated
Plasterboard	Guildhall enclosure.	0.48	1440	0.84	0.2	Insulated
Concrete	Pitched roof (representing roof tiles)	1.8	2280	1.04	0.2	Insulated

General notes (FDS User Guide):

- *Insulated – Assumes that the solid backs up to a perfectly insulated material, in which case no heat is lost to the backside.*
- *Exposed – Assumes that the backside is exposed to the thermal environment behind the solid.*
- *Void – Assumes that the backside is exposed to ambient conditions.*

Note 1: This was considered to be conservative as more heat is retained within the buoyant smoke layer. This allows for more smoke spread to the rear of the auditorium where storey exits are provided. With more heat loss, the smoke layer would otherwise stratify before reaching these storey exits.

4.8.2 Fire growth rate and heat release rate per unit area (HRRPUA)

According to the ABTT Yellow Guide (2015), scenery on an open stage arrangement should be limited to materials of limited combustibility as shown in Figure 26 below.

E2.22 On an open stage and elsewhere in the premises any permanently installed scenery should normally be made from the following:

a) non-combustible material; or
b) inherently flame-retardant fabrics; or
c) durably-treated flame-retardant fabrics; or
d) fabrics rendered and maintained flame-retardant by a non-durable process to the satisfaction of the fire authority; or
e) timber, hardboard or plywood treated by a process of impregnation which meets Class 1 (*BS 476-7*) or Class C-s3.d2 (*BS EN 13501-1*) spread of flame; or
f) timber framing of minimum 22mm nominal thickness; or
g) medium-density fibreboard (MDF), plywood or chipboard not less than 18mm in thickness; or
h) plastics material subject to special consideration by the fire authority; or
i) any other materials approved by the fire authority.

Figure 26: Scenery limitation for an open stage arrangement

Haworth Tompkins (architects) and CharcoalBlue (theatre consultants) indicated that the scenery to be adopted on the stage is likely to be continuous and non-extensive due to a lack of a flytower. They suggested that this may be small installations of painted panels and drapes, and that other types of performances such as spoken word, poetry and comedy are likely to have very minimal or no scenic dressing. Additionally, the drapery used on the stage area is to consist of non-combustible materials or of the specification of type B to BS 5867-2.

From the commentary provided above, the scenery on the Guildhall open stage can reasonably not be expected to contribute to a fast-growing fire. In absence of specified fire parameters for stage areas in fire safety guidance documents, the fire characteristics for the Guildhall stage was benchmarked to those of a typical office building.

A fire growth rate of 0.012 kW/s^2 (medium) was used following the growth curve of a t-squared fire. This is based on a category 2 for fire growth rates assigned to assembly places according to BS 9999: 2017. This fire growth rate was used for the entire fire simulation, this only needed to be up to the RSET time period (including additional time to assess the safety margin).

A heat release rate of 290kW/m^2 was specified for the simulated fire to represent a stage fire (same as that of an office building, CIBSE Guide E 2019).

The fire was set to grow in area (with a fixed heat release rate) from the centre of the fire vent with a spread rate calculated using Equation 1 below.

$$Spread\ rate = \sqrt{\frac{\alpha}{\pi} \cdot \frac{1}{HRRPUA}} \quad \text{.....(equation 1)}$$

The radiation transport solver was enabled and radiation from the fire was considered.

4.8.3 Fire fuel parameters

According to the SCA Guide (2021), soot yield production should be equivalent to the combination of a 10% yield with heat of combustion between 19 000 to 20 000 KJ/kg.

According to NFPA (2008), studies show that in well-ventilated conditions, CO yields are very low, typically less than 0.01. It is stated that CO yield increases near the point of flashover when there is a high density of combustible vapours and low oxygen concentration. As the simulated fire for this analysis will be in its early stages, with well-ventilated and pre-flashover conditions, CO yield is expected to be low. The use of the default FDS CO yield of 0.03 is therefore deemed to be acceptable.

A polyurethane fuel fire will be given a soot yield of 0.1kg/kg (SCA Guide 2021) and CO yield of 0.03kg/kg (NFPA 2008).

4.8.4 Design fire size

This assessment will be affected by the fire growth rate. The fire was simulated up the RSET period (plus additional time to assess the safety margin). The determination of a design fire size was deemed not necessary for this assessment due to the smaller simulation time to be used. At the end of the simulation, the fire size will have grown to a size determined by the equation, Q = αt^2, where Q is the fire size in kW, α is the growth coefficient (kW/s^2) and t is the RSET (170 seconds plus additional time to assess the safety margin). *Note, a medium growing fire is expected to reach a fire size of 1MW at a time of 290 seconds.*

4.8.5 Summary of input parameters

A summary of the proposed input parameters is shown inTable 4 below.

Table 4: Summary of proposed input parameters

Parameter	Value
Fire growth coefficient α	0.012 kW/s^2 (medium) (CIBSE Guide E 2019)
HRRPUA	290 kW/m^2 (CIBSE Guide E 2019)
Heat of combustion	20 MJ/kg (SCA Guide 2021)
Maximum design fire size (HRR)	Calculated as: αt^2, kW
Fire area	Calculated as: Q / HRRPUA, m^2
Soot yield	0.1 (SCA Guide 2021)
CO yield	0.03 (NFPA 2008)
Radiation	Radiation transport solver enabled
Ambient temperature	20˚C
Fire ventilation	Natural ventilation from open doors during the evacuation phase.
Building leakage	Deemed to have a negligible effect on the results as there are larger openings to outside.

4.9 Numerical model

4.9.1 Description of numerical model

The CFD model simultaneously solves the fundamental three-dimensional transient differential equations describing the conservation of mass, momentum, heat, combustion species, etc. over the cells in the computational domain. The default turbulence model in FDS is the Large Eddy Simulation (LES). The LES model directly simulates the large-scale turbulent eddies. Turbulent eddies smaller than the grid cell sizes are modelled by a sub-grid scale turbulence model.

4.9.2 Mesh grid

The effectiveness of FDS in resolving flow field for fires with buoyant plumes is estimated by evaluating the non-dimensional parameter, D*/δx, where D* is the characteristic fire diameter and δx is the mesh cell size.

A range of D*/δx from 4 to 16 can be used aid determining a suitable mesh size, depending on the design fire size. Generally, the smaller the fire size, the larger the D*/δx value should be, hence a smaller mesh cell size (δx) must be used.

At the RSET of 170 seconds, the fire will have grown to 0.35MW. This corresponds to a D* value of 0.6. Table 5 below outlines the grid cell sizes that correspond to various mesh resolution for the fire.

Table 5: Mesh cell sizes for the various D/δx values for the design fire*

	Mesh type	Calculated δx (m)
D*/2.5	Coarse	0.24
D*/5	Medium	0.12
D*/10	Fine	0.06
D*/20	Very fine	0.03

For this analysis, a mesh cell size of 0.05m was deemed to be adequate to resolve the simulated fire. This mesh cell size was used on the stage area around the fire location.

According to the SCA Guide (2021), a typical mesh cell size for smaller enclosures such as corridor and lobbies, typical mesh sizes of 0.1m and 0.2m are deemed to be suitable near field and far field, respectively.

A mesh cell size of 0.1m was deemed to be suitable to be used on the stage (areas remote to the fire location) and roof areas of the Guildhall (the critical area for smoke movement and assessing the gallery level ASET).

A mesh cell size of 0.2m was used for the auditorium enclosure on low level, the guildhall accommodation stair enclosure and the ground floor enclosure. A sensitivity study in these areas was conducted where the mesh cell size was reduced to 0.1m. The results of this sensitivity study are outlined in Appendix A of this report and show that the finer mesh cell size of 0.1m leads to similar or less onerous conditions in areas adjacent to the auditorium gallery accommodation stair (up to the determined ASET of 185 seconds from this area). The use of a 0.2m mesh cell size in these areas is therefore considered a conservative approach and deemed to be appropriate.

Mesh divisions were made at reasonable distances (at least 1m) from areas of interest i.e. fire location, door openings and the smoke extract vent.

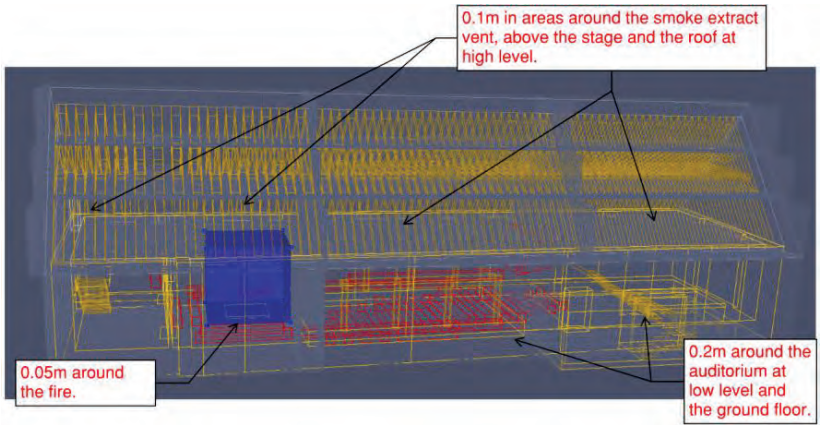


Figure 27: Mesh cell sizes used in different regions of the model

4.9.3 Mesh boundary conditions

Atmospheric conditions are presented into the model domain by setting all exterior mesh boundaries above the ground level as open boundaries. Exterior mesh boundaries adjacent to door openings into the model enclosure were set at least 1m away from these openings.

4.9.4 Numerical stability and convergence

FDS uses explicit, second-order numerical scheme for solving the partial differential equations. To ensure numerical stability of the scheme, the FDS simulation at each time step satisfies the Courant-Friedrichs-Lewy (CFL) condition. The CFL condition asserts that the solution of the equations cannot be updated with a time step larger than that which would allow a parcel of fluid to travel further than a single mesh cell.

5 Results

5.1 Fluid flows

5.1.1 Fluid flow through door openings and the smoke extract vent

Fluid flow vectors through the guildhall external stair storey exit are shown in Figure 28 below. Inlet air initially moves into the guildhall enclosure at an average velocity of ca. 3m/s. This reduces to an average velocity of ca. 2m/s later in the simulation as more inlet air was provided from the accommodation stair final exit (opened at a simulation time of 86 seconds).

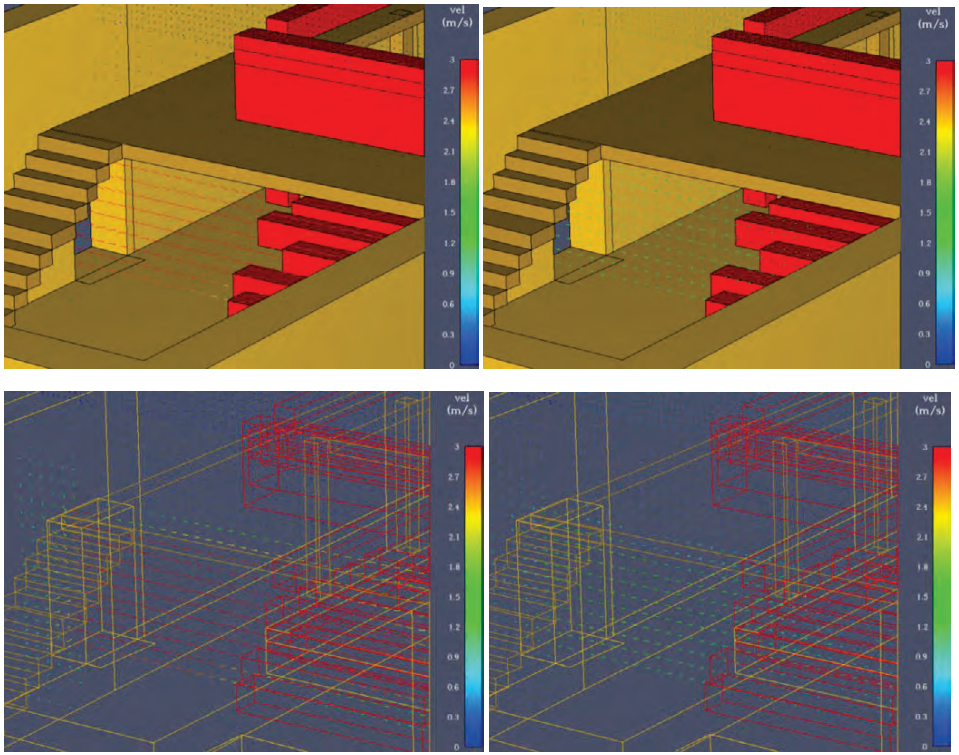


Figure 28: Velocity vectors across the guildhall exit showing air flow from outside (Scenario 1 at a simulation time of 80 and 200 seconds, respectively)

Fluid flow vectors through the accommodation stair and its final exit (on the ground floor) are shown in Figure 29 and Figure 30, respectively. Inlet air velocity across the accommodation stair initially is at a low level, it increases later in the simulation after which the guildhall external stair exit was closed (at a simulation time of 204 seconds). Inlet air velocity across the final exit moves into the building at an average velocity of ca. 1.2m/s.

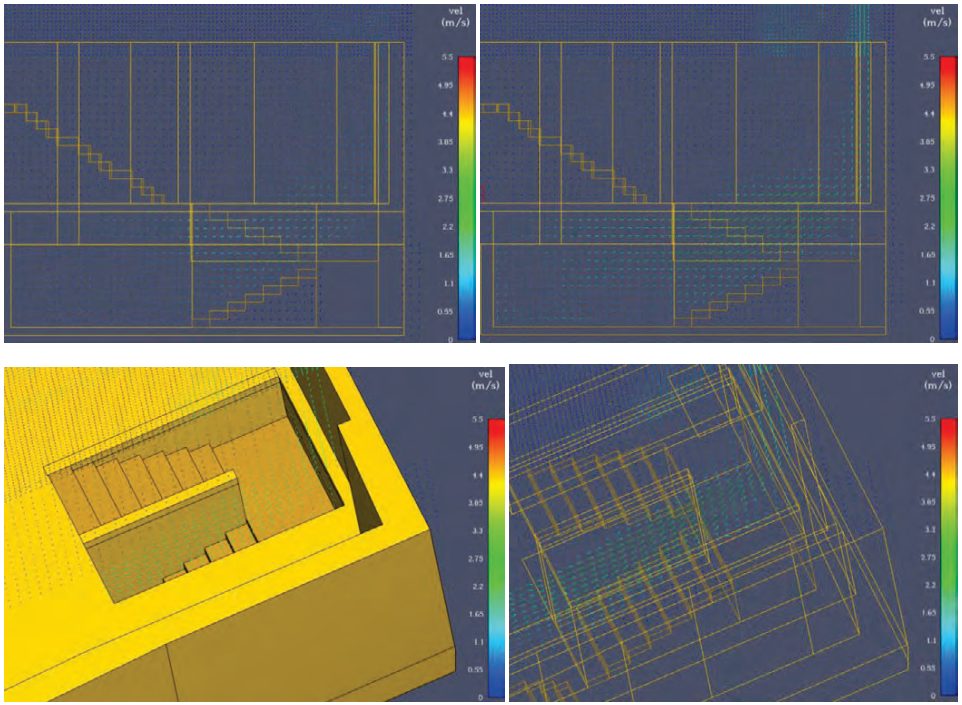


Figure 29: Velocity vectors across the accommodation stair showing air flow from to the guildhall enclosure (Scenario 1 at a simulation time of 200 and 250 seconds, respectively)

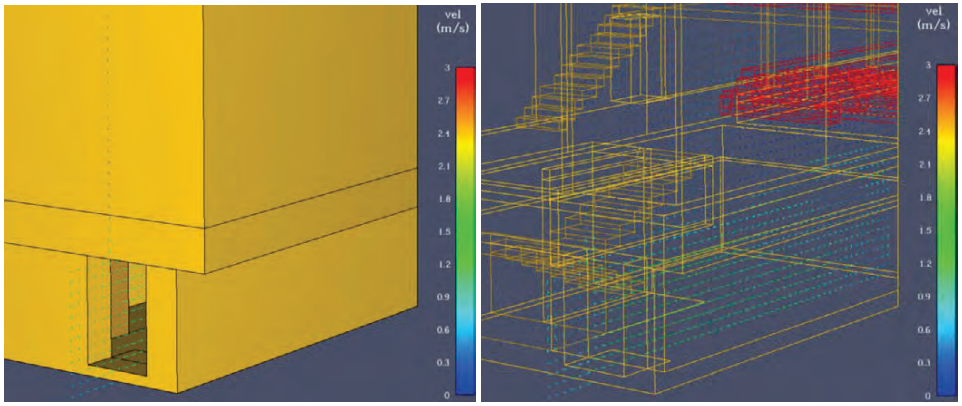


Figure 30: Velocity vectors across the final exit showing air flow from outside (Scenario 1 at a simulation time of 200 seconds)

Fluid flow vectors through the smoke extract vent are shown in Figure 30 below. Smoke is extracted across this vent at an average velocity of 4.5m/s.

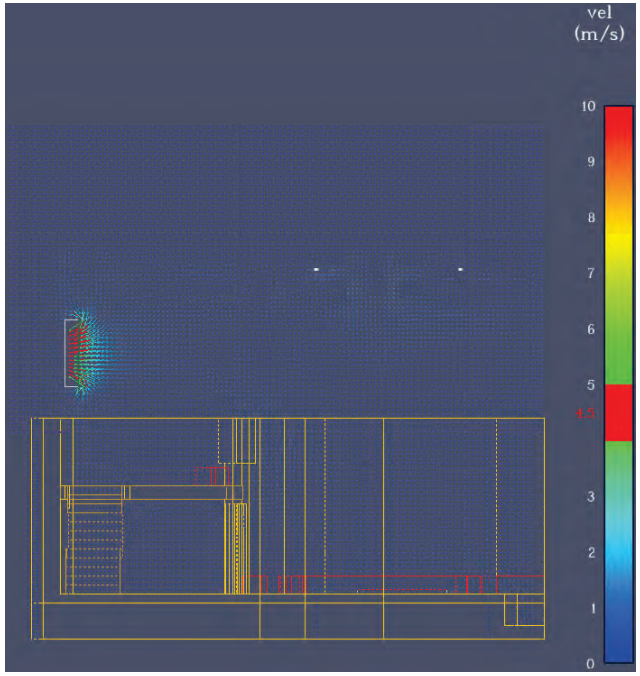


Figure 31: Velocity vectors across the smoke extract vent showing smoke flow from the guildhall enclosure (Scenario 1 at a simulation time of 200 seconds)

5.1.2 Fluid flow vectors in the Guildhall

Fluid flow vectors across the mid-section of the guildhall enclosure are shown in Figure 32 to Figure 35 below. Smoke is shown to ascend from the seat of the fire to the roof where it starts to spread laterally. The smoke plume is shown to be influenced by the operation of the smoke extract system (showing a flow bias to the left-hand side). The air inlet from the accommodation stair (final exit) ascends adjacent to the guildhall walls and mixes with the spreading smoke plume (to the right-hand side) to create some vortices at high level.

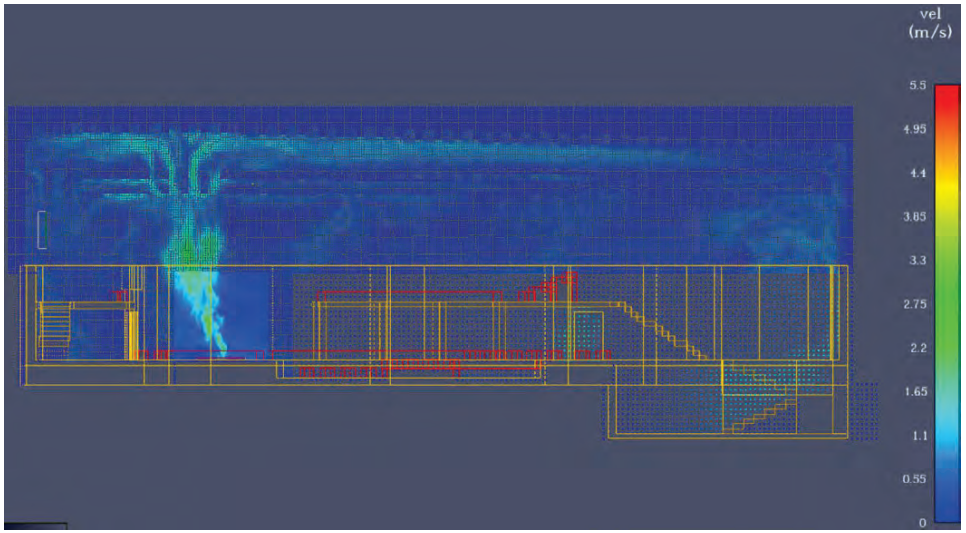


Figure 32: Velocity vectors across the guildhall enclosure at 100 s (Scenario 1)

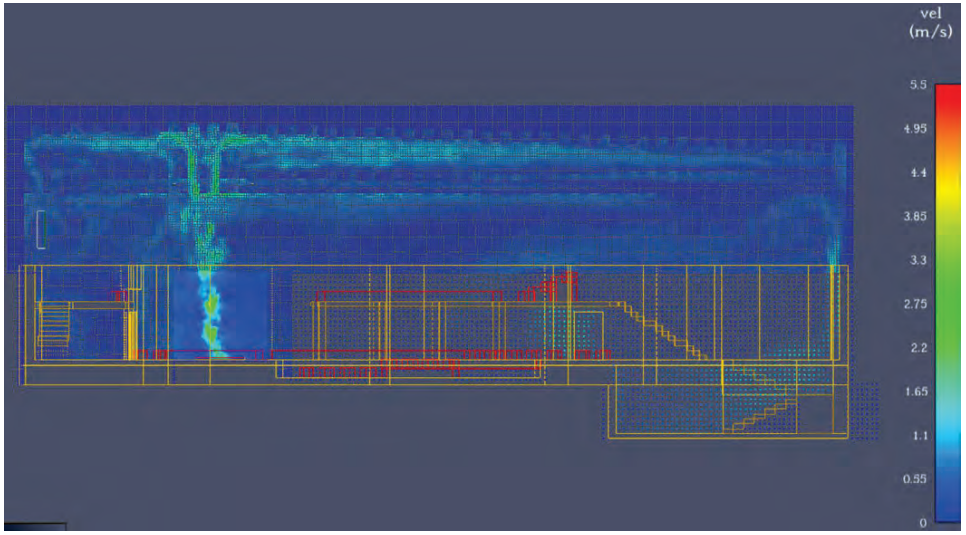


Figure 33: Velocity vectors across the guildhall enclosure at 150 s (Scenario 1)

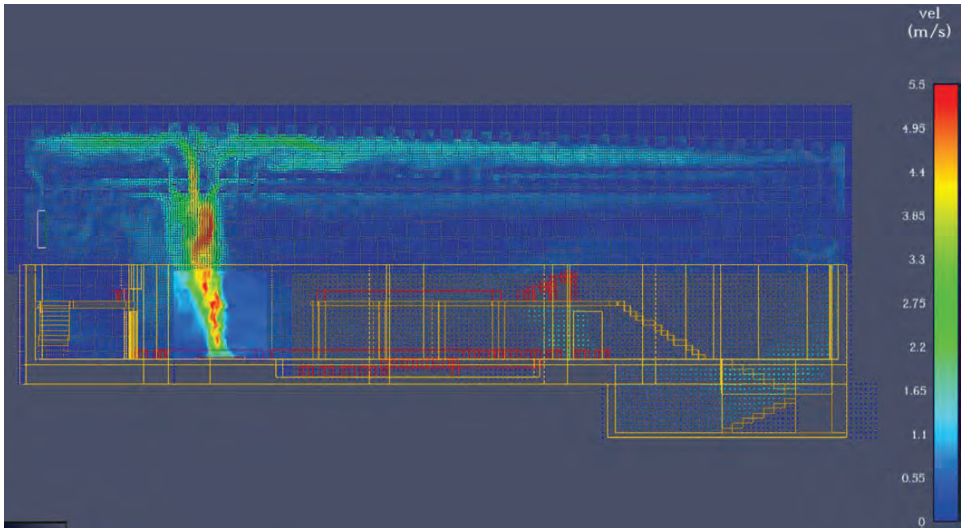


Figure 34: Velocity vectors across the guildhall enclosure at 200 s (Scenario 1)

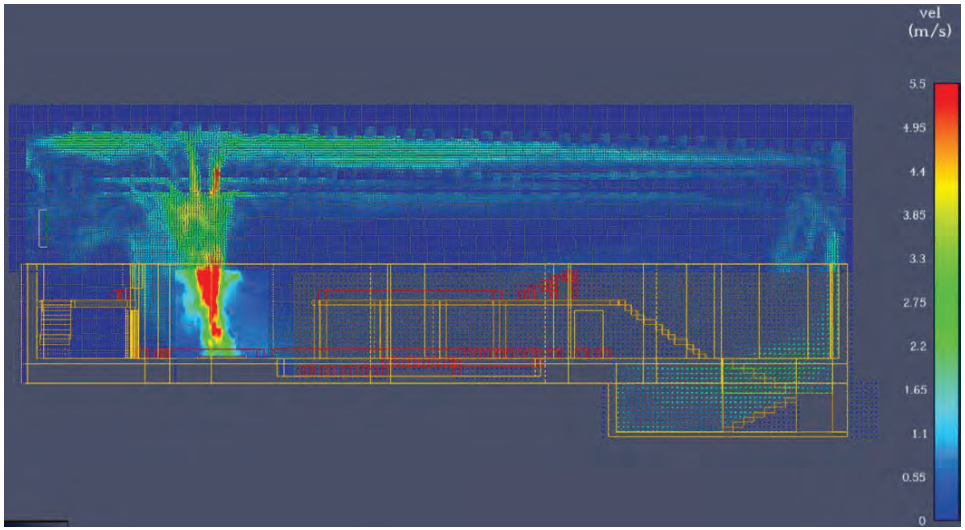


Figure 35: Velocity vectors across the guildhall enclosure at 250 s (Scenario 1)

5.2 Heat release rate

The fire was simulated to follow a t-squared curve with a medium growth rate. Figure 36 below shows the curves of the simulated HRR with the theoretical HRR curve for a t-squared fire. The simulated fire HRRs for all simulations are closely correlated to the theoretical HRR therefore the fires are considered to be simulated adequately for this analysis.

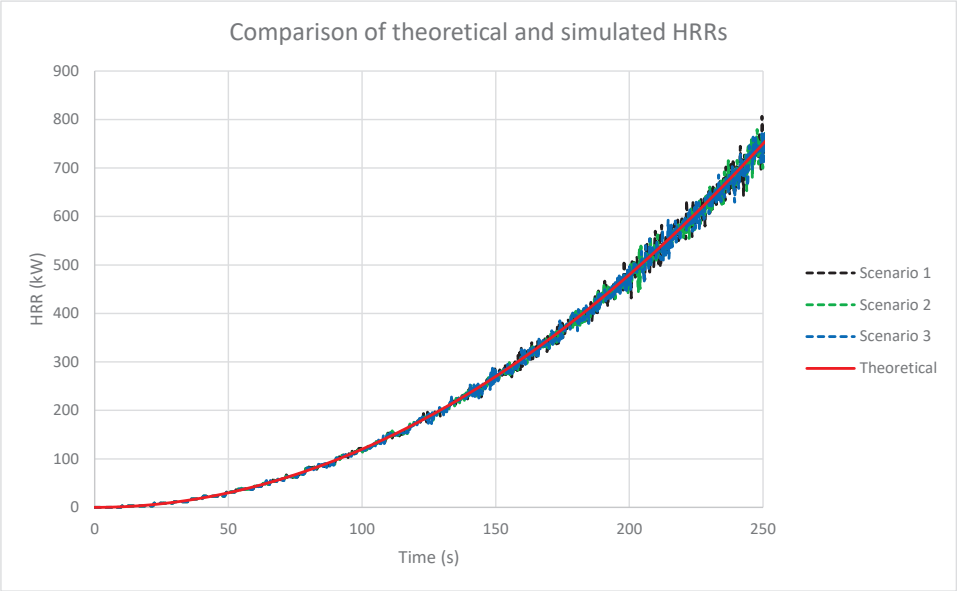


Figure 36: Resolution of the simulated fire

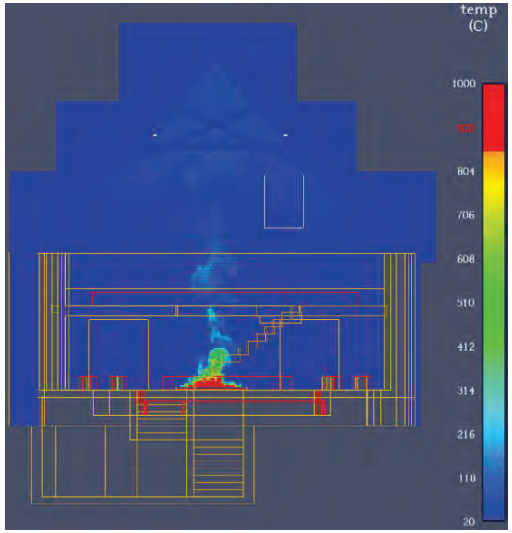


Figure 37: Fire plume temperature (scenario 1 at a simulation time of 250 seconds)

5.3 Smoke visibility

Smoke visibility slices shown in this section were placed at head height above the gallery floors (4.4m in the model), guildhall first floor (2.0m in the model) and accommodation stair half landing (0.6m in the model). The visibility scale was set such that areas with visibility of less than 5m are indicated in red. Any areas showing red pixels therefore represent areas that may have untenable conditions (tenability also subject to assessment of smoke toxicity levels).

The visibility slices shown in this section correspond to the time considered to be close to determining the tenability criteria of 5m or less. These slices are from scenario 1 which provided the most onerous smoke conditions in the guildhall hence attained the visibility tenability criteria the quickest. A more extensive set of slices from scenarios 2 and 3 (compared to scenario 1) and for earlier and later simulation times are outlined in Appendix B of this report.

5.3.1 Gallery floors

The areas used to assess visibility conditions for the gallery floors are highlighted in red sections as shown in Figure 38 below.

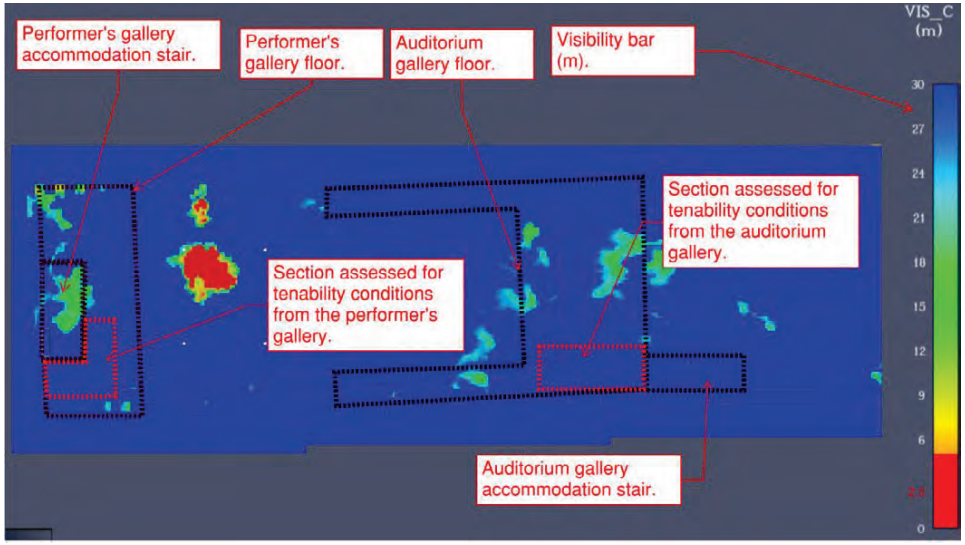


Figure 38: Annotations for determination of the ASET from the gallery floors

The smoke visibility slices above the gallery floors are shown in Figure 39 to Figure 41 below. Conditions adjacent to the auditorium gallery stair landing areas are considered to attain a visibility of 5m or less at a simulation time of 185 seconds. Conditions adjacent to the performer's gallery stair landing areas have high visibility at the same simulation time, and attain a visibility of less than 5m or less at a simulation time of ca. 248 seconds.

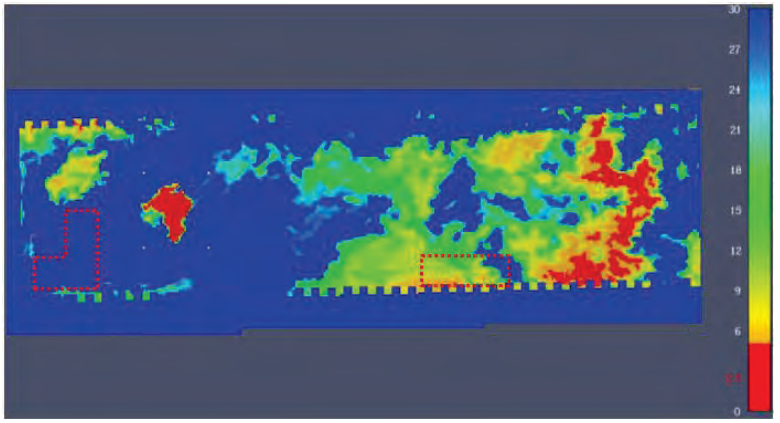


Figure 39: Smoke visibility slice above the gallery floors at a simulation time of 180 seconds

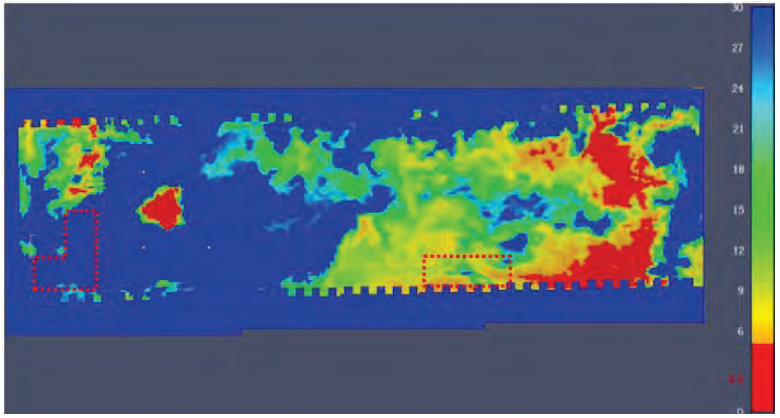


Figure 40: Smoke visibility slice above the gallery floors at a simulation time of 185 seconds

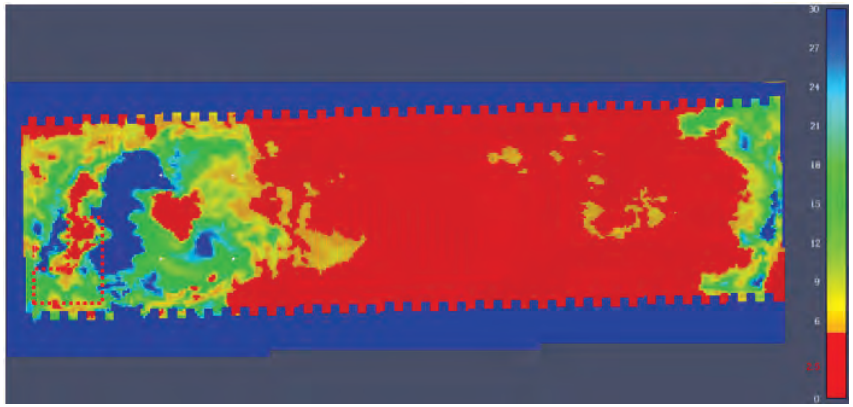


Figure 41: Smoke visibility slice above the gallery floors at a simulation time of 248 seconds

More detail of the conditions adjacent to the auditorium gallery stair landing areas are shown by vertical slices across mid-section of the gallery stair as shown in Figure 42 and Figure 43 below. The head height is indicatively shown by the dotted black line. These vertical slices show that areas above the gallery stair and its adjacent areas have visibility of more than 5m up to a simulation time of 200 seconds.

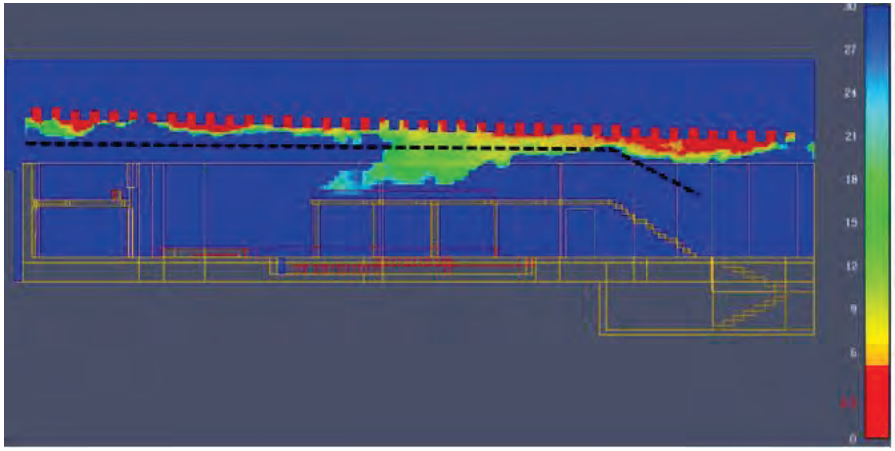


Figure 42: Smoke visibility slice across the auditorium gallery stair at a simulation time of 185 seconds

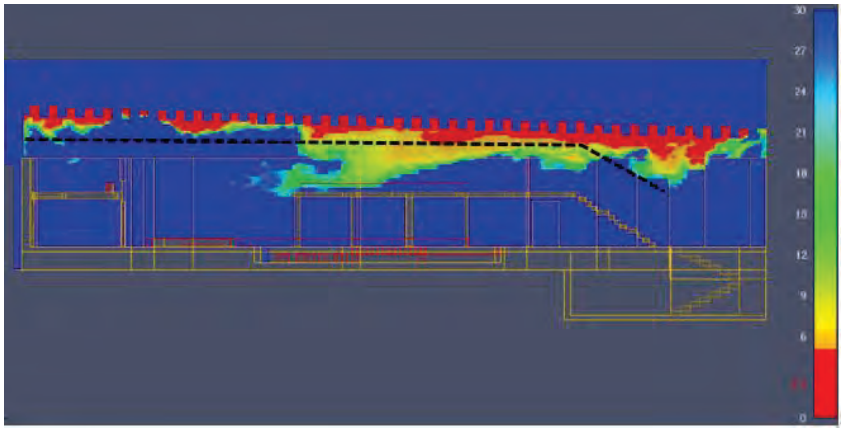


Figure 43: Smoke visibility slice across the auditorium gallery stair at a simulation time of 200 seconds

5.3.2 Guildhall first floor

The area used to assess visibility conditions for the guildhall first floor is highlighted in the red section as shown in Figure 44 below.

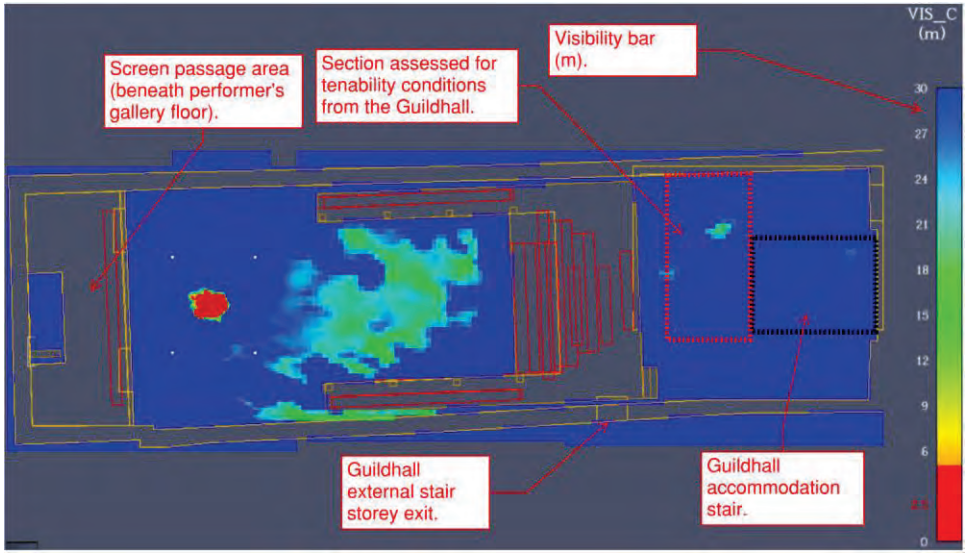


Figure 44: Annotations for determination of the ASET from the guildhall first floor

The smoke visibility slices above the guildhall first floor are shown in Figure 45 and Figure 46 below. Conditions adjacent to the guildhall accommodation stair landing areas are considered to attain a visibility of 5m or less at a simulation time of 235 seconds.

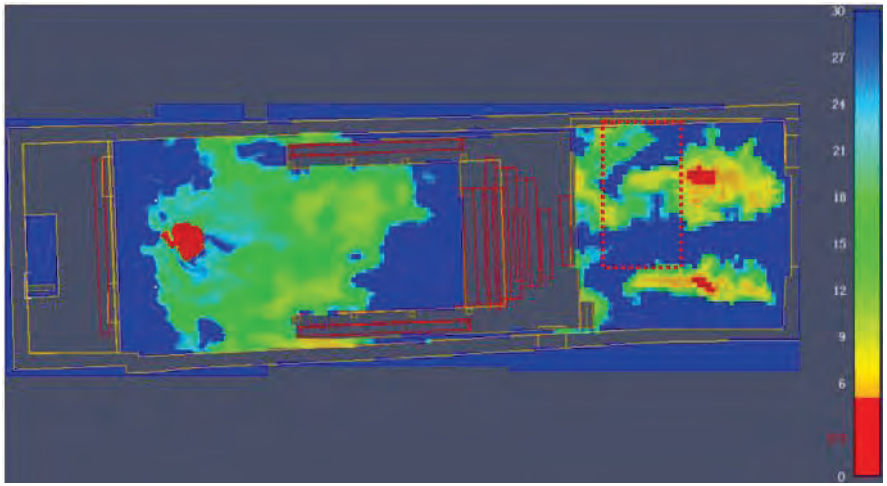


Figure 45: Smoke visibility slice above the guildhall first floor at a simulation time of 225 seconds

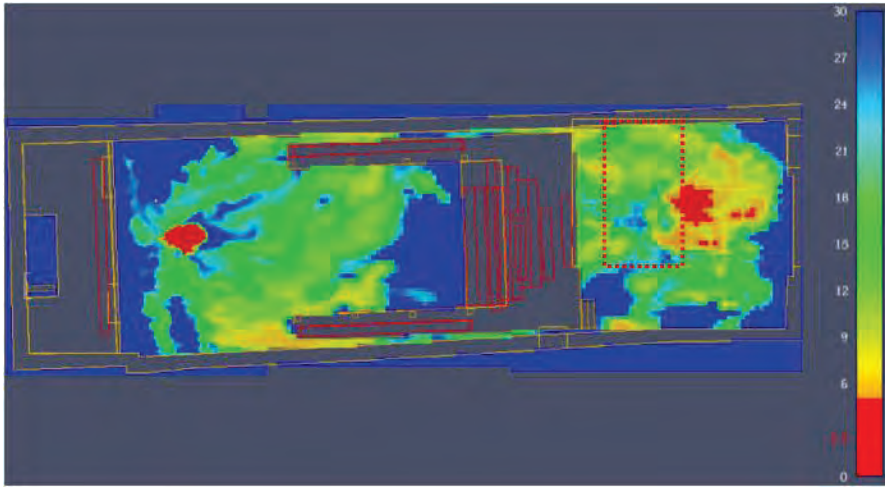


Figure 46: Smoke visibility slice above the guildhall first floor at a simulation time of 235 seconds

5.3.3 Accommodation stair half landing

The area used to assess visibility conditions for the guildhall accommodation stair half landing is highlighted in the red section as shown in Figure 47 below.

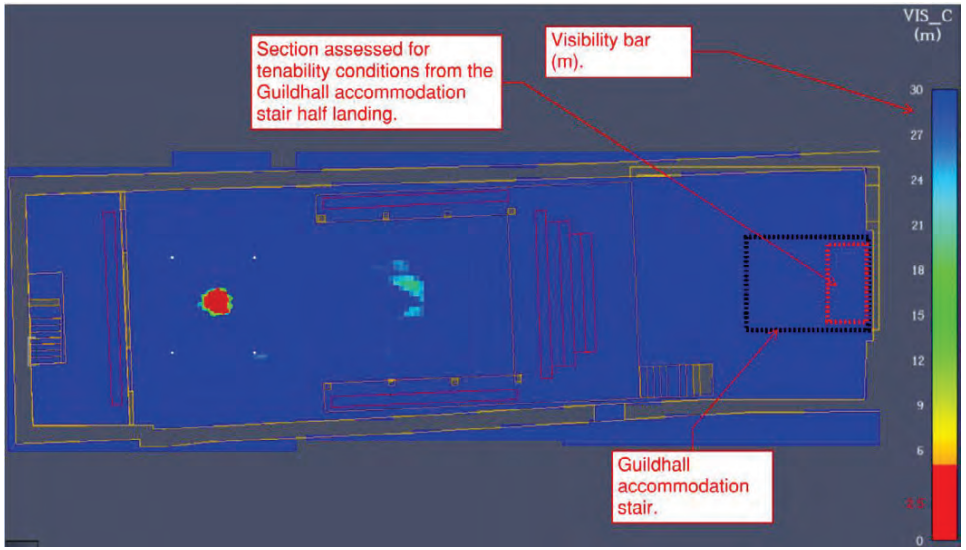


Figure 47: Annotations for determination of the ASET from the guildhall accommodation stair half landing

The smoke visibility slices above the guildhall accommodation stair half landing area are shown in Figure 48 and Figure 49 below. Conditions do not attain a visibility of 5m or less up to a simulation time of 250 seconds.

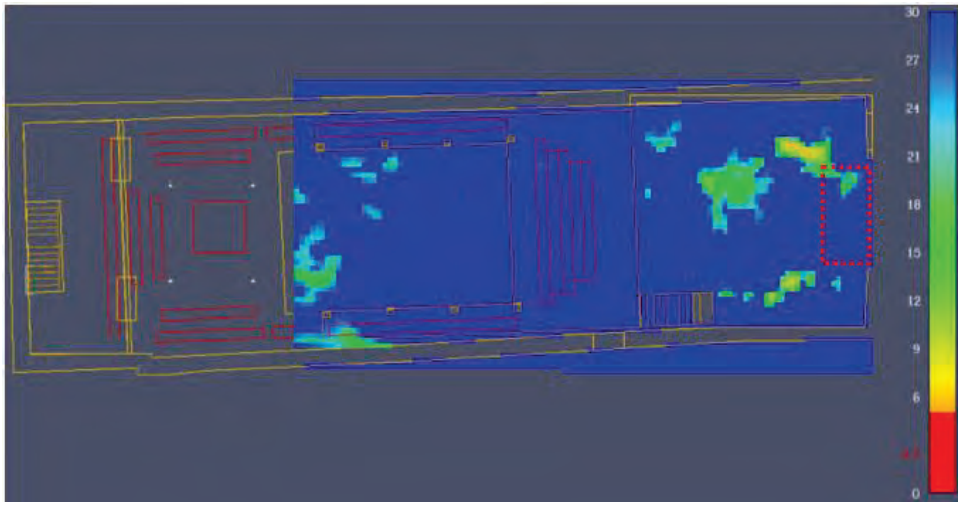


Figure 48: Smoke visibility slice above the gallery floors at a simulation time of 225 seconds

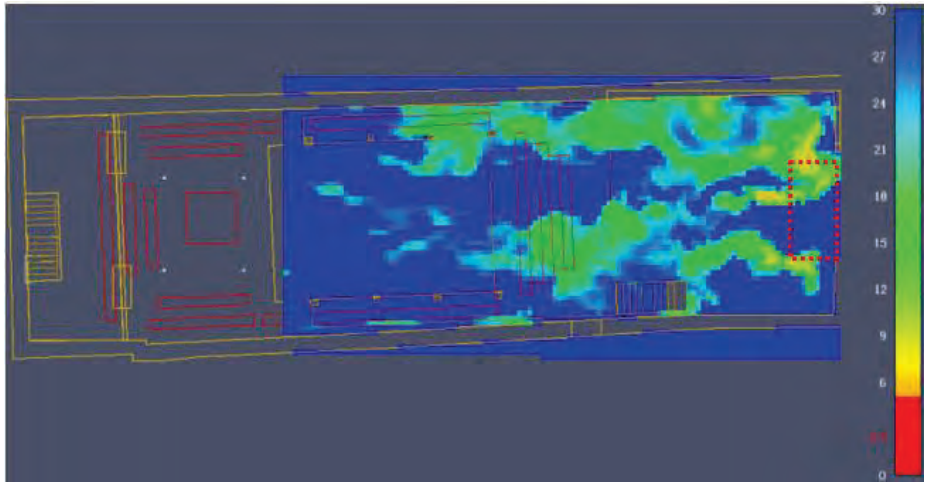


Figure 49: Smoke visibility slice above the gallery floors at a simulation time of 250 seconds

5.4 Smoke toxicity

Monitoring devices were placed above areas expected for queuing to record the levels of carbon monoxide (see Figure 24 and Figure 25).

Figure 50 below shows the average carbon monoxide concentration in ppm from devices placed above the auditorium gallery stair landing areas. The measured average carbon monoxide concentration did not exceed 45ppm for all scenarios. According to CIBSE Guide E (2019), carbon monoxide concentration before asphyxiation (5-minute exposure) should not exceed 800ppm and 1200ppm for retail/ residential or office fires, respectively. As the measured carbon monoxide concentration is significantly below these maximum levels, smoke toxicity above the auditorium gallery stair landing areas is deemed not to pose a threat to life safety.

Figure 51 below shows the average cumulative fractional effective dose (FED) in percentage. The average cumulative FED does not exceed 0.12% in all scenarios. According to CIBSE Guide E (2019), for people walking to escape routes (light work), the cumulative FED should not exceed 30% to prevent incapacitation. As the average cumulative FED above the auditorium gallery stair landing areas is significantly below this level, smoke toxicity is deemed not to pose a threat to life safety.

The auditorium gallery attains the visibility criteria of 5m the earliest hence this area has more smoke concentration at any one time relative to all areas of the auditorium being considered for the ASET. From the commentary above, it is shown that it would take a considerable amount of smoke buildup for areas that have a visibility of less than 5m to attain conditions of smoke toxicity that would present a risk to life safety. Using a visibility criterion of 5m is therefore considered to be acceptable (due to the provision of light emitting signage which will improve visibility conditions and occupants will be queuing in areas adjacent to the stair landings). As a visibility criterion of 5m is used in all other areas being considered for the ASET, smoke toxicity levels in these areas are considered to be acceptable since these areas reach the visibility criteria of 5m in a time period after this is attained on the auditorium gallery stair landing areas.

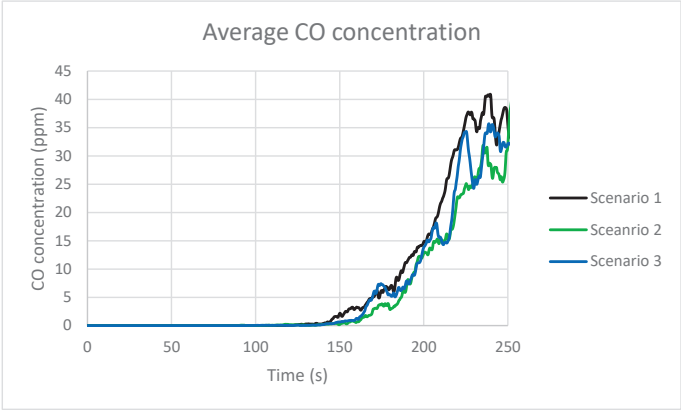


Figure 50: Carbon monoxide concentration above auditorium gallery stair landing areas in ppm

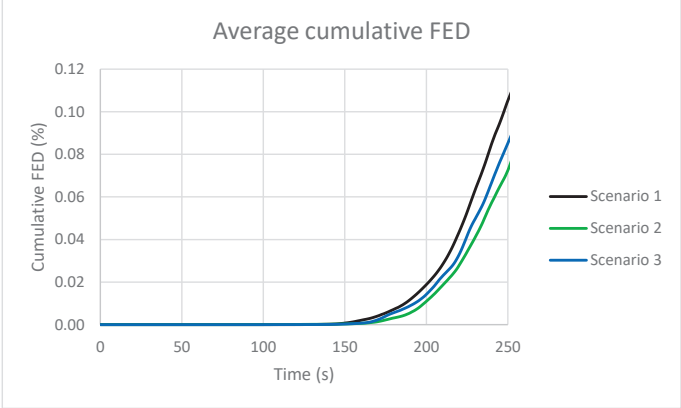


Figure 51: Cumulative FED above the auditorium gallery stair landing areas

5.5 Smoke temperature

Smoke temperature slices were placed as horizontal above the gallery floors and the auditorium first floor. The slices shown in below are from scenario 1 which attained the most onerous smoke conditions in the auditorium (slices from scenarios 2 and 3 are outlined in Appendix B). The visibility bar was set such that areas with temperatures of more than 60˚C are indicated in red. Any areas showing red pixels therefore represent areas that may have untenable conditions.

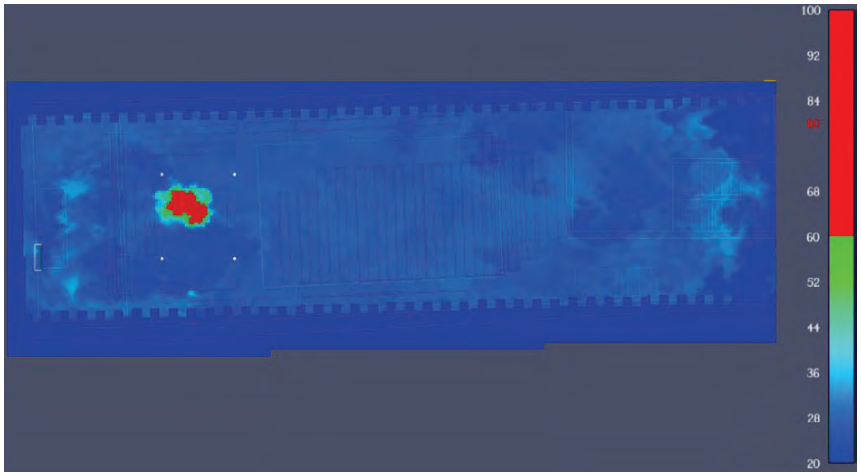


Figure 52: Smoke temperature slice above the gallery floors at a simulation time of 250 seconds

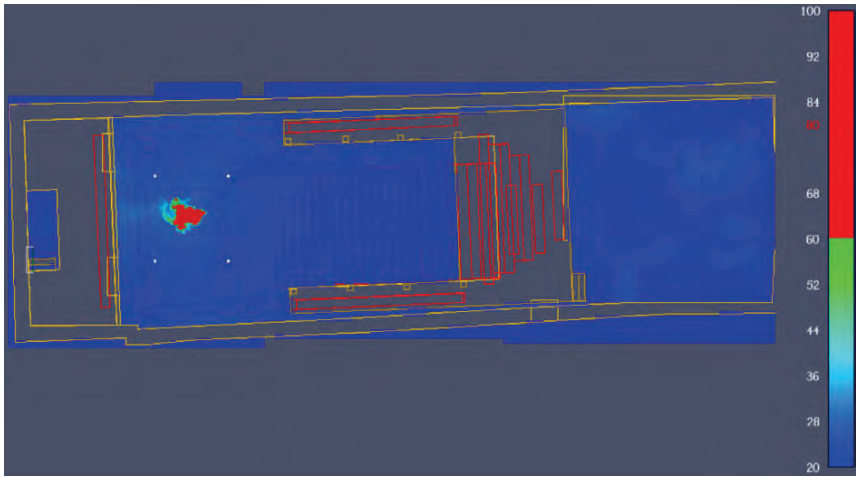


Figure 53: Smoke temperature slice above guildhall first floor at a simulation time of 250 seconds

Smoke temperatures on the gallery floors and the guildhall first floor do not accumulate to reach 60˚C up to a simulation time of 250 seconds. For this analysis, smoke temperatures do not pose a life safety risk and are expected to be at an acceptable level throughout the evacuation period.

5.6 Available safe egress time

The results for the CFD modelling are summarised below.

5.6.1 Gallery floors

- Smoke visibility above the performer's gallery stair landing areas fell below 5m at a simulation time of 248 seconds.
- Smoke visibility above the auditorium gallery stair landing areas fell below 5m at a simulation time of 185 seconds. A vertical slice across the mid-section of the stair showed that smoke visibility is maintained above 5m up to a simulation time of 200 seconds.
- The average carbon monoxide concentration above the auditorium gallery landing area did not exceed 45ppm. The cumulative overall FED did not exceed 0.12%. Smoke toxicity levels are therefore maintained at an acceptable level.
- Smoke temperatures did not exceed 60˚C and therefore acceptable.

The ASET on the performer's gallery stair landing areas was determined to be 248 seconds.

The ASET on the auditorium gallery stair landing areas was determined to be 185 seconds.

5.6.2 Guildhall first floor

- Smoke visibility above the guildhall accommodation stair landing areas fell below 5m at a simulation time of 235 seconds.
- Smoke visibility above the guildhall accommodation stair half landing areas did not fall below 5m up to a simulation time of 250 seconds.
- As smoke toxicity levels on the auditorium gallery stair landing areas were maintained at an acceptable level, it was deduced that smoke toxicity levels would also be acceptable on the guildhall first floor as the former attains a higher smoke concentration before the latter.
- Smoke temperatures did not exceed 60˚C and therefore acceptable.

The ASET on the guildhall first floor was determined to be 235 seconds.

6 Conclusions – ASET RSET evaluation

The RSET was determined from evacuation calculations as outlined in PD 7974-6 (2019). The RSET for all areas was based on a detection and alarm time of 30 seconds, and a pre-travel time of the 1st percentile of 30 seconds. The adoption of a pre-travel time of 30 seconds is considered to be a conservative approach as occupants will be able to see the onset of a fire on the stage combined with the ability of staff members to direct the evacuation process using a live voice/ public address system.

The ASET was deduced from fire and smoke CFD modelling by assessing tenability conditions at head height (2m above finished floor level). The tenability criteria adopted is based on visibility of more than 5m, temperatures of less than 60˚C, and assessment of smoke toxicity (based on carbon monoxide concentration less than 800ppm and overall cumulative fractional effective dosage less than 30%). The ASET used for this analysis is based on results of scenario 1 which produced the most onerous smoke spread to the auditorium.

6.1 Performer's gallery

The RSET for occupants to travel from the performer's gallery was determined to be 105 seconds. The ASET was determined from smoke visibility to be 248 seconds. The ASET exceeds the RSET with a 136% safety margin; this is considered to be acceptable.

6.2 Auditorium gallery

The RSET for occupants to travel from the auditorium gallery was determined to be 153 seconds. The ASET was determined from smoke visibility to be 185 seconds. The ASET exceeds the RSET with a 21% safety margin; this arrangement is considered to be acceptable from a risk-based approach based on the following reasons.

- The ASET was determined from considering an extensive area above the stair landing area. During the latter stages of the evacuation process, a few occupants are expected to be queuing in an area adjacent to the stair landing area. This area was shown by a vertical slice to have visibility conditions of more than 5m up to a simulation period of 200 seconds. The ASET would therefore exceed the RSET by a safety margin of 31% in areas expected for occupants to be queuing in the latter stages of an evacuation.
- Emergency lighting will be provided in close proximity to the stair landing area (as emergency lighting is required in areas of level changes). This emergency light emitting signage will improve visibility conditions for occupants to identify exit signage showing the escape route down the stair. Smoke toxicity was shown to be significantly below levels that would lead to incapacitation for the entire evacuation period (up to a simulation time of 250 seconds). The provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate from the auditorium gallery.

6.3 Guildhall first floor

The RSET for occupants to travel from the performer's gallery was determined to be 167 seconds. The ASET was determined from smoke visibility to be 235 seconds. The ASET exceeds the RSET with a 41% safety margin; this arrangement is considered to be acceptable from a risk-based approach based on the following reasons.

- The RSET considered the time for occupants to travel down the entire accommodation flight of stairs to the ground floor. In the latter stages of an evacuation, the last occupants to evacuate down the accommodation stair will be able to take temporary refuge on the stair half landing area, which is at a lower level than the guildhall first floor. This accommodation stair half landing was shown to have visibility conditions of more than 5m for the entire evacuation period (up to a simulation time of 250 seconds).
- As mentioned in section 6.2 above, the provision of light emitting signage (considering occupants are queuing in close proximity to the stair landing area) and low smoke toxicity levels are deemed to provide adequate conditions for the last few occupants to safely evacuate to the accommodation stair half landing area.

7 References

1. ABTT Yellow Guide, *Technical Standards for Places of Entertainment*, Association of British Theatre Technicians (ABTT) 2015, p E2.22.
2. CIBSE Guide E, *Fire safety engineering*, The Chartered Institution of Building Services Engineers London 2019, 4th Edition, p 6-4, 6-5, 7-8, 10-4, 10-5.
3. Cote A.E., Grant C.C., Hall J.R., Solomon R.E., Powell P.A., *Fire Protection Handbook*, NFPA 2008, 20th Edition, p 2-37, 6-13.
4. Hurley M. J., *SFPE Handbook of Fire Protection Engineering*, Springer 2016, 5th Edition, p 2536.
5. McGrattan K., Hostikka S., McDermott R., Floyd J., Vanella M., *Fire Dynamics Simulator User's Guide*, NIST 2023, 6th Edition, p77, 337, 338.
6. PD 7974-6, *Application of fire safety engineering principles to the design of buildings – Part 6: Human factors: Life safety strategies – Occupant evacuation, behaviour and condition*, BSI 2019, p 28, 29, 30, 72, 84, 94.
7. Smoke Control Association, *SCA guidance on CFD analysis for Smoke Control design in Buildings*, SCA 2021, p 43, 45, 46.

Appendix A – Auditorium mesh sensitivity study

A mesh sensitivity study (referred as Scenario 1(SA) in this section) was conducted for Scenario 1 by reducing the mesh cell around the auditorium on the lower level and the ground floor level from a size of 0.2m to 0.1m as shown in Figure 54 below.

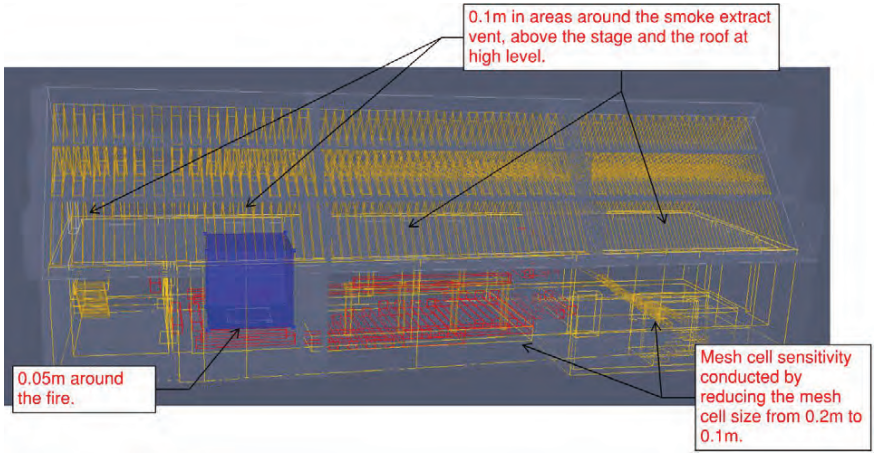


Figure 54: Mesh cell sensitivity study around the auditorium on the lower level

The reduction of the mesh cell in this location will have an impact on the inlet air supply to the auditorium from the final exits open to outside (external stair and guildhall accommodation stair final exits). This effect is evaluated by assessing the changes to the tenability conditions on the auditorium gallery floor (as this is the area that attains untenable conditions the earliest).

The areas used to assess visibility conditions for the gallery floors are highlighted in red sections as shown in Figure 55 below.

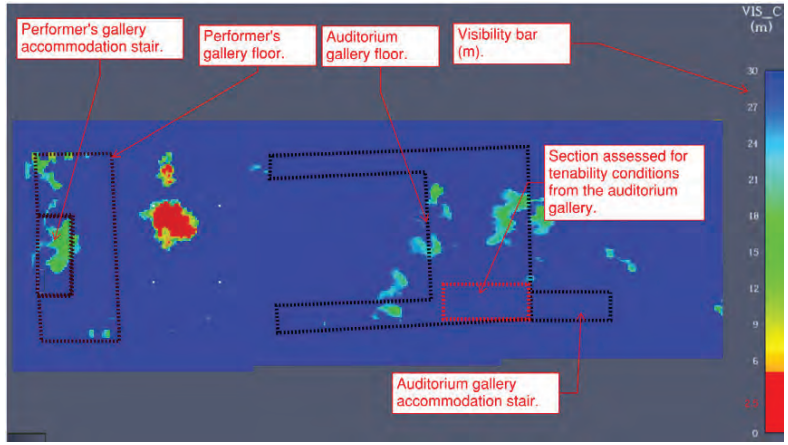
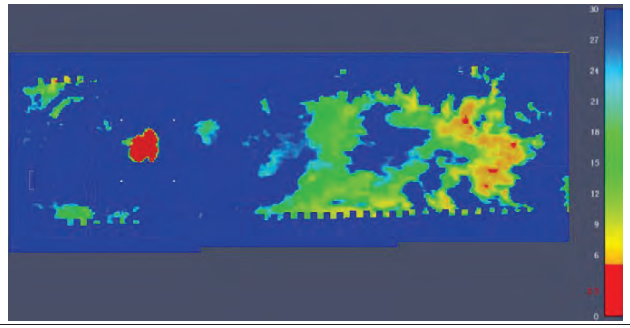
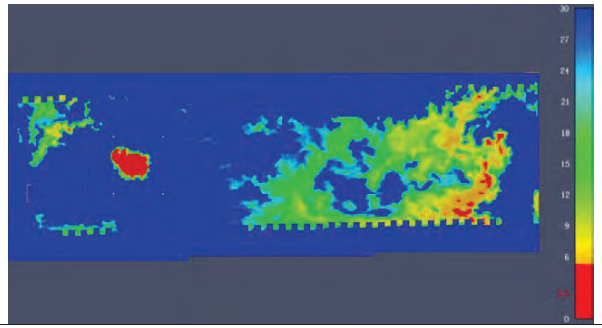
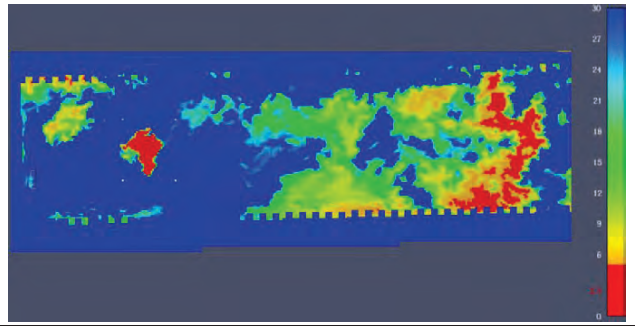
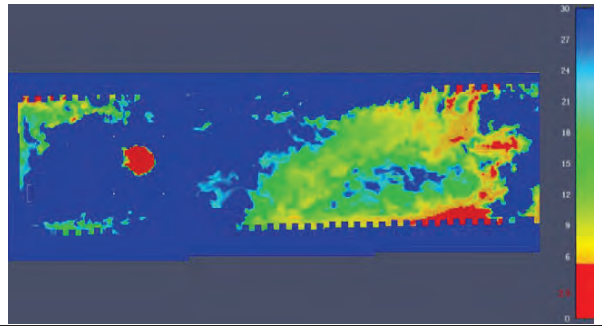
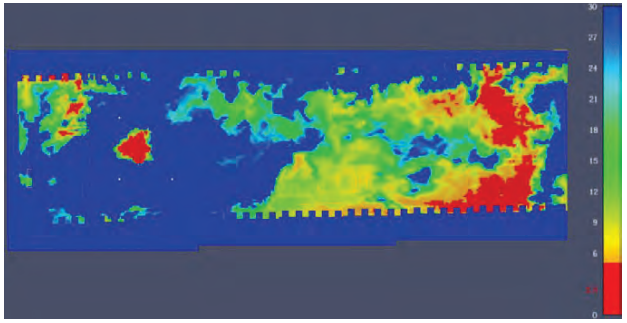
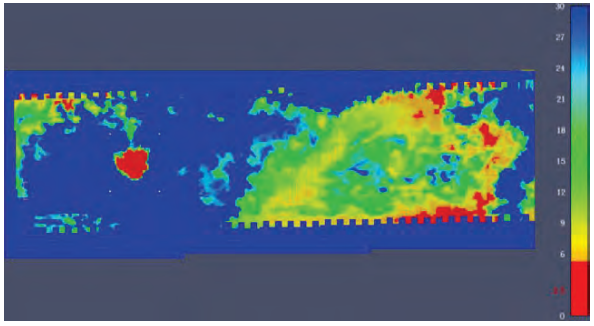
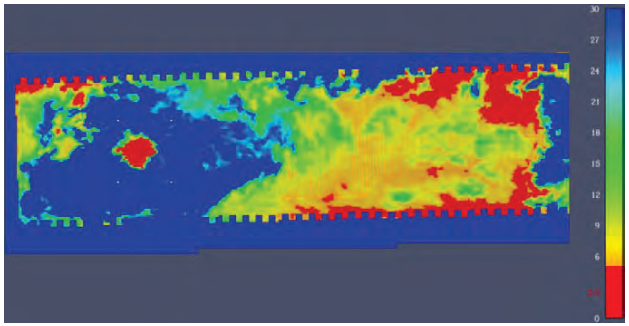
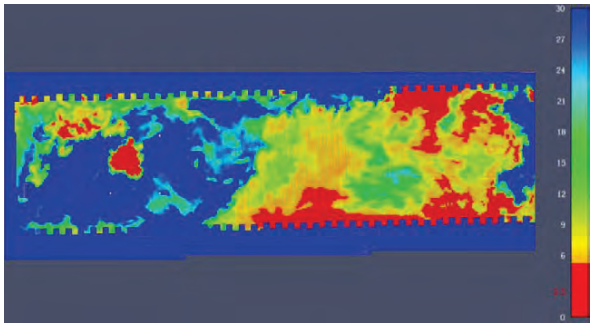


Figure 55: Annotations for determination of the ASET from the auditorium gallery floor

The smoke visibility slices above the auditorium gallery floor for Scenario 1 and Scenario 1(SA) are shown below.

Time (s)	Scenario 1	Scenario 1 (SA)	Comments
170			Similar conditions are attained in the auditorium between Scenario 1 and Scenario 1(SA).
180			Scenario 1 show more areas with a visibility of less than 5m in the auditorium relative to Scenario 1(SA). There are similar visibility conditions above the auditorium gallery accommodation stair between the two scenarios.
185			Scenario 1 show more areas with a visibility of less than 5m in the auditorium relative to Scenario 1(SA). Scenario 1 also shows more areas with visibility of less than 5m above the auditorium gallery accommodation stair. At the ASET of 185 seconds, Scenario 1 shows more onerous conditions relative to results attained from cenario 1(SA). The use of a coarse (0.2m) mesh cell size around the auditorium low level and ground floor is therefore deemed to produce more onerous conditions for the determination of the ASET (from the auditorium gallery floor).

200			Similar conditions are attained in the auditorium between Scenario 1 and Scenario 1(SA), however, there are differences between the locations of untanble conditions. Scenario 1(SA) show more areas with a visibility of less than 5m in areads ajacent to the south wall and above the auditorium gallery accommodation stair. As the ASET is dtermined to be 185 seconds, this phenomenon occurs after this period and therefore not deemed to be significant for evacuation through the auditorium gallery accommodation stair.

As shown by the visibility slices above, mesh cell sizes of 0.2m and 0.1m produce similar results in the early period of the simulations (up to 170 seconds). At the ASET of 185 seconds, the coarse mesh cell size of 0.2m show more onerous visibility conditions in areas adjacent to the auditorium gallery accommodation stair. The use of a finer mesh cell size of 0.1m would not lead to a reduced time for the ASET. At the determined ASET of 185 seconds, the use of a mesh cell size of 0.2m is therefore deemed to be a conservative approach. Although visibility conditions for the finer mesh cell size of 0.1m are more onerous in areas adjacent to the auditorium gallery accommodation stair in the later period of the simulations (at 200 seconds), this occurrence is after the ASET period of 185 seconds used for this analysis therefore the use of a coarse mesh cell size of 0.2m is deemed to be appropriate.

Appendix B – Smoke visibility and temperature slices

Gallery floors

The areas used to assess visibility conditions for the gallery floors are highlighted in red sections as shown in Figure 56 below.

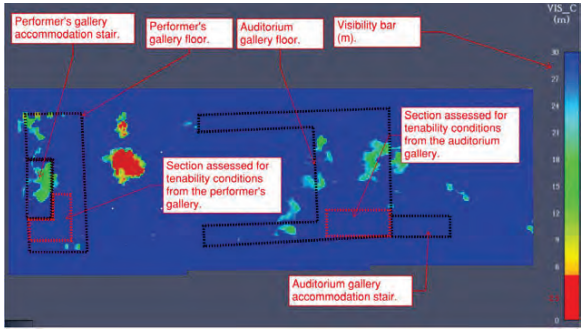
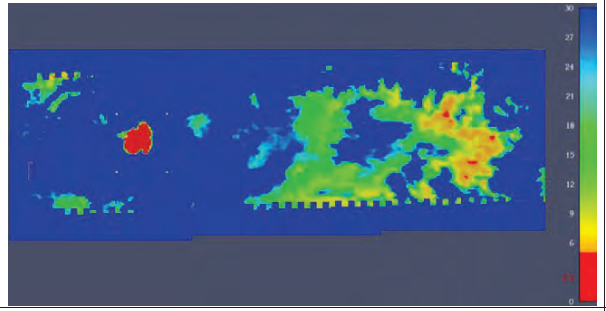
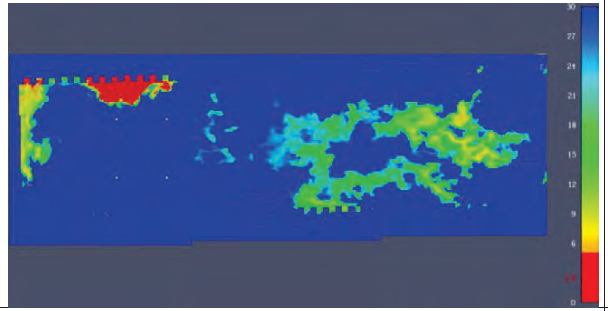
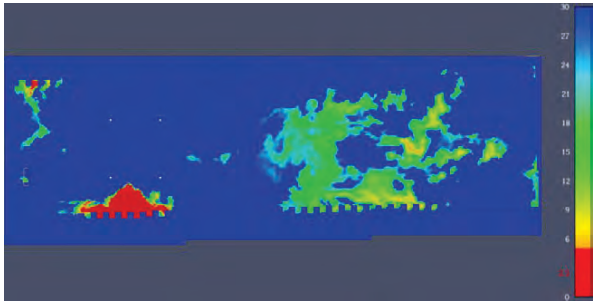
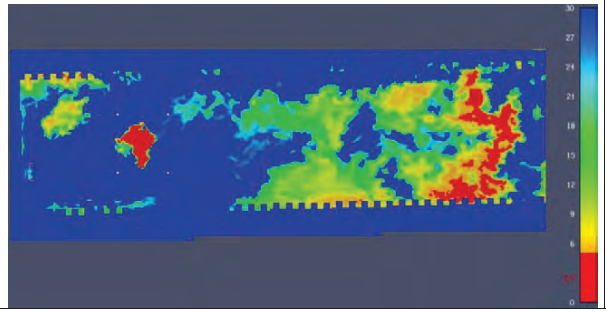
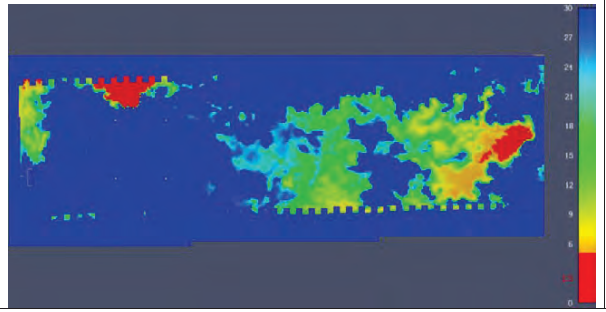
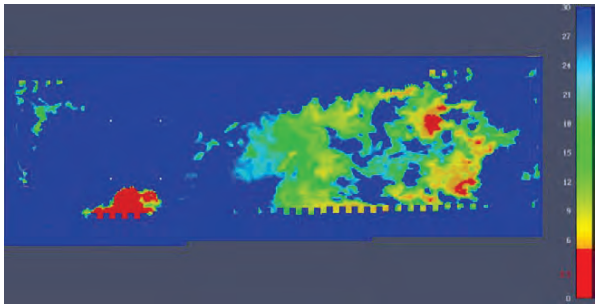
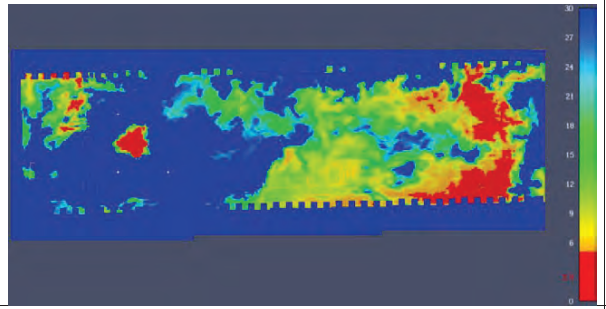
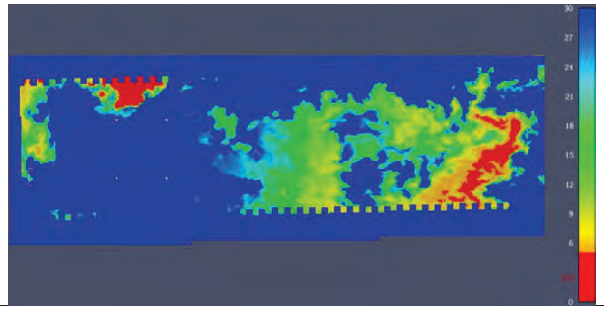
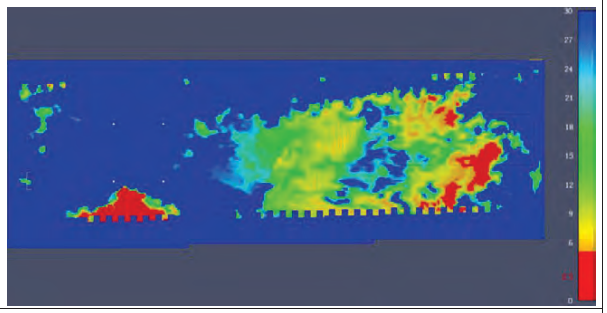
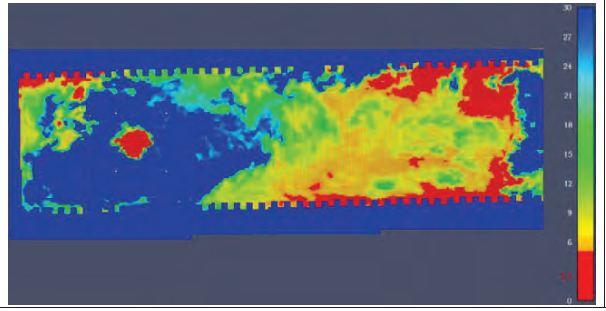
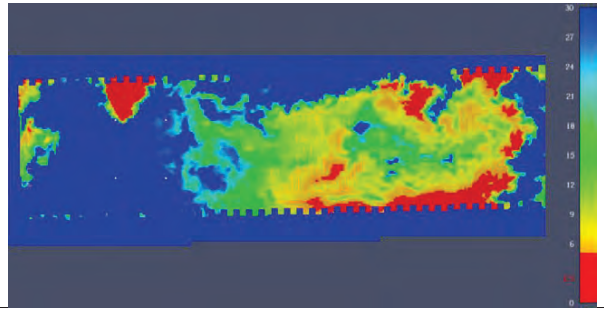
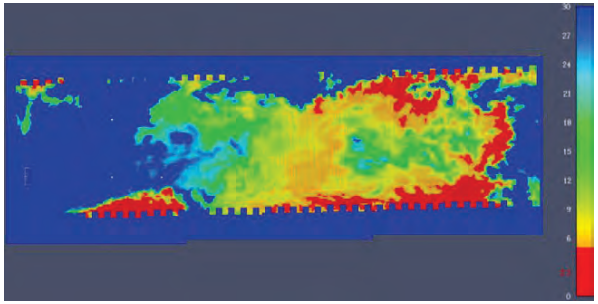


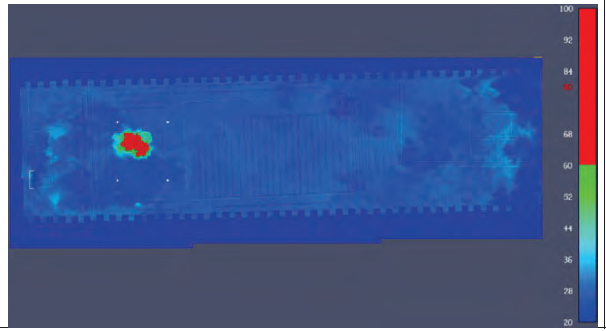
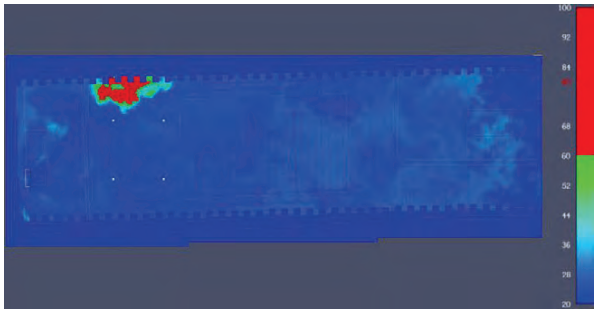
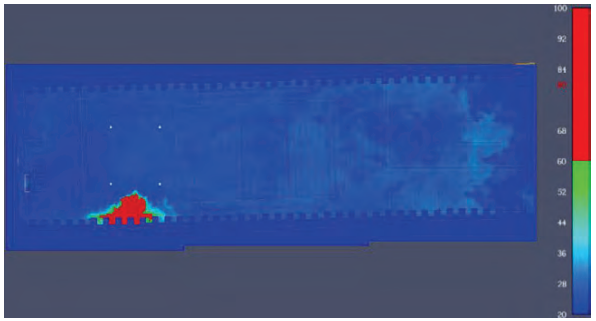
Figure 56: Annotations for determination of the ASET from the gallery floors

Smoke visibility

Time (s)	Scenario 1	Scenario 2	Scenario 3
170			
180			

185			
200			

Smoke temperature

Time (s)	Scenario 1	Scenario 2	Scenario 3
250			

Auditorium first floor

The area used to assess visibility conditions for the guildhall first floor is highlighted in the red section as shown in Figure 57 below.

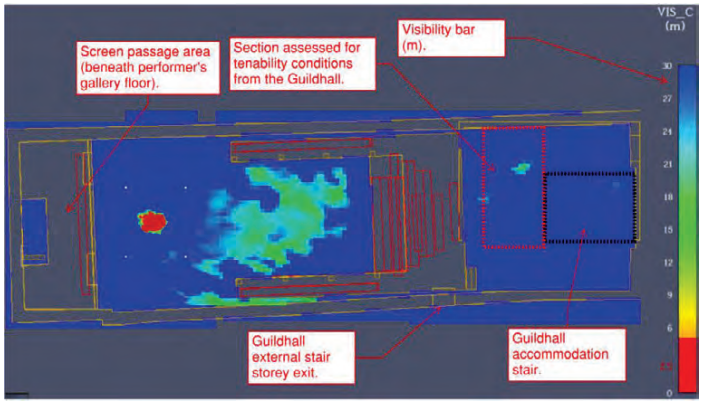
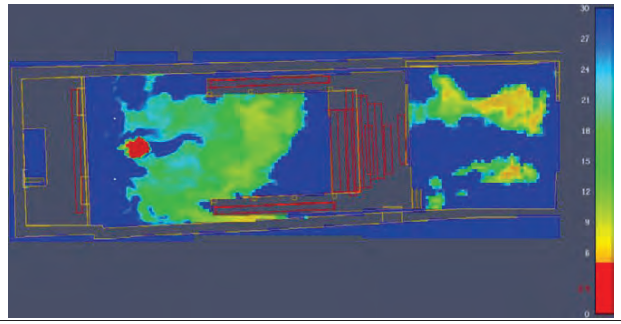
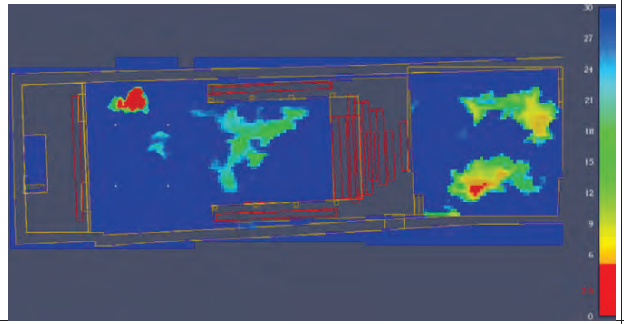
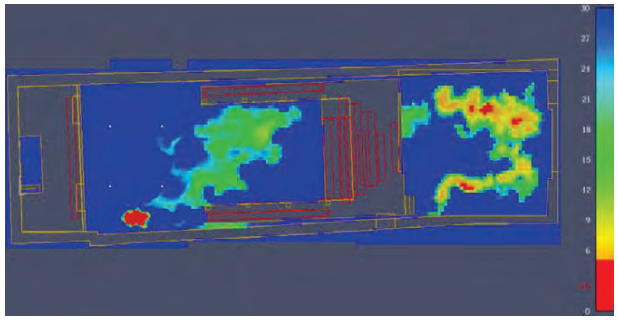
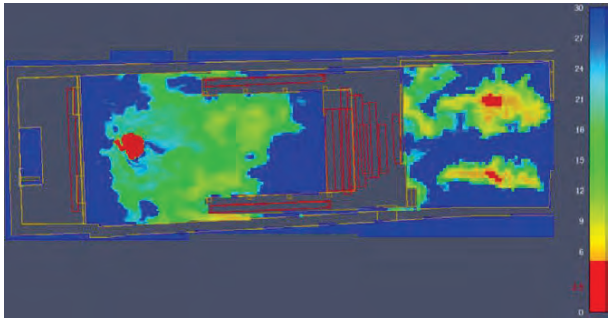
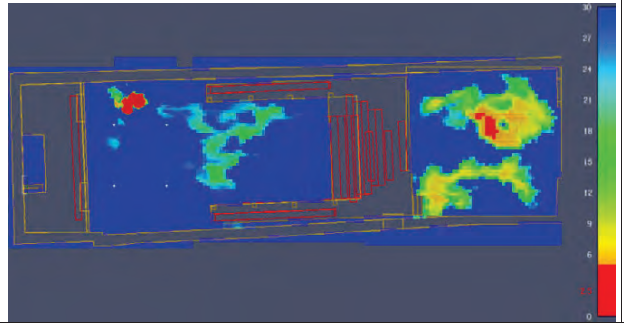
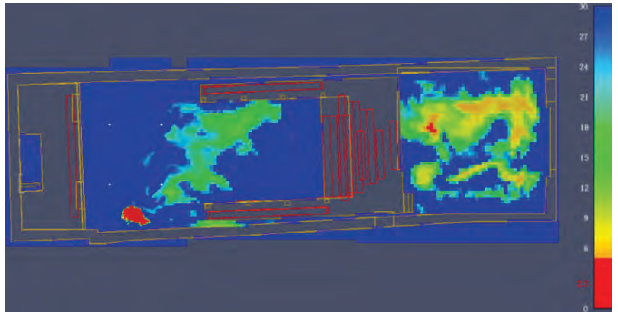
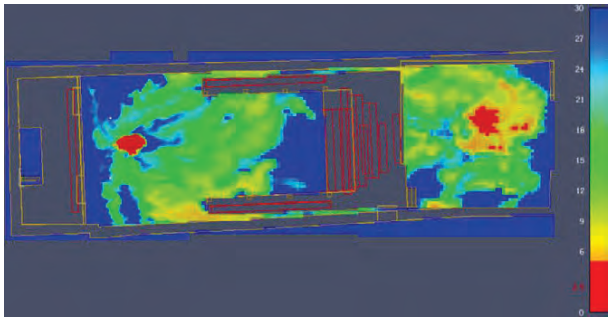
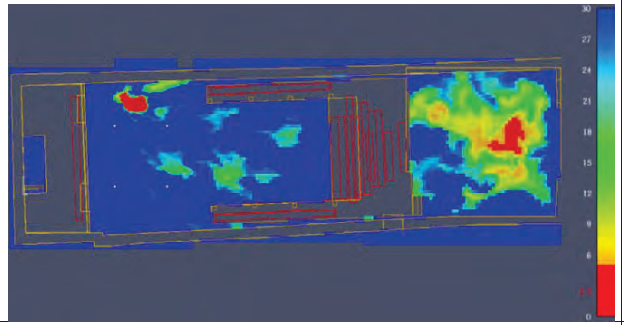
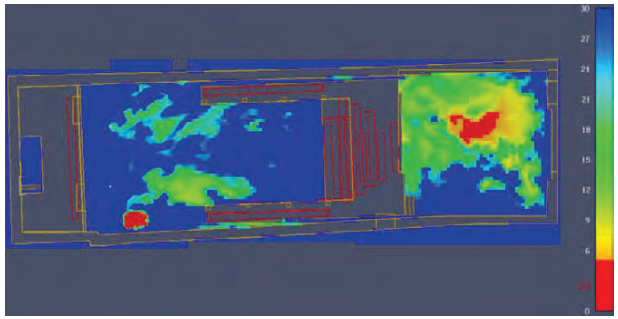
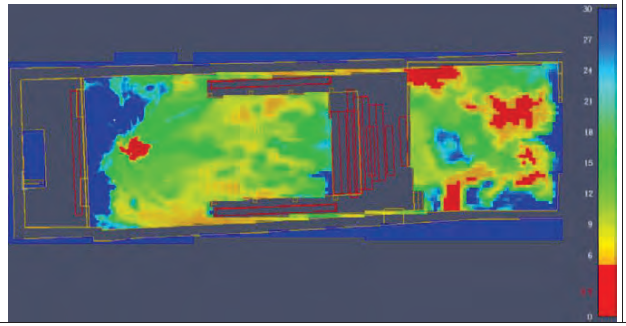
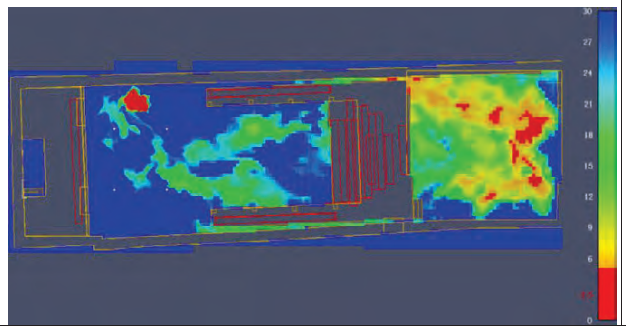
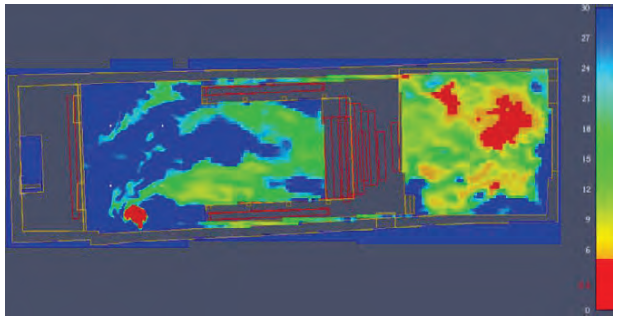


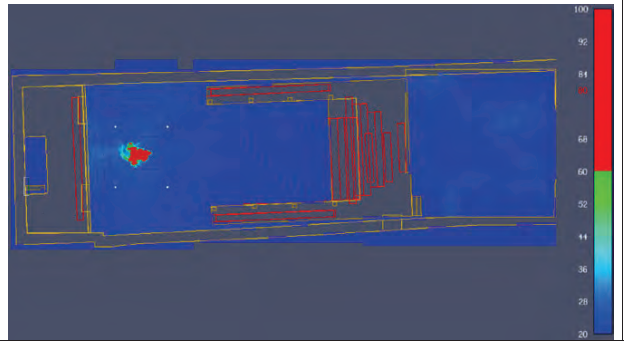
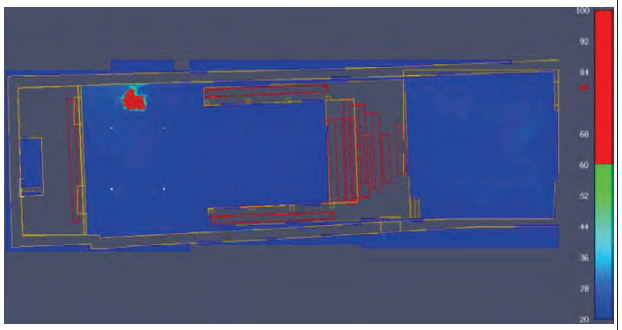
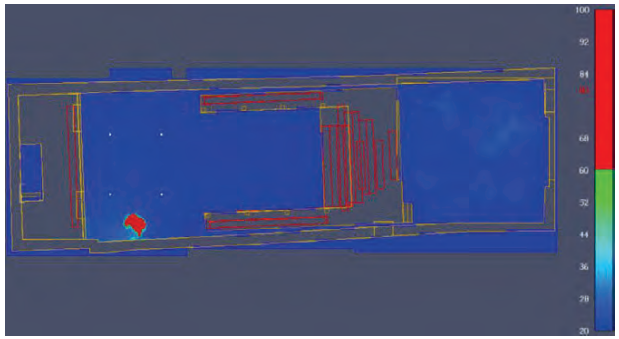
Figure 57: Annotations for determination of the ASET from the guildhall first floor

Smoke visibility

Time (s)	Scenario 1	Scenario 2	Scenario 3
220			
225			

235			
250			

Smoke temperature

Time (s)	Scenario 1	Scenario 2	Scenario 3
250			

Accommodation stair half landing

The area used to assess visibility conditions for the guildhall accommodation stair half landing is highlighted in the red section as shown in Figure 58 below.

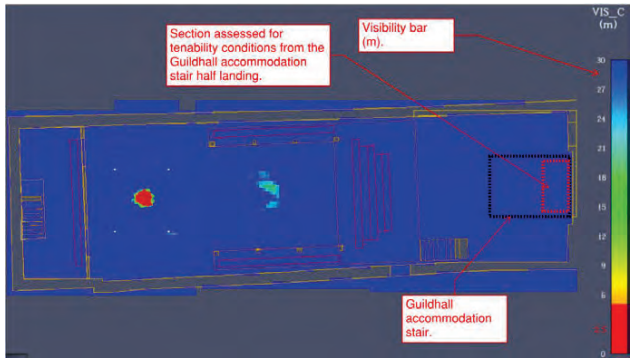
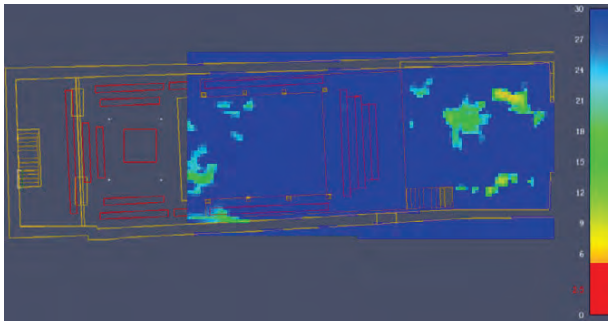
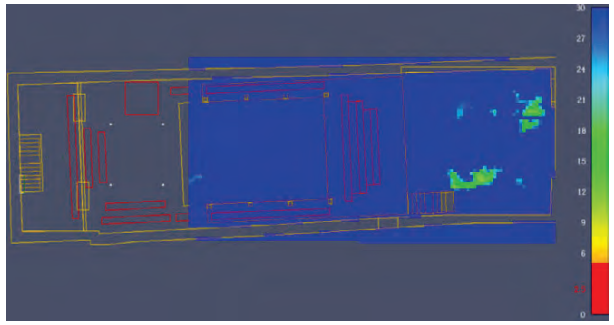
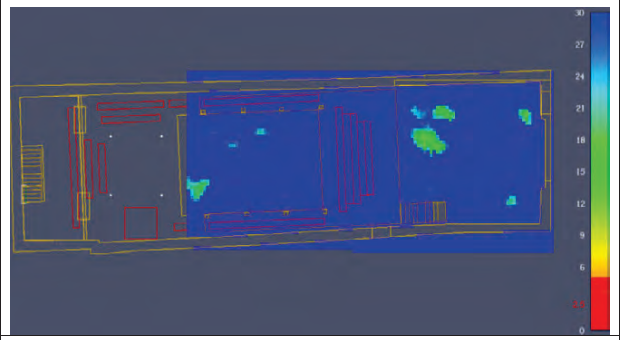
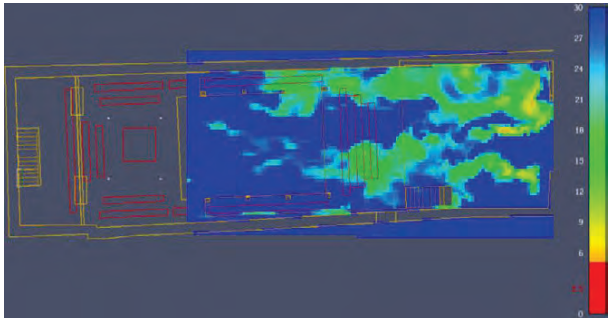
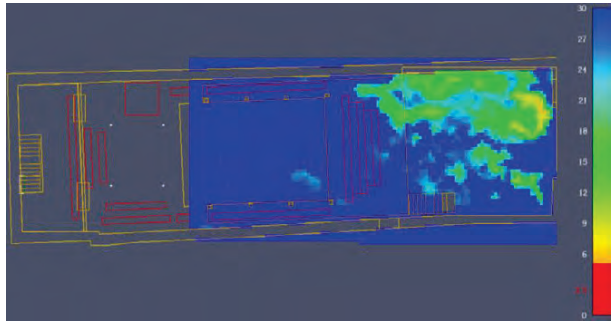
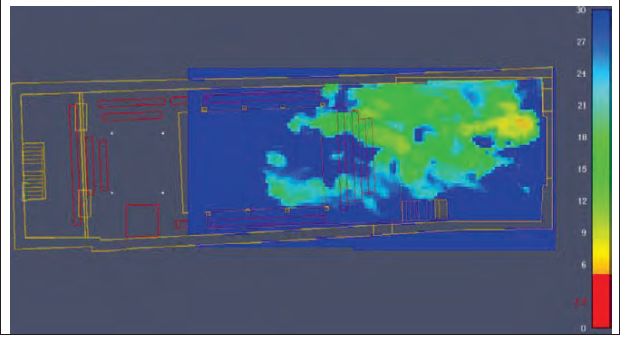


Figure 58: Annotations for determination of the ASET from the guildhall accommodation stair half landing

Smoke visibility

Time (s)	Scenario 1	Scenario 2	Scenario 3
225			
250			

Appendix C – Guildhall smoke conditions

Figure 59 to Figure 61 below show the guildhall smoke conditions at a simulation periods from 100 to 250 seconds.

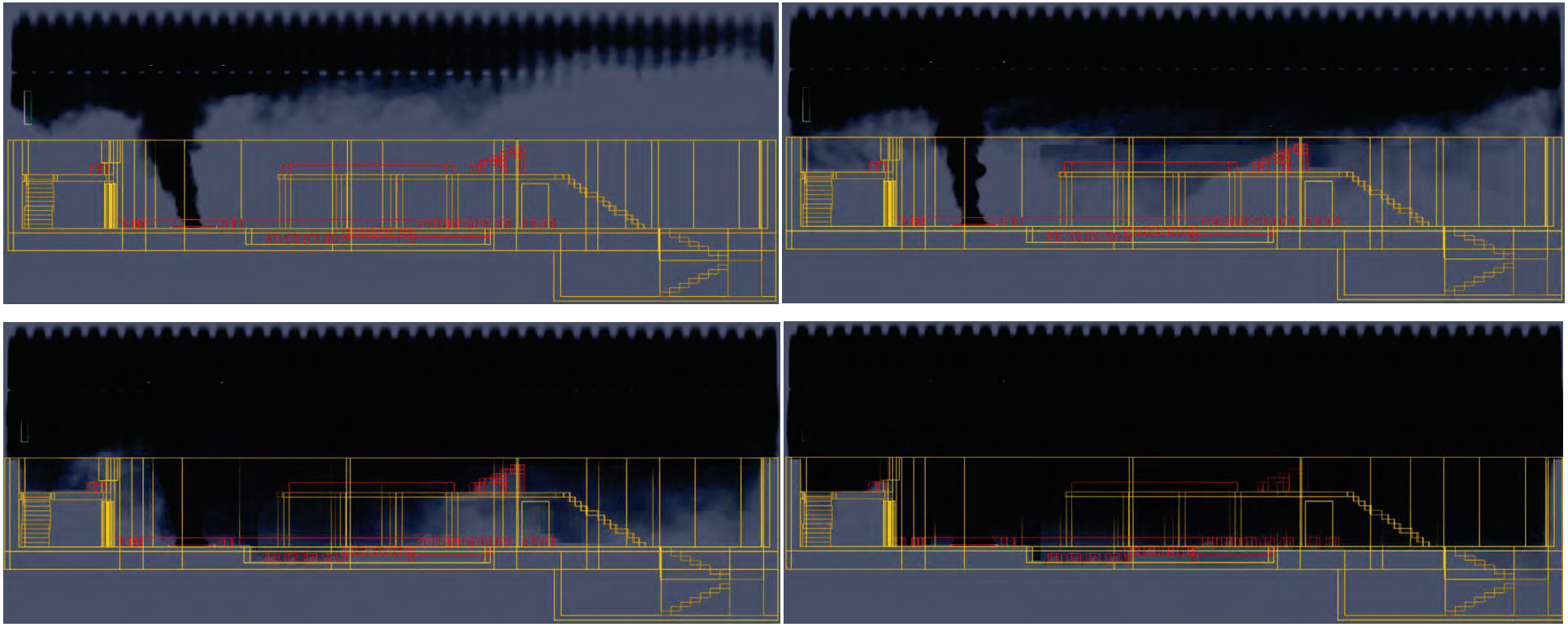


Figure 59: Guildhall smoke conditions for Scenario 1 at 100s, 150s, 200s and 250s, respectively (left to right, top to bottom)

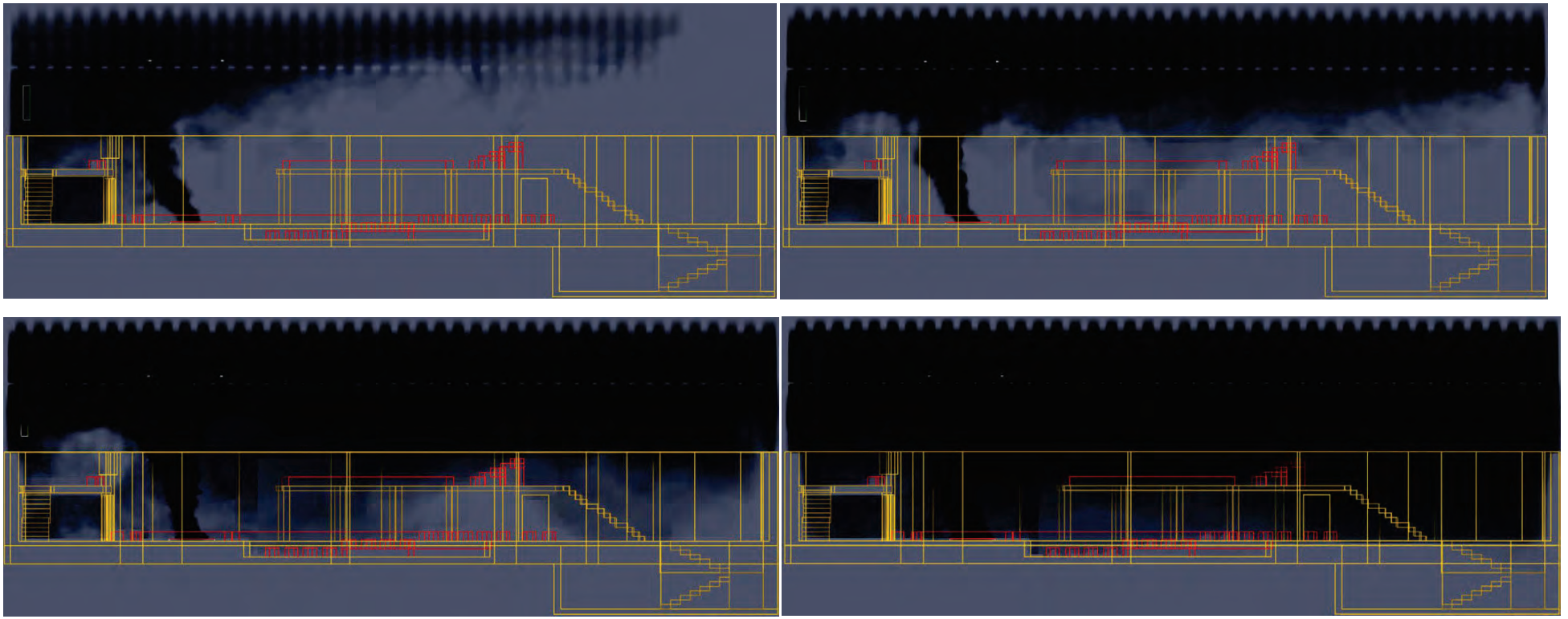


Figure 60: Guildhall smoke conditions for Scenario 2 at 100s, 150s, 200s and 250s, respectively (left to right, top to bottom)

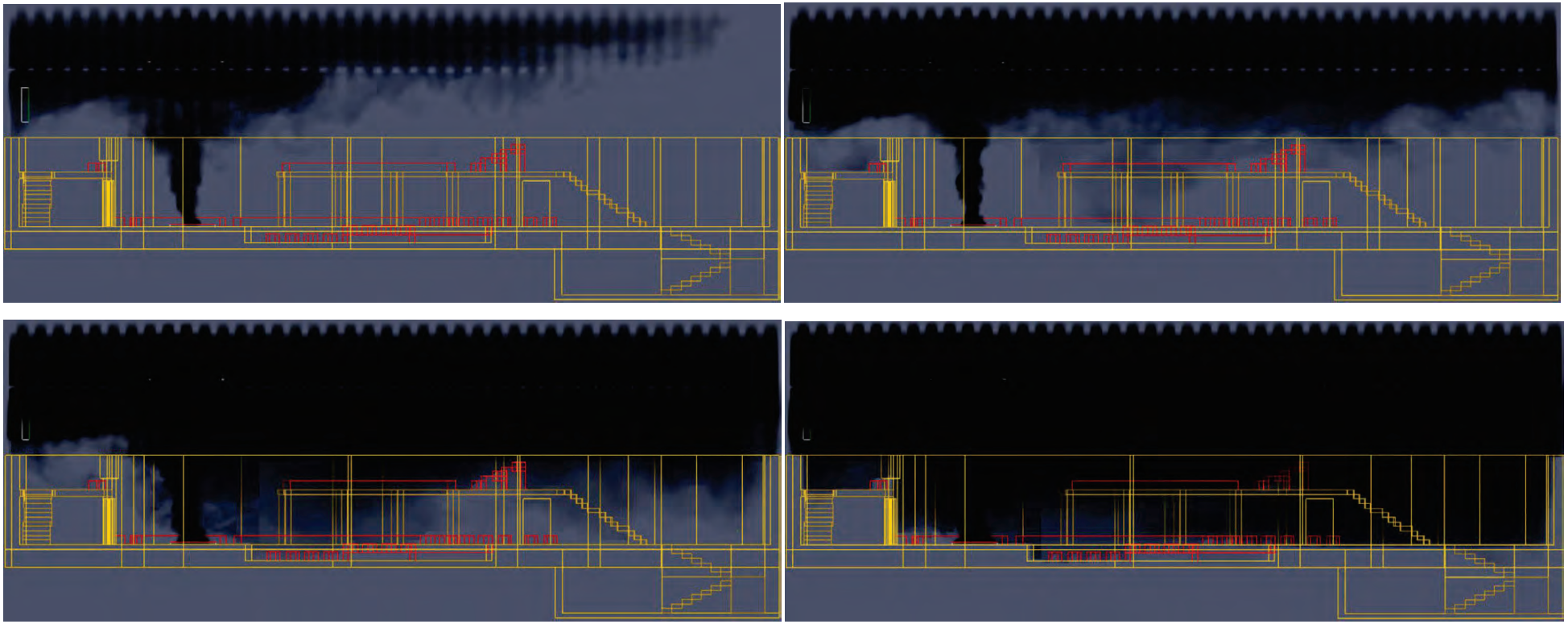


Figure 61: Guildhall smoke conditions for Scenario 3 at 100s, 150s, 200s and 250s, respectively (left to right, top to bottom)

Appendix D – AIS Building Control Approval Tracker

BUILDING REGULATIONS APPROVALS

PART B: CFD REVIEW REPORT (CFDRR)

24 Bruton Place, London, W1J 6NE
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Project Number	**P/504446**	**Client Ref No**	
Project Address	**29 King Street, King's Lynn PE30 1HA**	**CFDRR Rev No / Date**	CFDRR01
Description	**Redevelopment and renovation of listed Guildhall to create a multifunctional theatre and creative hub.**	**Plan Check Surveyor**	**Stephen Percival**
Fire Consultation Status	**Required**	**Fire Engineer**	**Guy Foster**

Approved Document B		**Fire Safety**		
Requirement	**Item**	**Comment**	**Status**	**Date**
General	1	The Fire surgery have provided a CFD proposal for the project to demonstrate the removal of the proscenium arch will not impact on the MOE for occupants. The proposed CFD analysis parameters are set out in TFS report P23-041 dated 4/3/24 as an ASET / RSET analysis	Noted	20/03/24
CFD Modelling	1	Flow capacities – Section 2.4 ; Stair flow capacities and calculated performers gallery and Auditorium flow times agreed	Noted	20/03/24
	2	Final exit flow capacity : Exit door closure time for modelling agreed	Noted	20/03/24
	3	Table 1 summary of evacuation times appears satisfactory Simulation sequence : Agreed.	Noted	20/03/24
	4	ASET – CFD modelling Model geometry – agreed	Noted	20/03/24
	5	Smoke ventilation arrangement: We note a maximum extract rate of 7.0m3/s has been proposed with a ramp up time of 30 seconds – this to be confirmed by system provider. Subject to modelling findings we would anticipate that what the model indicates will then feed into the design requirements which must then be shown to be achievable by the system provider as the project moves forward.	Noted	20/03/24
	6	We note need for design to include modulating fans as when inlet door closes negative pressures will result.	Noted	20/03/24
	7	Fire location : Agreed	Noted	20/03/24
	8	Performance criteria : Performance for means of escape only - agreed	Noted	20/03/24
	9	Smoke visibility: Agreed in conjunction with smoke toxicity	Noted	20/03/24
	10	Evaluation criteria: Visibility of >10m, Temp of < 60 deg and CO less than 800ppm and fractional effective dose of < 30% at the noted heights and for CO measured at exits where persons may queue as per figures in report	Noted	20/03/24
	11	Input parameters : Materials properties ; Agreed – project to confirm if this is reasonable assumption	Noted	20/03/24
	12	Fire growth rate and HRRPUA : Agree principle of medium fire growth rate in this case . We note intent to use spread rate design fire.	Noted	20/03/24
	13	Fuel parameters : Soot yield and CO yield agreed	Noted	20/03/24
	14	Design fire size : Noted. We reserve the option to request sensitivity analysis for the fire size if the results indicate that conditions may be close to the failure against the performance criteria .	Noted	20/03/24
	15	Mesh size : Agreed	Noted	20/03/24
	16	Summary table 4 – Noted	Noted	20/03/24

Date Received	**CFD Model Reference / Version - Description**	**Date Completed**
15/3/24	**Project St Georges Guildhall** **Subject ASET/ RSET Parameter Proposal** **Date 04/03/2024** **Author Marshall Nyamuchiwa** **Project no. P23-041**	**20/3/24**

Checklist of items checked when reviewing CFD:

GENERAL	
1	Report ref detail and model numbers. Pre-modelling criteria agreed. Report in line with criteria/ scenarios.
2	Software utilised / validated.
3	Cell- grid sizes / Mesh assessment/ Justifications.
4	Does model reflect geometry of project area being examined.
INPUTS	
1	Grid.
2	Reaction – Fire size, HRRPUA, t2, steady state.
3	Soot yields / other yields check.
4	Fire reaction.

5	Fire location /perimeter.
6	Obstacles – are materials realistic and defined and in line with project. Justifications.
7	Openings –vent arrangements, flows and correspond to timeline/ window breakage.
8	Visibilities.
OUTPUTS	
1	Does data represent critical times/areas.
2	Is data readable.
3	Check, necessary data results, e.g; Temp, Pressure. Flows visibility, toxicity.
CONCLUSIONS	
1	Are results within limitations of the acceptance criteria.
2	Have sensitivity cases been run / reviewed.
3	Have safety margins been applied- sufficient.
OTHER OBSERVATIONS / COMMENTS	
1	Competence of modeller.

Appendix D – Fire service pre-consultation meeting notes

Project	**St Georges Guildhall**
Subject	**Fire Brigade Meeting Notes**
Date	**23/02/2024**
Author	**Marshall Nyamuchiwa**
Reviewed	**Andrew Nicholson**
Project no.	**P23-041**

THE FIRE SURGERY

1 Introduction

The Fire Surgery were commissioned to develop the fire strategy for the proposed redevelopment works of St George's Guildhall, King's Lynn.

The scheme is currently in RIBA Stage 3. The Fire Surgery produced a RIBA Stage 2 fire strategy report referenced: *230914R0F1P23-041 - St Georges's Guildhall Stage 2 Fire Strategy Report*. This report outlined the fire strategy principles for the scheme and highlighted some aspects of the design that were to be further developed, including provisions for the fire service.

As part of the qualitative design review (QDR) process, The Fire Surgery presented the fire strategy principles for the scheme to Norfolk Fire Service on the 19th February 2024. Michael Brown and Timothy Harper-Allison of **Norfolk Fire and Rescue Service**, Harry Tate of **Haworth Tompkins** (project architect and manager), George Mirams of **Max Fordham** (M&E engineers), Andrew Nicholson and Marshall Nyamuchiwa of **The Fire Surgery** were in attendance for this presentation.

This design note outlines the meeting notes from this presentation to formalise the fire service pre-consultation QDR process. This design note is to be forwarded to Norfolk Fire Service for their review, comment and documentation.

2 Meeting Notes

Fire strategy principle	Meeting notes
	Means of escape
1. The guildhall stage is not provided with a safety curtain therefore consist of an open stage arrangement.	It was presented that a mechanical smoke ventilation system is to be provided, in accordance with BS 9999 and ABTT Yellow guide recommendations. • Norfolk Fire and Rescue Service raised a query with regards to the inlet supply air to the system. The inlet air is to be provided from; one existing door to outside (which will be powered open), one fire exit to an external stair (open during the means of escape), and another internal fire exit into an escape stair (the final exit on the ground floor to outside is expected to be open during means of escape). • Andrew Nicholson of The Fire Surgery mentioned the potential of additional inlet air being provided from building leakage. This will not be relied upon for the design of the system, however, there is potential to test the amount of building leakage at the practical completion commissioning stage.
2. The design incorporates seating at height through the introduction of a gallery floor.	It was presented that this arrangement is to be justified through a fire engineered solution based on an ASET/ RSET analysis. • The ASET is to be determined from CFD modelling and the ASET is to be deduced from evacuation calculations. • The Fire Surgery have developed the input parameters for this ASET/ RSET analysis and are to forward this document to Norfolk Fire Service for their review and comment. • Norfolk Fire and Rescue Service raised a query on the fire size and growth rate. The simulated fire will have a medium growth rate based on the scenery and type of shows expected in the Guildhall. Types of scenery not compatible with this fire strategy approach are to be outlined in the RIBA Stage 3 fire strategy report.
3. Access to the assembly point(s).	Evacuating occupants will most likely use the entrance points to the site for egress, unless directed otherwise. • Norfolk Fire and Rescue Service raised a query on the potential for contraflow between evacuating occupants and the fire service along the main entrances to the building site. Harry Tate of Haworth Tompkins mentioned that there

St Georges Guildhall Fire Brigade Meeting Notes

Fire strategy principle	Meeting notes
	will be a viable evacuation path from the courtyard, through the White Barn and onto Ferry Lane, which would abate this concern. • This evacuation procedure from the courtyard is to be detailed in the RIBA Stage 3 report.
Access and facilities for the fire service	
1. Although the Guildhall is provided with adequate perimeter access, there are excessive travel distances from the fire vehicle parking location (King Street) to the most remote buildings on site.	It was presented that the provision of sprinkler protection represents a significant mitigation measure to improve on existing firefighting provisions. The provision of a horizontal dry fire main was also discussed. • Norfolk Fire and Rescue Service were in agreement that the provision of sprinkler protection was a significant improvement for firefighting operations. • Norfolk Fire and Rescue Service raised concerns with regards to the provision of a horizontal dry fire main due to its extended length of ca. 60m. Main concern was with regards to its maintenance and drainage. • Norfolk Fire and Rescue Service mentioned the potential to provide a firefighting inlet to the sprinkler water storage tank to supplement water supply. • Considerations were made for a fire appliance to ether into the courtyard from King Street, through the southern bridgehead. The height of this bridgehead was stated to be ca. 3.6m and the access route between buildings was measured to be ca. 3.1m. It was discussed that the courtyard could potentially be used as a turning point. This arrangement is to be considered for fire service access, however, there remains a potential constraint that the landscaping may not allow the carrying capacity of 12.5 tonnes for a pumping appliance.

St Georges Guildhall Fire Brigade Meeting Notes

Fire strategy principle	Meeting notes
	• As a dry fire main present maintenance issues and does not present a significant improvement to firefighting operations, this provision will not be made for the fire strategy of the building. Consideration will be made with the design team with regards to the provision of a firefighting inlet to the sprinkler water storage tank.
2. Fire service override controls for the mechanical smoke control system.	Norfolk Fire and Rescue Service queried the provision of override controls for the mechanical smoke control system for use by the fire service. • Override controls for the mechanical smoke control system are to be provided. The location of these controls is to be discussed with the design team, and likely to be adjacent to the building main fire alarm panel.
Active and passive fire safety systems	
1. Means of detection and alarm system.	The Stage 2 fire strategy report proposed the provision of a category L2 fire alarm systems. • The provision of an enhanced category L1/P1 fire alarm system is to be considered at RIBA Stage 3. Due to building constraints, this may revert to a category L5 system is there are challenges with providing coverage in certain areas. The provision of an aspirating detection system in certain areas was also discussed (as a CDM risk management measure).
2. Sprinkler system coverage.	It was presented that sprinkler coverage is to be provided in feasible areas, with the exception of the Guildhall enclosure (as this will be impractical). • Consideration will be made with the design team for the provision of sprinkler coverage in the Undercroft (areas beneath the Guildhall).
3. Compartmentation.	It was presented that the Guildhall and adjoined buildings will be provided with enhanced compartmentation (a period of 60 minutes fire resistance) to limit the potential of internal fire spread.

St Georges Guildhall Fire Brigade Meeting Notes

Fire strategy principle	Meeting notes
	It was presented that detailed designs for the floor separation between the Undercroft and the Guildhall are being considered (to a period of 60 minutes fire resistance). It was presented that the new Gallery floor within the Guildhall is to be provided to a period of 30 minutes fire resistance. The new gallery floor will consist of timber elements and the structural fire resistance of these elements is to be established from char rate calculations.

H. HADA Stage 4 Report
Accessibility

Guildhall of St George, Kings Lynn | Stage 4 Access Statement

February 2025

hada
inclusive design consultancy and landscape architecture
designing with plants and people

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Issue date	Draft number	Draft by	Check by	Amended by	Notes	Sent for review to:
25.02.19	01	HA	-	-	1st draft S4 Access Statement for comment	Harry Tate, HTA ; Charlotte Perkins, JCLA
25.02.26	02	HA	HT	HA	2nd draft S4 Access Statement for comment	Harry Tate, HTA ; Charlotte Perkins, JCLA

Contents

draft

1. Introduction

1.1 Background

The historic Guildhall of St George is the largest surviving medieval Guildhall in the country. As a Grade I listed building with the first recorded performance at the Guildhall in 1445, it is the oldest working theatre in the UK.

The Guildhall site includes a café / bar, restaurant and gallery with warehouses used for storage and workshop space for local amateur theatre companies.

Following a number of feasibility studies, the current proposals expand the activities of the site and improve accessibility.

This access statement is based on the refurbishment plans as they have evolved through stage 2 to 4 to ensure compliance with appropriate inclusive design standards where possible. This report only highlights areas where a variation from the norm is adopted due to historic or structural constraints. Reference should be made to the Stage 3 Access Statement for more general description of the project.

1.2 Constraints and variations

The Guildhall is Grade I listed and as such any changes to original features have been challenging to incorporate. The other buildings on site are Grade II listed, with the exception of the Shakespeare Barn and Garden House (or Linen Store) which are not listed.

Most areas are accessible for wheelchair access with the following exceptions:

- auditorium gallery
- 29 King Street offices
- some stepped creative hub units off the courtyard with ‘mezzanine levels

1.3 Method of review

The design reviews are intended to check that the Stage 4 proposals are fit for purpose as well as being compliant with appropriate statutory Building Regulations in assisting the Guildhall to meet their obligations of The Equality Act.

The report does not describe or evaluate any part of the site that is used solely for inspection, repair or maintenance of any service or fitting, in accordance with Approved Document M. If a disabled person requires access to these areas as part of their work then their employer is expected to take all reasonable steps to ensure that there are no barriers to them carrying out their work. Any building adjustments that are required would be carried out at that time.

The report considers the requirements of all users and their needs in the widest sense, including:

- Performers, staff and patrons
- People with restricted mobility;
- Blind and partially sighted people;
- People with hearing loss;
- Older people;
- People with dementia and memory difficulties;
- People with different learning and perceptive abilities; and
- Families, children and young adults;

The meaning of ‘disabled’ in this Access Strategy is as defined in the Equality Act. Consideration is also given the LGBTQIA+ community.

Note:
HADA provides guidance and advice as access consultants. The consultancy does not have the authority to officially approve designs, only appraise and confirm that a design complies with statutory standards, i.e. Building Regulations, or policy guidelines. Final responsibility remains with designers and the approvals authority.

1.4 Standards and policy

The access provisions are reviewed against the access regulations and standards that apply, which are identified below.

National Regulations:

The Building Regulations 2010, Approved Document M (Access to and use of buildings) Volume 2: Building other than dwellings, HM Government, 2015 edition;

The Building Regulations 2010, Approved Document K (Protection from falling, collision and impact), HM Government, 2013 edition;

Approved Document B (Fire safety) – Volume 2

- *Buildings other than dwellinghouses* (2006 edition incorporating 2010 and 2013 amendments)

Approved Document Part T : Toilet accommodation, 2023

Best Practice:

BS 8300-1:2018 Design of an accessible and inclusive external environment - Part 1: External environment - Code of Practice, British Standards Institution, 2018

BS 8300-2:2018 Design of an accessible and inclusive built environment - Part 2 Buildings - Code of Practice, British Standards Institution, 2018.

British Standard 9999:2008 Code of Practice for Fire Safety in the Design, Management and use of Buildings, British Standards Institution, 2008;

Local policy

South East King's Lynn Supplementary Planning Document (SPD)

A full list of references and a description of relevant legislation, regulations, standards and guidance are detailed in Appendix 1 | References for inclusive design..

1.5 Other and best practice standards

Approved Documents M and K provide statutory access advice but refer to other standards and regulations about specific aspects of buildings and their immediate surroundings, e.g. *BS 8300-1:2018 and BS 8300-2:2018*.

There are no nationally enforceable access standards or regulatory controls governing public realm, recreational spaces and landscaping. **For primary routes and approaches to buildings Approved Documents M are taken as a bench mark for determining accessibility.**

With regards to streetscape and pavement design, guidance is provided by the Department for Transport's Inclusive Mobility Guide and Transport Notes. For recreational landscape BS8300-1:2018 is referred to.

A degree of interpretation and appropriateness of these standards may be required on a case by case basis.

1.6 Building Regulations and Listed Building Consent

The scope for making alterations to improve access in historic or listed buildings is limited by the need to protect and conserve the architectural features of the existing fabric. A guiding principle for alterations to historic buildings is that the alterations should be reversible wherever possible, enabling the building to be restored to its original condition if required some time in the future.

As a result, it may be possible that Listed Building Consent can override some of the guidance of *Approved Document M (Vol.2)* and *K,* particularly for the existing building improvements. It is expected that the refurbishment proposals will comply with Building Regulations where possible given the existing building fabric and listed building constraints.

The Equality Act cannot override any other piece of legislation. In such cases a managed approach or alternative provision may be adopted and will be identified in this report and the building's Access Management Plan.

1.7 The Equality Act

Statutory consents

When considering a reasonable adjustment to a physical feature, the Equality Act does not override the need to obtain consents such as planning permission, building regulations approval, listed building consent, scheduled monument consent and fire regulations. If the consent is not given, there is still a duty to consider a reasonable means of avoiding the feature.

Refer to Appendix A1.1 for further information.

Design standards

Service providers and public authorities carrying out their functions do not have to remove or alter a physical feature of a building for a period of 10 years from construction or installation if it accords with the relevant objectives, design considerations and provisions in Approved Document M. They may still need to consider a reasonable means of avoiding the feature.

1.8 Management and maintenance

Once building works are complete full accessibility will rely on effective facilities management.

Management items will range from provision of a good quality website to the effective maintenance of lifts in residential buildings. Inspection of specialist devices and training of staff should become a regular element of management processes. Access Management Plans can form part of a building operator's on-going duties.

1.9 Access for maintenance and services

The access statement does not describe or evaluate any part of the development that is used solely for inspection, repair or maintenance of any service or fitting, in accordance with Approved Document M. If a disabled person requires access to these areas as part of their work then their employer is expected to take all reasonable steps to ensure that there are no barriers to them carrying out their work. Any building adjustments that are required would be carried out at that time.

1.10 Consultation

The Guildhall design team will consult with local disability groups and deaf and disabled staff and visitors to ensure that the aspirations set out in this report will be delivered and maintained beyond capital works completion.

1.11 Appointment

Helen Allen (trading as HADA) was appointed by the Haworth Tompkins Architects as Access Consultant to the project in May 2023.

2. Inclusive design variations

This schedule captures access and inclusion-related items requiring further development, clarification, or discussion. The schedule follows Sections 1-5 of Approved Document M (AD M) 2015 and includes references to relevant sections of Approved Document K (AD K) 2013, AD Part T and other relevant guidance, including BS8300-2:2018.

Additional items that may not meet Approved Document B (AD B) Vol.2, may present a vulnerability under the Equality Act.

Any variations to the Building Regulations will need to be confirmed with Building Control as the approving body.

Any management issues are identified in the Mgmt column denoted with √ Symbol.

Item outstanding and unresolved

Information pending for review / discussion

Item resolved with explanation

2.1 Arrival / landscaping

Most of the courtyard paving will be retained as this is in good condition. The levels from the White Barn to the Creative Hub units will be levelled out with gentle gradients across the courtyard ranging from 1:31 to 1:42. The St George's courtyard entrance has original stone paving slabs followed by a substantial run of cobbles. It is not intended to replace the stone and cobbles here as they are of heritage value and there is an alternative accessible route into the courtyard through the building.

Key access improvements in the landscape will include:

- there will be two raised landscape levels plus the paved river terrace via the 1:21 slope; an existing retaining wall at the back of the landscaped steps will provide informal seating. Wheelchair users can view performances from the paved river terrace, sharing the same route as their companions and other visitors. Mid-terrace access to the meadow is not step-free due to the desire to retain the depth of the existing wall near the restaurant, rather than extending it outward which would be imposing. This results in condensed slopes near the terrace seating area; step-free access to the meadow is still possible near the arbour.

- relandscaped Shakespeare courtyard with smooth stone pedestrian paving with maximum gradients of 1:21.

- the White Barn Garden behind the White Barn will have step-free access by grading the garden levels down to match internal floor levels.

Fig. IMAGE REQUIRING UPDATE FOR PICNIC BENCH ACCESS

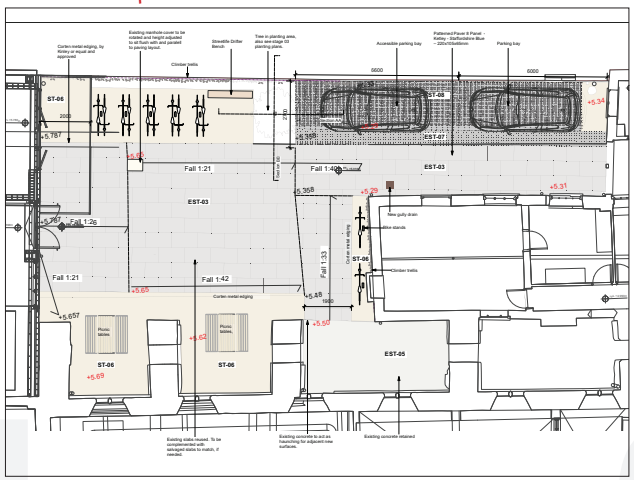

Fig 1 Proposed accessible parking and cycle parking

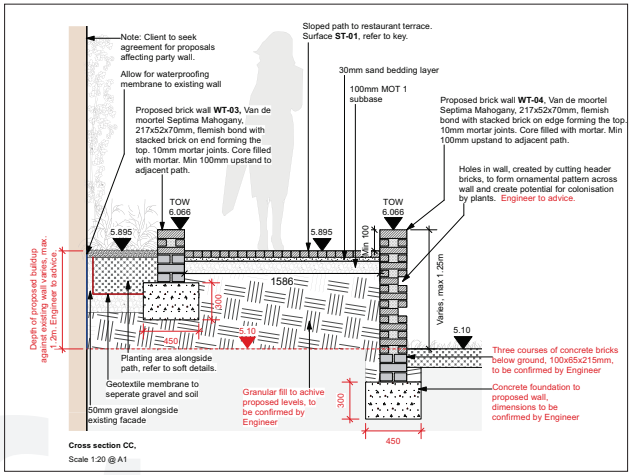

Fig 3 Proposed section through terrace ramp

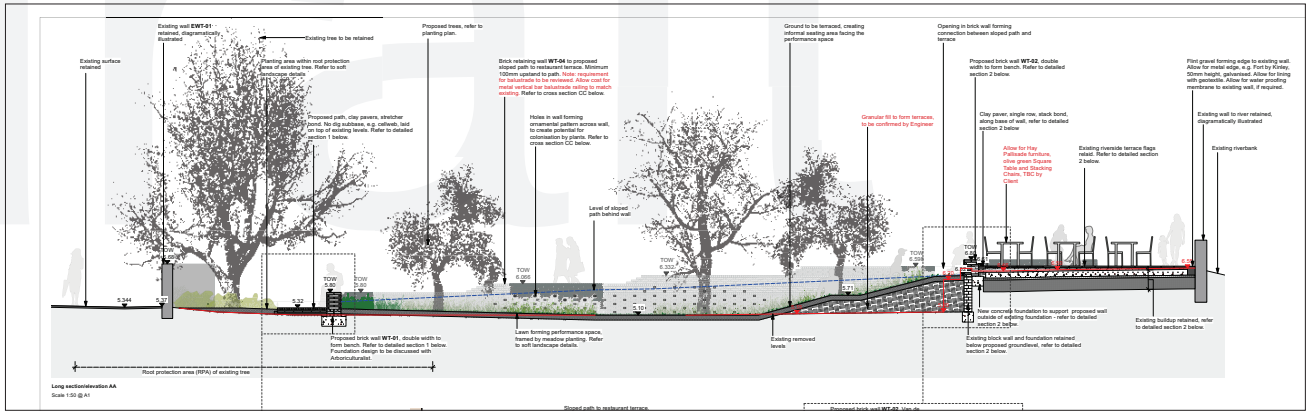

Fig 2 Proposed terraced garden levels

Ref	Item	Description	Variation / rationale	Status
1	Parking	There will be two new staff parking bays, including one accessible bay, within the Shakespeare Courtyard. The side transfer zone will have firm compacted gravel underfoot and 1:60 cross falls but no further markings.	This is deemed acceptable on the basis that this is a private controlled area for staff only.	
2	Bicycle parking	There will be 1200mm zone on the ends of the stands for the accessible adapted bikes. The surface under the end bays will be firm underfoot with compacted gravel; max cross falls 1:21 near cycle sands.	FINAL DETAILS PENDING	
3	Ramped route to cafe	There is a drop on the other side of the tap edge of the ramp to the grassed bank (fig 3). There is no edge protection (balustrade) to maintain historic sightlines but the tap edge prevents wheelchairs rolling off and provides definition / tap edge for cane users. Steve Percival from Sweco's comments: Under building regulations if there is a drop of more than 380mm guarding would be required, however this is applicable inside the building but we don't control gardens or external areas Unless it leads direct into a building its not a building regulations issue	This is deeemed acceptable and there is no requirements for handrails as slopes are below 1:21	
4	Steps to grassed terrace	The garden terrace comprises lawn with stepped access from the restaurant terrace; steps will have tonal contrast on step nosings but no handrail or tactile corduroy flooring at the top on the terrace by the tables and chairs. Nosing detail will be an inset strip within the brick of 55mm, reeded brass or bronze on the tread only	As this is not deemed as part of the circulation route or an approach to a building entrance and only provides access to a grassy bank then this is deemed acceptable. FINAL TONAL CONTRAST TBC	
5	Entrances - Maltings Yard	Some entrance thresholds off the courtyard currently have a single step up to the FFL. Many of these are to internal stepped routes whilst the flexible space (was Fermoy Gallery) by the cafe already has step free access via its main entrance and internal ramp. It is proposed that such single step thresholds are replaced with short rise ramps to aid access for equipment. Refer to fig 4. All steps, e.g. FD02 North Warehouse Range Typical Step detail, will have nosing contrast -	Nosing detail will be an inset strip within the brick of 55mm, reeded brass or bronze on the tread only. FINAL TONAL CONTRAST TBC	
6	Creative hub entrances, Maltings Yard	There are 4 stepped entrance thresholds off the courtyard entrance thresholds with existing retained stepped access - once where public access is not permitted, once where alternative level access is also provided, and three other occurrences, e.g. flexible space by the cafe already has step free access via its main entrance. It is proposed that such single step thresholds are replaced with short rise ramps to aid access for equipment. PLEASE DOUBLE CHECK	This is deemed acceptable on the basis that comparable creative hub space is offered elsewhere on site of equal quality or there are alternative routes.	
7	Restaurant terrace	The outdoor terrace will have a gentle slope ranging g from 1:53 to 1:60 from the ramp to the entrance doors.	Noted	
8	Shakespeare courtyard	There are falls ranging from 1:21 to 1:40 and paving slabs over most of the yard; gravel under the picnic benches will not be in the area used by wheelchair users with reinforced gravel. IS THIS RESIN BOUND?	PLS CONFIRM	

9	White Barn Garden	The courtyard is accessed via a 1:50 and 1:25 slope ; the steepest cross falls are 1:30. Joints between pavers are compliant.	None	

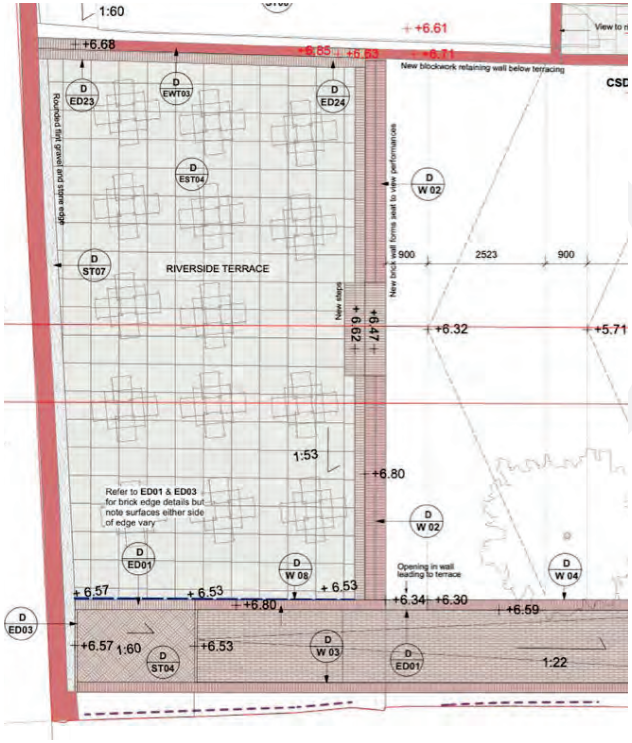

Fig 4 Restaurant terrace

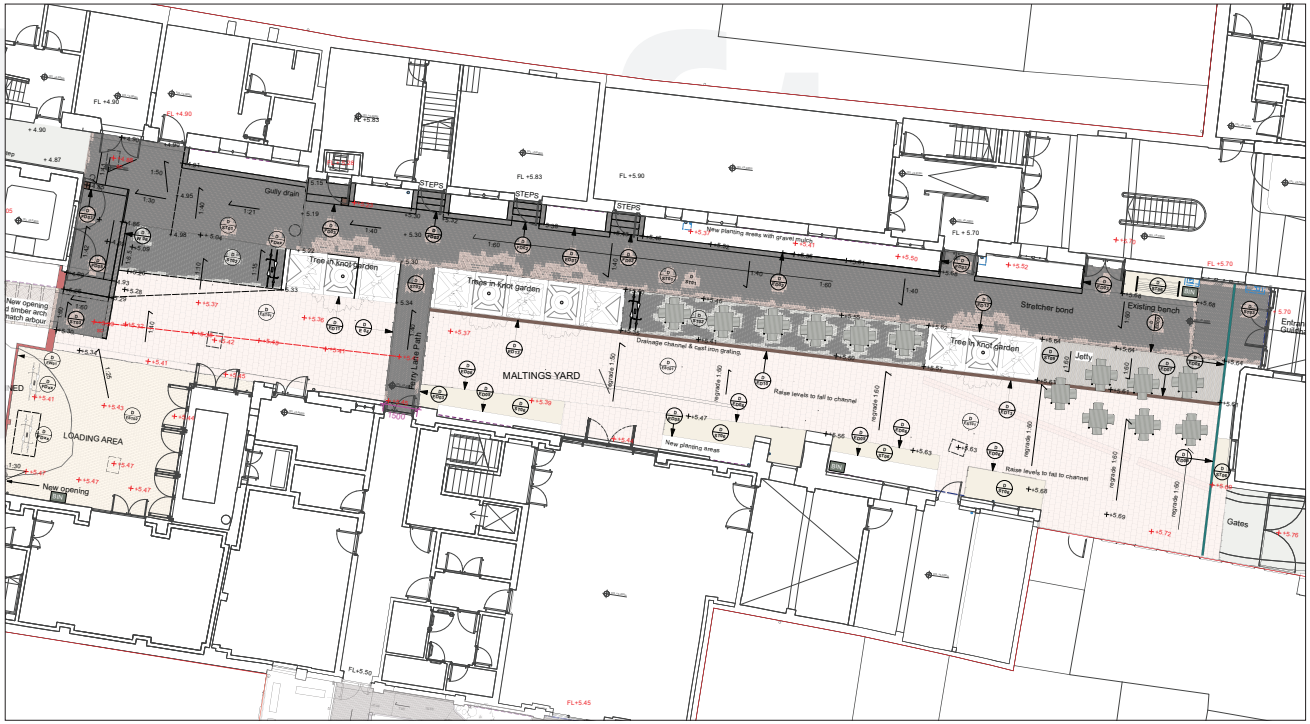

Fig 5 Stepped routes off courtyard

2.2 Interiors

The interior layouts on the whole are compliant with minor details to ensure existing conditions such as narrow doorways or deep reveals meet current access standards and ease of use. In such cases door automation is fitted.

There will be ten new accessible unisex WCs (AWC) including a Changing Places AWC across the site as follows:

- GF - five in total - two off the Guildhall corridor route, one near the cafe, one in the White Barn, one serving the creative hubs and for the offices off the courtyard route.
- FF - four in total - two BoH for the dressing rooms and Green Room in the Guildhall, one for the restaurant and one in the White Barn.
- There will be a separate accessible baby change room near the cafe.
- a new Changing Places AWC / first aid will also be provided with the WC block off the Guildhall corridor route.
- Gender neutral facilities will be located off the Guildhall corridor route in anticipation of the emerging AD Part T whilst those near the cafe will be separated. There will also be gender neutral WCs in the restaurant.

There will be no FoH WCs in the Guildhall at first floor level, due to limited space, and everyone will be required to descend to ground level; this is well within the AD Part M 40m distance rule via the lift.

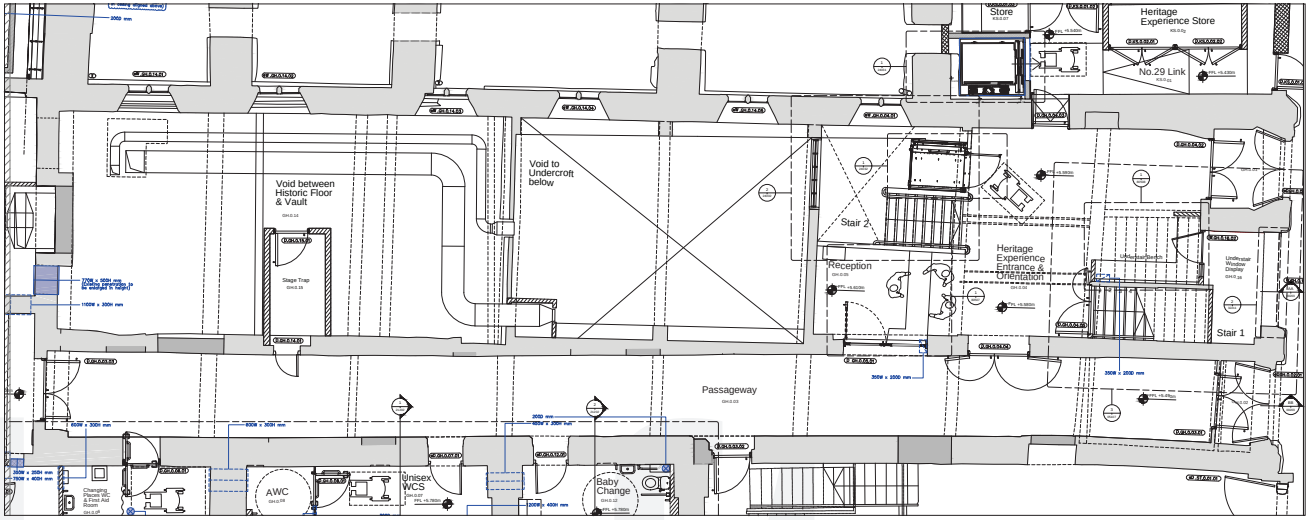

Fig 6 Proposed ground floor - Guildhall reception and WCs

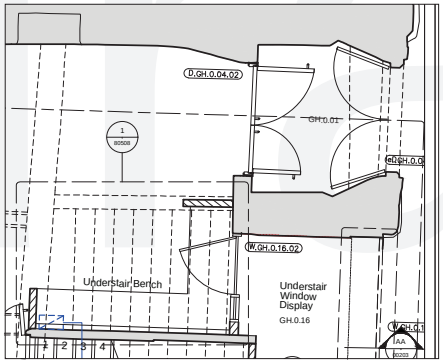

Fig 7 Theatre entrance doors

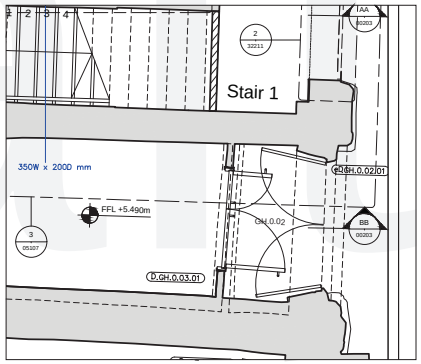

Fig 8 Courtyard cafe entrance doors

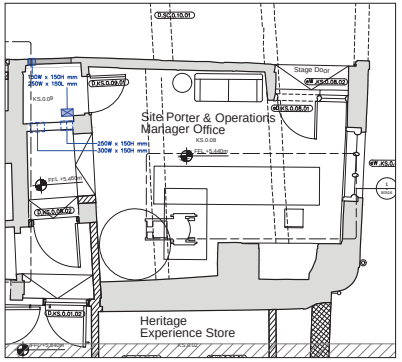

Fig 9 No 29 entrance doors

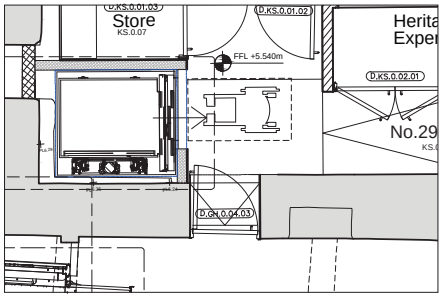

Fig 10 Link door to platform lift to upper level

Ref	Item	Description	Variation / rationale	Status
1	Entrance, theatre	The main original entrance doors (fig 5) have an approximate clear opening width of 700 mm per leaf, but these are kept open day-to-day during opening hours and are listed. The inner doors are to be replaced and will feature full height single pane vision panels with the inner doors having a leaf and a half style, with one leaf providing 800mm. These doors will be fitted with automation via a pushbutton or PIR	No variation but door weights and automation TBC FINAL DETAILS PENDING	
2	Passageway entrance door	The proposed primary entrance route into the courtyard, creative hub and restaurants (fig 6) rather than through the theatre foyer - these will be fitted with automation via a pushbutton or PIR. The external doors will be retained open day to day.	No variation but door weights and automation TBC FINAL DETAILS PENDING	
3	Entrance 29 King St	Circulation within No.29 King Street will be improved, with four short rise ramps ranging from 520mm with a rise of 80mm (about 1:6.5) to gradients of 1: 18.6 to 1:18.8 (over 373mm and 421mm and 509mm) will be fitted from the covered archway into the stage entrance / site manager's office and reception linking to the main body of the building.	External land levels could not be adjusted to meet / ease internal ffl due to historic status. Step-free access is also possible via the main entrance foyer and a new connecting door between Guildhall ground floor GRADIENT DETAILS PENDING	
4	Reception	Desk design / induction loop / lighting TBC.	FINAL DETAILS PENDING	
5	Corridor doors, G/F, main building	Direct access to the cafe from the courtyard will also be possible via double doors. All doors will comply with AD Part M with regards clear opening widths and opening forces	This is deeemed acceptable	
6	Circulation GF, main building	The lower courtyard levels will be gently feathered up with 1:40 slopes in the cafe area and linking up with the Red Barn to create a step free access throughout.	This is deeemed acceptable	
7	Circulation GF No 29	Link door from GF No 29 to the main body of the building and platform lift is set into an original deep reveal (fig 9) with no 300mm side clearance.	This door will be retained open.	
8	Lift, G/F to 1st	There will be a platform lift near reception. A back up to the FoH lift is possible using the piano / passenger lift as a managed alternative. The proposed gallery level has no lift access due to listed building constraints. The stage gallery level has no lift access due to listed building constraints but this can be managed at the level below. All lifts will have protected power supply and battery back up for assisted egress	This is deemed acceptable based on alternative seating of better quality at lower levels with the same price band offer. FINAL DETAILS PENDING FOR LIFT FIT OUT	
9	Lift, G/F to basement space	Access will be via a new staircase and a new platform lift from reception. The flexible space at this level will function as the refuge and the platform lift will have an ancillary battery back up.	FINAL DETAILS PENDING FOR LIFT FIT OUT	

10	Lift,stage / goods BoH	Step-free stage access will be provided via the new stage lift. This will also be the BoH passenger lift and FoH back up lift.	FINAL DETAILS PENDING FOR LIFT FIT OUT/CONTROLS	
11	Stairs, No 29	The existing stair is very steep and will be rebuilt with regulation treads and risers to provide a stair which offers greater ease of daily use and can facilitate wheelchair carry downs as an alternative egress route from the Guildhall.	Treads, 250mm Risers, 161mm 740mm clear width between handrails.	
12	Stairs, main auditoria	Main entry stair to east end to be retained but re-leveled to suit the new FFL of the Guildhall. Existing stair is not completely even. New stair will provide consistent steps of 156mm rise and 275mm tread depth. Continuous handrail to be provided all around one side of stair. First lower flight to include handrail on both sides. Upper fight to feature handrail on one side only but benefits from top rail of central balustrade. Main gallery stair to feature steps of 169mm rise and 260mm tread depth. Handrails to be provided on both sides. Performer stair to feature steps of 163mm rise and 250mm tread depth. Handrail to be provided on one side alongside top rail of balustrade to the other side. All stairs to feature brass nosing to steps.	FINAL DETAILS PENDING FOR TONAL CONTRAST ON BRASS NOSING AND FLOOR FINISH	
13	Cafe	The new cafe will have a multi-height counter and separate entrance off the courtyard. The floor plate will have gentle slopes of 1:40 TBC	FINAL DETAILS PENDING - COUNTER DESIGN ETC	
14	Offices, Kings St	Step free access to the first floor offices cannot be achieved due to the multiple short level changes and narrow corridor widths within the existing listed historic building.	Ground floor office space is available off the courtyard with the AWC and can be managed.	
15	Kitchen / meeting rooms, Kings St	There are standard WCs at first floor level with a kitchen at ground floor level, all of which will be retained. Step free access is not possible to the kitchen and meeting room due to existing floor height changes and insufficient space to install ramps without causing significant harm to the listed building.. Likewise, at first floor there will be no step-free wheelchair access.	This can be managed and considered acceptable given the constraints and availability of alternative facilities at ground level. A hot desking approach can be adopted to minimise segregation and discrimination. Otherwise, improvements will be undertaken for blind and partially sighted people with regards tonal contrast. There is an office next to the AWC in No 29 off the courtyard access.	
`16	Refuges, theatre	The refuge in the No.29 link is intended to take a maximum of 6 wheelchairs. In case of lift failure, the alternative escape route is wheelchair carry down through No.29 King Street and into the No.29 link. The refuge next to the south west auditorium lift will be oversized to accommodate six wheelchairs.	None - for information	
17	Refuges, Creative Hub	FINAL DETAILS PENDING - SIGNAGE	FINAL DETAILS PENDING	

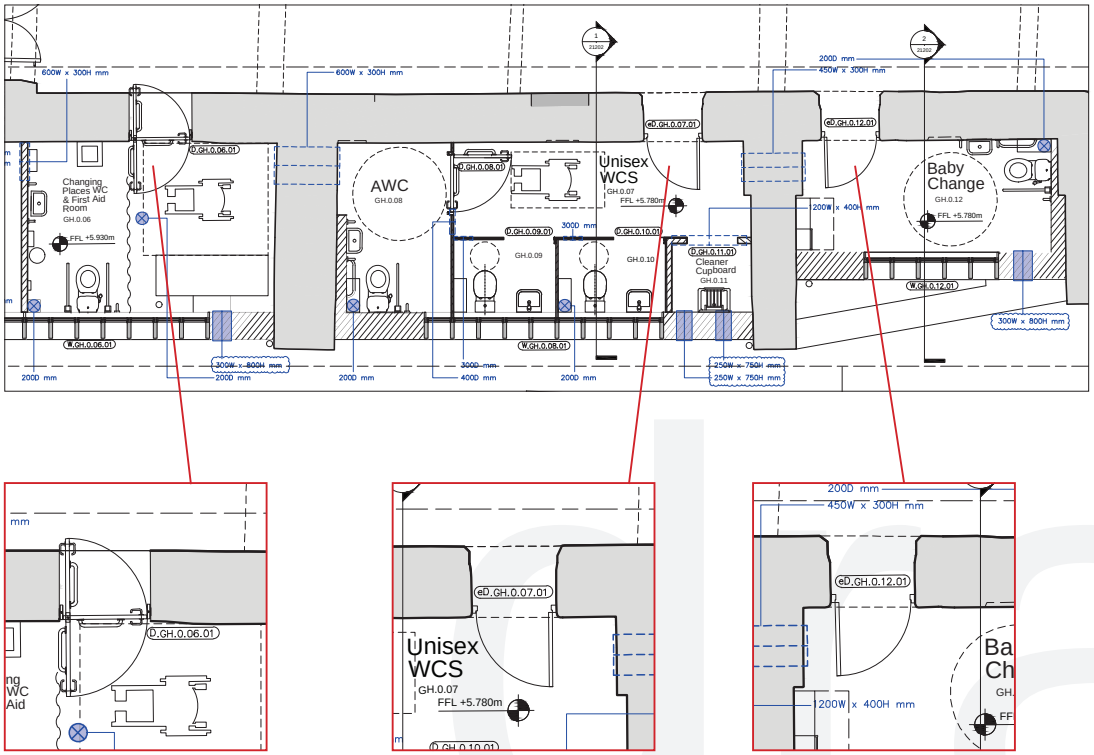

Fig 11 Proposed Guildhall WCs door reveals

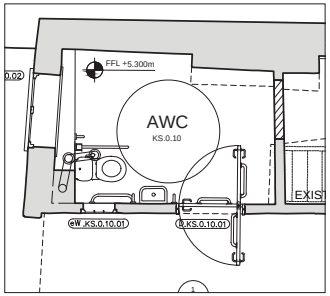

Fig 12 AWC No29

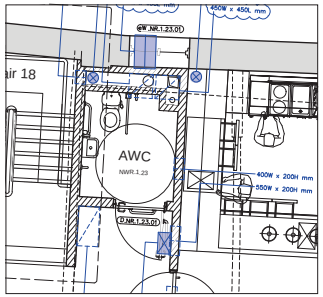

Fig 13 AWC restaurant

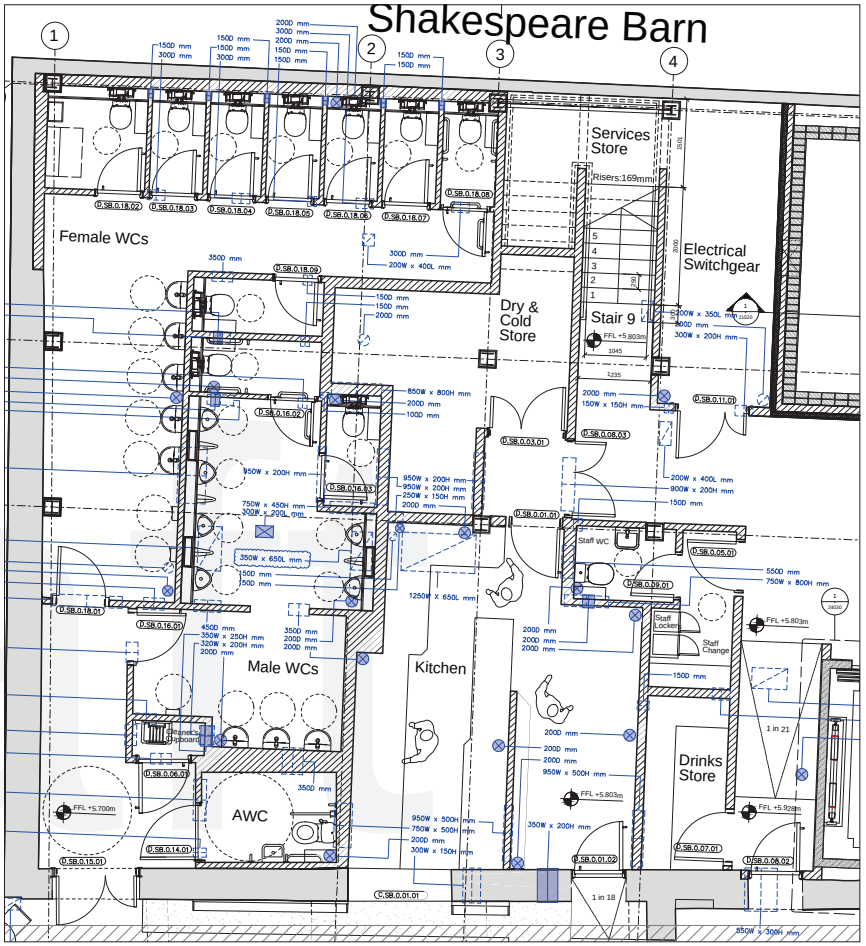

Fig 14 Proposed cafe WCs and BoH

18	Refuges, basement flexible space	Egress from the basement flexible space will be via the platform lift, which will have its own battery back up and protected power supply. In the tunnel, the intended wheelchair refuge would be immediately after the slope, where a wheelchair user can await further assistance to be carried out via the new foyer stairs for final evacuation into the main courtyard.	This will be managed and acceptable as part of the fire strategy	
19	WCs standard, theatre	Tonal contrast information pending - walls, floors, fittings	FINAL DETAILS PENDING	
20	AWC, theatre	AWC meets ADM layout ; there is a deep door reveal (existing structural walls) for the washroom but as the door frame is mounted on the inside wall with a 300mm space for door handle access so there is a 300mm space on the approach. The doors will not be automated.	This is acceptable as there will be a horizontal bar across the door and as there is no latch will make the door easy to push for wheelchair users.	
21	Changing Places WC (CPWC)	CPWC meets BS8300-2:2018 layout with a COW of 810mm; there is a deep door reveal (existing structural walls) but as the door frame is mounted on the inside wall with a 300mm space for door handle access on the approach. The doors will not be automated.	This is acceptable as patrons will be assisted., FINAL DETAILS PENDING- tonal contrast	
22	AWC, family room	FINAL DETAILS PENDING- tonal contrast/ fit out	FINAL DETAILS PENDING	
23	Restaurant WCs	FINAL DETAILS PENDING- tonal contrast/ fit out	FINAL DETAILS PENDING	
24	Creative Hub units	The various barns and stores around the courtyard will be refurbished to provide eight creative hub units. Some of the first floor units, near the restaurant, will remain stepped due to their existing condition and can only be reached via stair 14.	This can be managed as there are step-free ground floor units.	
25	Signage , WCs		FINAL DETAILS PENDING	

2. Appendix 1 | References for inclusive design

A1.1 Legislation

- **Equality Act 2010**

The Equality Act 2010 ('the Act') combines and supersedes previous separate discrimination legislation (including the Disability Discrimination Act 1995 as amended ('the DDA') and the disability discrimination provisions of SENDA 2001 for England, Wales and Scotland. People are protected from discrimination and harassment based on 'protected characteristics'; victimising anyone as a result of action taken in connection with the Act is also unlawful. There are nine different protected characteristics under the Act which have different levels of protection depending on the context (such as employment, provision of goods and services or the provision of education). This Access Statement focuses on the protected characteristic of disability; the definition of disability is essentially the same as under the DDA.

The types of discrimination that can arise in relation to disability are:

- Direct disability discrimination;
- Indirect disability discrimination;
- Treating disabled people unfavourably because of something arising in consequence of their disability without justification; and
- A failure to make reasonable adjustments for disabled people ('the RA duty'). The RA duty works in different ways depending on who requests the reasonable adjustments to be made, for example an employee or a member of the public.

The Act also provides protection for people who are treated less favourably because of their relationship with a disabled person (such as a carer) or for people treated less favourably because they are mistakenly believed to be disabled. A disabled person can always be treated more favourably than a non-disabled person.

If an employer is a listed public authority (such as a local authority) they will be subject to the public sector equality duty. If the employer is not a public authority but carries out a public function as part of its work, it will be covered by the general part of the equality duty in relation to the exercise of that function.

The public sector equality duty seeks to promote equality from within an organisation and the general duty requires the organisation to have due regard to the need to:

- Eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by the Act;
- Advance equality of opportunity between persons who share a relevant protected characteristic and those who do not; and
- Foster good relations between persons who share a protected characteristic and those who do not.

Due regard must be given to these three aims when undertaking procurement and to comply with procurement law, consideration must be given to the extent to which equality considerations are relevant and proportionate to the subject matter of the contract.

Most of the listed public authorities are also subject to the specific duty (which operates slightly differently in England and Wales). This involves reporting requirements to demonstrate compliance with the three aims of the general duty. The public sector equality duties are relevant both to the design and the management of the built environment.

The Reasonable Adjustment Duty and specific building provisions

The Equality Act does not contain any specific requirements for the built environment and therefore has no relevance to 'compliance' in respect of physical building standards.

Statutory Consents

When considering a reasonable adjustment to a physical feature, the Act does not override the need to obtain consents such as planning permission, building regulations approval, listed building consent, scheduled monument consent and fire regulations. If the consent is not given, there is still a duty to consider a reasonable means of avoiding the feature.

- Planning Act 2008, HMSO, 2008
- Disability Discrimination Act 2005, HMSO, 2005
- The Chronically Sick and Disabled Persons Act 1970, Department of Health, 1970
- Regulatory Reform (Fire Safety) Order 2005

A1.2 Regulations and Standards

Building Regulations 2010

- **Approved Document M (Access to and use of buildings) – Volume 2: Building other than dwellings,** HMSO, 2015 edition;
- **Approved Document B (Fire safety) – Volume 2 - Buildings other than dwellinghouses** (2006 edition incorporating 2010 and 2013 amendments)
- **Approved Document K - Protection from falling, collision and impact,** HMSO, 2013.
- Emerging amendments to AD Part M and new AD **Part T : Requirement T1: Toilet accommodation, 2023**

Regulations require Building Control approval. The Regulations make clear that designs other than those shown in the document can be approved if they are justified as being equally or more effective. Approval confers acceptance that the building meets

all reasonable standards in respect of physical access for disabled people with regard to the Equality Act.

National Planning Policy

- **National Planning Policy Framework (NPPF),** Department for Communities and Local Government, 2012

The NPPF states that all developments should be designed to be inclusive and that this should be addressed by local policies. It also advises that local planning authorities should assess their housing requirements by considering the needs of the different groups in the community including children, older people and disabled people.

- **Town and Country Planning** (Development Management Procedure) (England) Order 2015, Article 9

A1.3 References

British Standards

BS 8300:2009 (Amended 2010) Design of Buildings and their approaches to meet the needs of disabled people. Code of practice, British Standards Institution, 2010.

BS 9999:2008 Code of practice for fire safety in the design, management and use of buildings, British Standards Institution, 2008.

BS 9266:2013 Design of accessible and adaptable general needs housing. Code of practice, British Standards Institution, 2013.

BS 5656-2:2004 Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Accessibility to lifts for persons including persons with disability, British Standards Institute, 2004.

DD CEN/TS 15209:2008 Tactile paving surface indicators produced from concrete, clay and stone, British Standards Institution, 2008.

BS 7997:2003 Products for tactile paving surface indicators, British Standards Institution, 2003.

*BS 5395-1:2010 Stairs. Code of practice for the design of stairs with straight flights and winders***,** British Standards Institution, 2010.

*BS 7000-6:2005 Design Management Systems. Managing inclusive design. Guide***,** British Standards Institution, 2005.

BS 5499-4:2013 Safety signs. Code of practice for escape route signing, British Standards Institution, 2013.

*BS 8501:2002 Graphical symbols and signs. Public information symbols***,** British Standards Institute, 2002.

*BS EN 81-28:2003, Safety rules for the construction and installation of lifts. Remote alarm on passenger and goods passenger lifts***,** British Standards Institution, 2003

*BS EN 81-41:2010, Safety rules for the construction and installation of lifts. Special lifts for the transport of persons and goods. Vertical lifting platforms intended for use by persons with impaired mobility***,** British Standards Institution, 2010

*BS EN 81-70:2003, Safety rules fir the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Accessibility to lifts for persons including persons with disability***,** British Standards Institution, 2003

Access Statements

Guidance on Information Requirements and Validation, Department for Communities and Local Government, 2010.

Design and Access Statements: How to Write, Read and Use Them, Commission for Architecture and the Built Environment (CABE), 2006.

Planning and Access for Disabled People, ODPM, 2003.

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Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure, Oxley P., Department for Transport, 2002.

Improving Walkability: Good Practice Guidance on Improving Pedestrian Conditions as Part of Development Opportunities, Transport for London, 2005.

Guidance on the Use of Tactile Paving Surfaces, Department for Transport 2007.

Traffic Advisory Leaflet 5/95 Parking for Disabled People, Department for Transport, 1995.

Planning Policy Guidance 13: Transport, Department for Communities and Local Government, 2011.

Shared Space: Local Transport Note 1/11, Department for Transport, 2011.

Inclusive urban design: Streets for life, Architectural Press, 2006.

Inclusive Urban Design: A guide to creating accessible public spaces, David Bonnett Associates, BSI, 2013

Signage, Lighting And Wayfinding

The Colour, Light and Contrast Manual: Designing and Managing Inclusive Built Environments, Bright K., Cook G., Wiley-Blackwell, 2010.

Sign Design Guide: a guide to inclusive signage, JMU and the Sign Design Guide, 2000.

Buildings

Building inclusion : Physical access guidance for the arts. Arts Council 2013

Building Sight: a Handbook of Building and Interior Design Solutions to Include the Needs of Visually Impaired People, Barker, Barrick and Wilson, RNIB/ HMSO, 1995.

Making Existing Buildings Accessible: Museums and Art Galleries. Cave, Adrian. London: RIBA, 2007

Technical Standards for Places of Entertainment, The Association of British Theatre Technicians, Entertainment Technology Press, 2013

Signage, lighting and wayfinding

The Colour, Light and Contrast Manual: Designing and Managing Inclusive Built Environments, Bright K., Cook G., Wiley-Blackwell, 2010.

Sign Design Guide: a guide to inclusive signage, JMU and the Sign Design Guide, 2000.

Office and commercial

Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice L24, HSE Books ,1992.

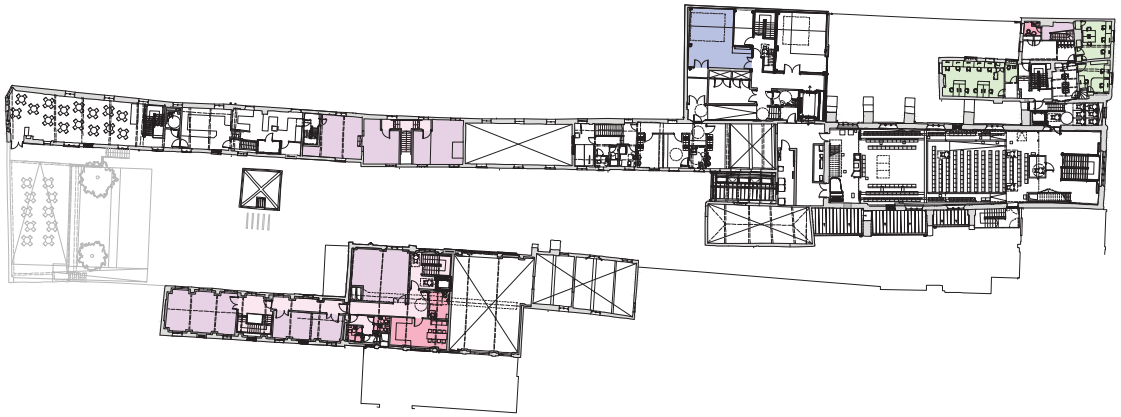
The Accessible Office: Designing the Inclusive Workplace, JMU Access Partnership, Royal National Institute of Blind People, 2005.

J. Creative Hub Area Schedule

St George's Guildhall, King's Lynn
Creative Hub Area Provision - Stage 4

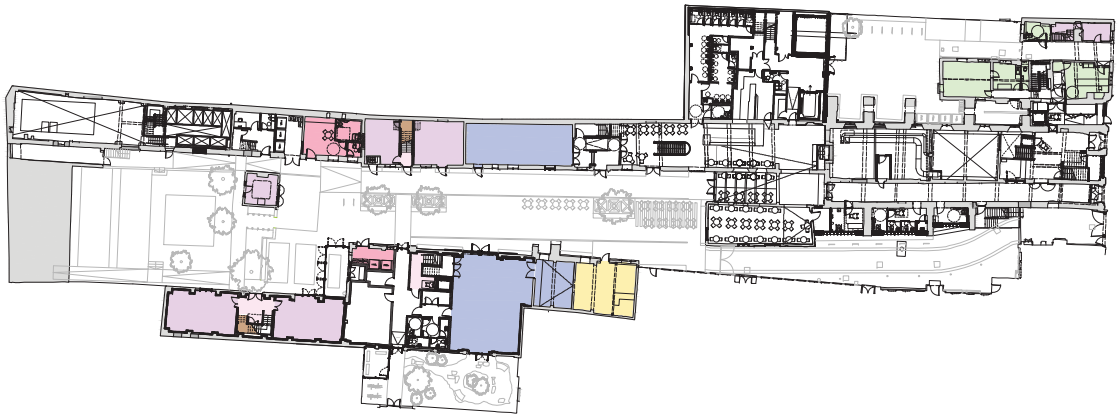
FIRST FLOOR AREA:

Tenant Lettable Creative Hub:	189m2
Communal Support Space:	41m2
Stairs and Circulation:	83m2
Flexible Event Space:	43m2
Storage:	0m2
Retail:	0m2
Administrative Space:	68m2
Administrative circulation:	55m2



GROUND FLOOR AREA:

Tenant Lettable Creative Hub:	162m2
Communal Support Space:	41m2
Stairs and Circulation:	22m2
Flexible Event Space:	192m2
Storage:	7m2
Retail:	45m2
Administrative Space:	67m2
Administrative circulation:	12m2



TOTAL AREA:

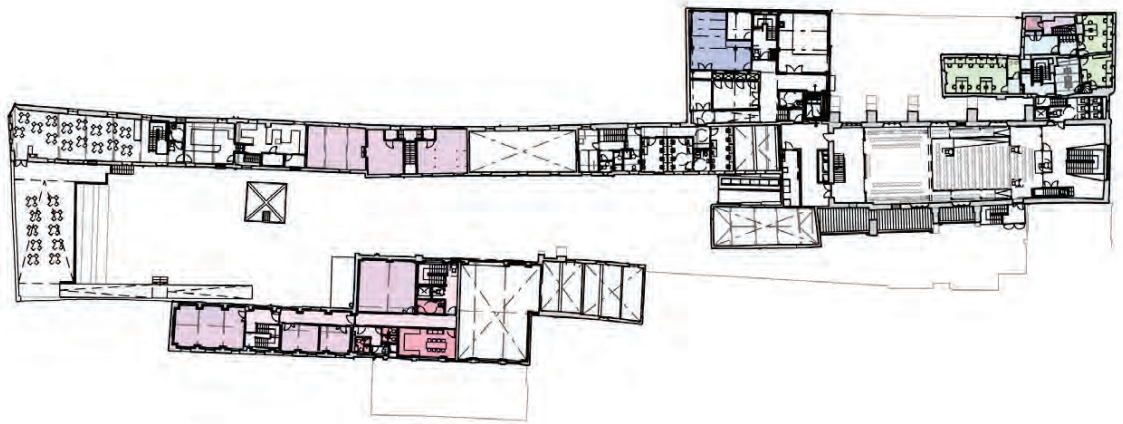
Tenant Lettable Creative Hub:	351m2
Communal Support Space:	82m2
Stairs and Circulation:	105m2
Flexible Event Space:	235m2
Storage:	7m2
Retail:	45m2
Administrative Space:	135m2
Administrative circulation (No. 29):	77m2

Grand Total:	1037m2
Total: (excluding No. 29Administrative)	825m2
Brief Target:	669m2

St George's Guildhall, King's Lynn
Creative Hub Area Provision - Stage 3

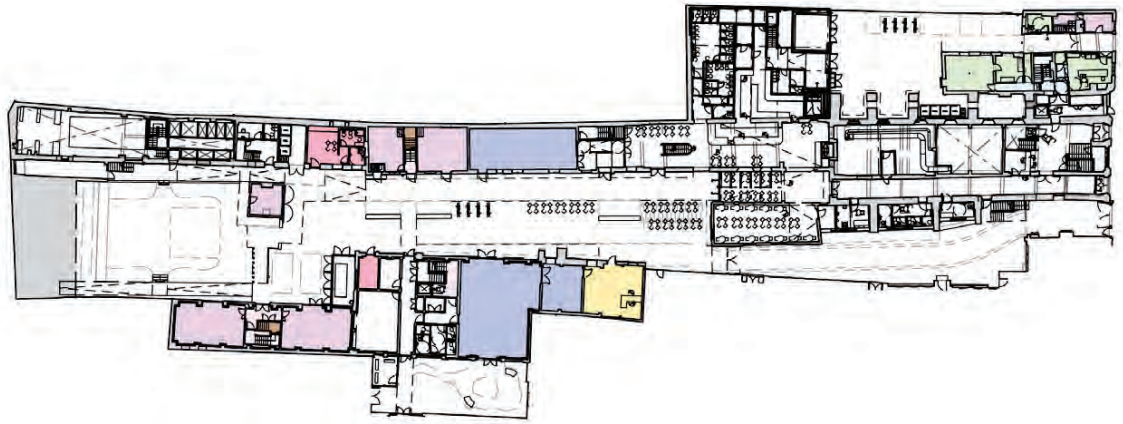
FIRST FLOOR AREA:

Tenant Lettable Creative Hub:	201m2
Communal Support Space:	38m2
Stairs and Circulation:	84m2
Flexible Event Space:	41m2
Storage:	0m2
Retail:	0m2
Administrative Space:	68m2
Administrative circulation:	55m2



GROUND FLOOR AREA:

Tenant Lettable Creative Hub:	163m2
Communal Support Space:	39m2
Stairs and Circulation:	22m2
Flexible Event Space:	194m2
Storage:	7m2
Retail:	43m2
Administrative Space:	67m2
Administrative circulation:	12m2



TOTAL AREA:

Tenant Lettable Creative Hub:	364m2
Communal Support Space:	77m2
Stairs and Circulation:	106m2
Flexible Event Space:	235m2
Storage:	7m2
Retail:	43m2
Administrative Space (No. 29):	135m2
Administrative circulation (No. 29):	77m2

Grand Total:	1044m2
Total: (excluding No. 29Administrative)	832m2
Brief Target:	669m2

St George's Guildhall, King's Lynn
Creative Hub Area Provision - Summary of change between Stage 3 & 4

STAGE 3		STAGE 4		Notes
TOTAL AREA:		TOTAL AREA:		
Tenant Lettable Creative Hub:	364m2	Tenant Lettable Creative Hub:	351m2	Minor area reduction due to new restaurant plant access stair requirement in North Range
Communal Support Space:	77m2	Communal Support Space:	82m2	Minor area increase due to adjusted sizes of WC & shower accommodation to meet accessibility standards
Stairs and Circulation:	106m2	Stairs and Circulation:	105m2	No significant change
Flexible Event Space:	235m2	Flexible Event Space:	235m2	No change
Storage:	7m2	Storage:	7m2	No change
Retail:	43m2	Retail:	45m2	No significant change
Administrative Space (No. 29):	135m2	Administrative Space:	135m2	No change
dministrative circulation (No. 29):	77m2	dministrative circulation (No. 29):	77m2	No change
Grand Total:	1044m2	Grand Total:	1037m2	
Total: (excluding No. 29Administrative)	832m2	Total: (excluding No. 29Administrative)	825m2	
Brief Target:	669m2	Brief Target:	669m2	

K. Max Fordham Specialist Lighting
Stage 3 Report

St Georges Guildhall

Redevelopment & Creative Hub Project

Stage 3 Report

13/02/25

MAX FORDHAM

Contents

MAX FORDHAM

Lighting and St Georges Guildhall

MAX FORDHAM

Evolution of artificial lighting throughout St Georges Guildhall timeline

MAX FORDHAM

Medieval Period 1066-1485

Construction of the Guildhall 1406 - 1437. Theatrical performance took place from the earliest period

Use of daylight, candles, torches, and oil lamps

Early Modern Period 1485 - 1750

Addition of window in North wall to increase daylight on stage area. Possible performance by Shakespeare's company the Earl of Pembroke's Players in 1592

Use of daylight. Use of candelabras and refinements in candle making

Early Modern Era to late 1700s

Adaptation of the hall for use by the corporation including performance

William Murdoch uses gas lighting in his home in Cornwall 1792

Late Early Modern to Modern Era 1766 - 1816

Formal conversion of space into a theatre in 1766

1802 Humphry Davy invents the first electric light, known as the arc lamp. 1816 gas lighting starts to be used in theatres

Modern Era 1814 – 1945

Closure of the theatre

1840 Sir William Robert Grove develops the first incandescent lamp. Edison patents the first practical lamp in 1879

Modern Era 1927 - 1950s

Restoration of the theater 1949 – 1951, Existing candelabra introduced into building in 1953

1927 Patent of the first fluorescent lamp by Edmund Germer. 1950s invention of the first visible spectrum light emitting diode

Modern Era 1950s to Present

Alterations to the auditorium 1962. Candelabra re-lamped with replacement LED lamps?

Shuji Nakamura creates a high-brightness blue LED leading to the development of white LEDs. Adoption of LED lighting from early 2000s leading to the ban of tungsten and fluorescent light sources

St Georges Guildhall – Performance Lighting

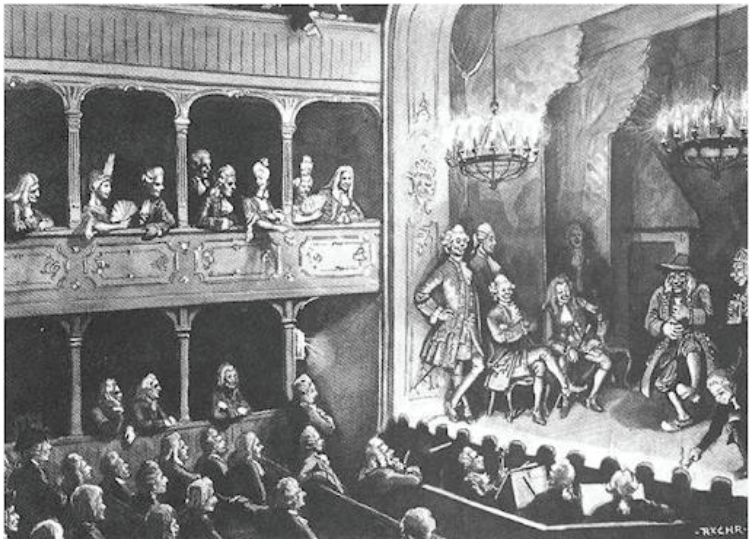
St George's Guildhall was used for theatre from Medieval times and visited by Shakespeare's company the Pembroke's Players in 1593.

Candlelight or oil lamps would not have provided enough illumination to light the performers on stage after dark and as such, performance would have generally occurred during the hours of daylight.

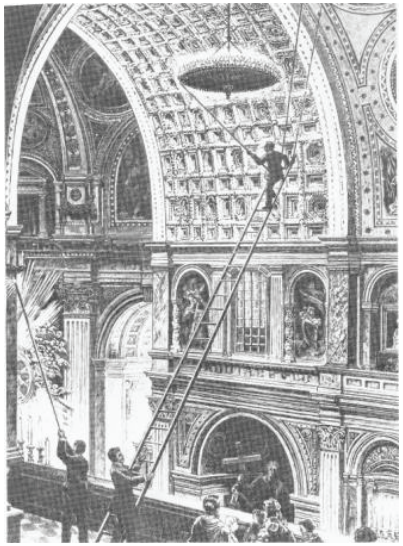
Records do however exist showing the purchase of a large quantity of candles, indicating that there were possibly evening performances.

Evidence suggests that a large window was inserted into the North wall pre 1660s to provide increased daylight to the stage area.

The first possible recording of the current candelabra could be from the 1953 during the restoration carried out by Marshall Sisson, right.



Candles started to be used to light theatres in the late 1500's however, hundreds of candles would have been required to light a stage, causing oxygen depletion and the possibility of hot wax dropping onto performers



Accessing candles in candelabras could be quite a task

Contemporary performance illuminated by (LED) candlelight still requires thousands of candles (and the house lighting being on)

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St Georges Guildhall – Existing Lighting

Location: Kings Lynn
Built: 1406-1437

Original Lighting for performance:
- Daylight

Current Lighting:
- Daylight
- Medieval style candelabras with LED? Lamps, poss. dating from 1950s.

Pros:
- Candelabras familiar to the local audience
- Could be re-used elsewhere

Cons:
- Low ambient light levels
- Architectural features of the space are not illuminated
- Access to candelabras over seating area is difficult
- Little flexibility
- Low quality manufacturing – welds and wiring visible, not self supporting

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Precedent projects

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Penshurst Place Great Hall

Location: Penshurst, Tonbridge
Built: 1341

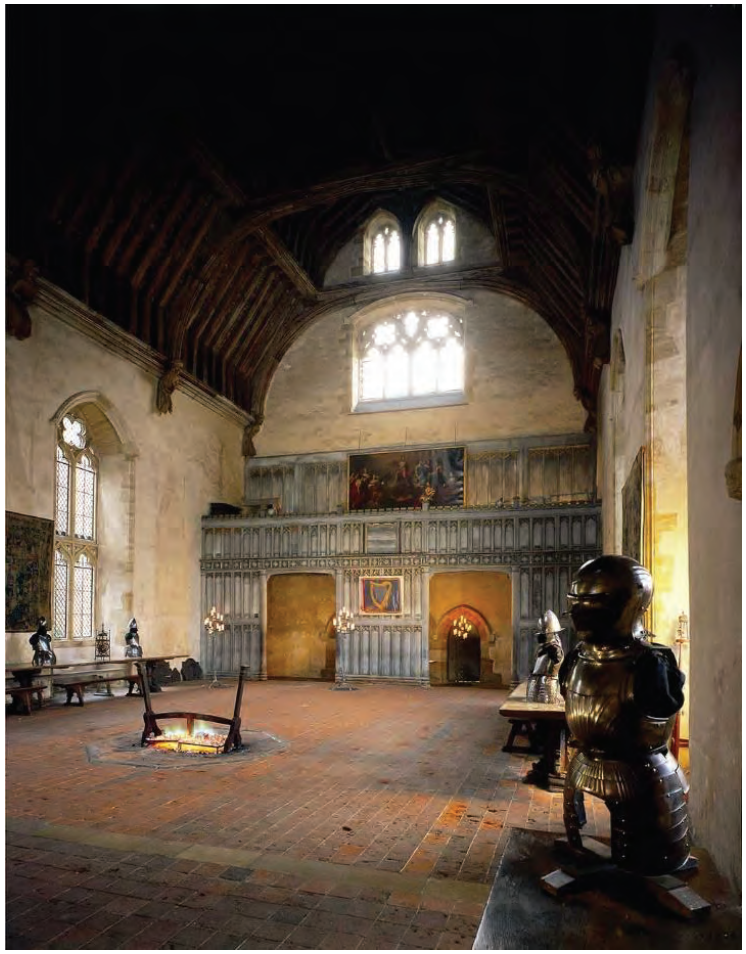
Original Lighting:
- Daylight
- Candlelight
- Central open fire

Current Lighting:
- Daylight
- Floods mounted at high level illuminating the ceiling.
- Colour change spotlights brought in for events.
- Central open fireplace
- Candlelight

Pros:
- Very minimal artificial lighting

Cons:
- Space has limited use at night due to extremely low ambient lighting. Possibly restricted to dining events where candlelight is suitable on tables

Banquet in the Baronial Hall, Penshurst Place
Joseph Nash, 1838



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Haddon Hall

Location: Derbyshire
Built: 1370

Current Lighting:
- Date of pendants is unknown, but unlikely to be original.
- Chandelier type pendants behind screen
- Surface mounted uplights illuminate some tapestries.

Pros:
- Style of pendant is consistent with the architecture

Cons:
- With the extent of artificial lighting, it will likely feel gloomy at night.

Twelfth Night Revels in the Great Hall, Haddon Hall, Derbyshire Joseph Nash, 1838

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York Guildhall - Current Lighting

Location: York
Built: 1445
Re-opened: 2022

Current Lighting:
- Surface mounted downlights in ceiling
- Column mounted uplights and downlights
- Commercial styled direct/ indirect pendants to side-isles
- Integrated architectural lighting to screen

Pros:
- The space is well-lit, and provides flexible illumination for a wide range of different events

Cons:
- The style of the pendants is not in keeping with the architecture
- The column mounted up/ downlights are very visible

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St. Mary's Guildhall - Current Lighting

Location: Coventry
Built: 1342

Current Lighting:
- Current lighting as shown in the image is contemporary and not original to the building.
- Uplights placed at the back of the room between the vertical timbers washing light up the walls and ceiling.
- Suspended lanterns above the doors
- Surface-mounted wall lights providing ambient lighting and possibly contribute to uplighting of the ceiling
- Inground uplights between the radiators uplight the ceiling.

Pros:
- The vertical surfaces and ceiling are well lit

Cons:
- The uplights at floor level cause glare.
- Not much light at ground level

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St Georges Guildhall – Interior and Exterior Entrance Lighting Concepts

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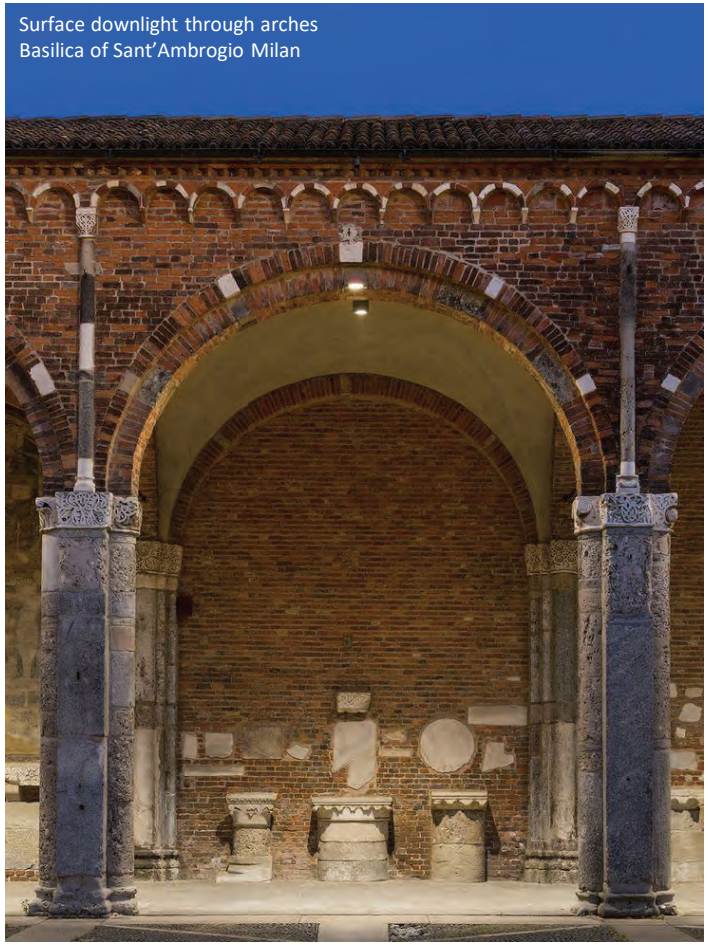
Main Entrance Exterior Inspiration

Framing uplight,
Corpus Christi College Cambridge



Surface downlight through arches
Basilica of Sant'Ambrogio Milan

Halo illuminated signs

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Main Entrance Exterior Visual

Lighting principles

- Well lit vestibules create an inviting entrance. Lighting bleeding from within creates visual interest for the public passing by.
- Flexible lighting within the window display with a well illuminated backdrop to create clear vistas through the vitrine and into the space.
- Signage backlit, subtly highlighting the external signage.

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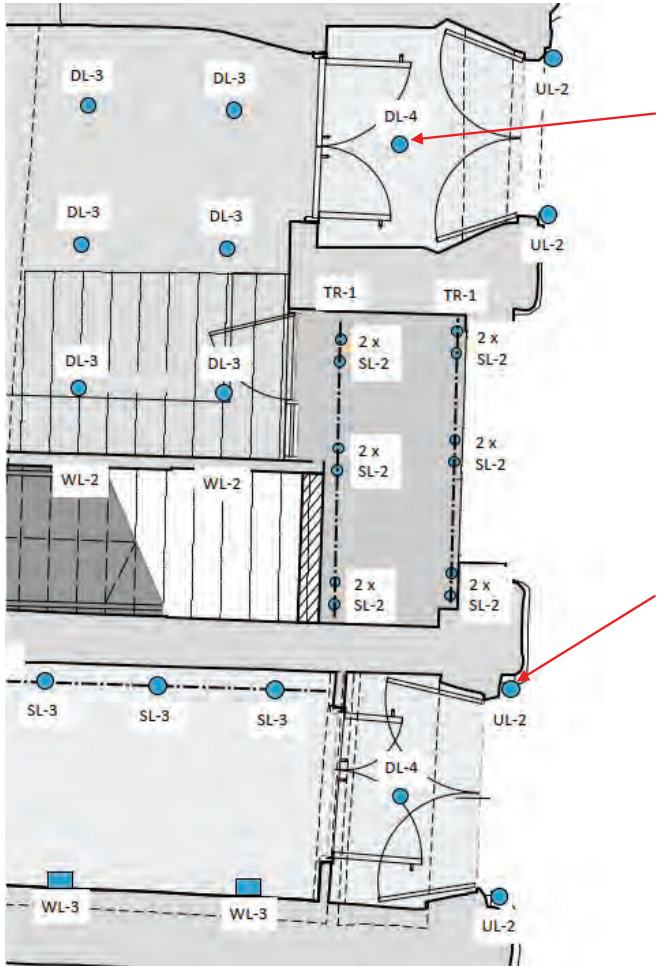
Main Entrance Exterior Concept



1. Surface mounted downlight within each entrance vestibule provides a welcoming ambient glow illuminating the interior surfaces. Spill light bleeds out through the threshold providing visual activity to passing public. Luminaire ideally not visible from outside.

Indicative deep recessed surface mounted low glare downlight, in bronze or RAL finish.

2. Inground darklight uplights to the exterior jambs frame the entrance providing a presence on the public street.

Indicative deep recessed darklight with low glare, in solid copper for natural patina finish.

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Entrance Reception Inspiration

Clear views through the display case to bright backdrop.
Westminster Abbey Queen's Diamond Jubilee Gallery

Surface mounted luminaires made from textured or mesh material in regular layout create sparkle and visual interest
Hotel Café Royal, London

Copper mesh

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Entrance Reception Visual

Lighting principles

- Integrated into the wood slat ceiling, decorative lamps provide general ambient lighting and a visual sparkle throughout the reception lifting the dark finished ceiling creating visual brightness.
- Emphasis to be created over the reception desk and seating areas that create focal beacons aiding wayfinding to welcome guests.
- The backdrop to the reception is to be well illuminated. A visually bright vertical surface enables views through from the window vitrine.

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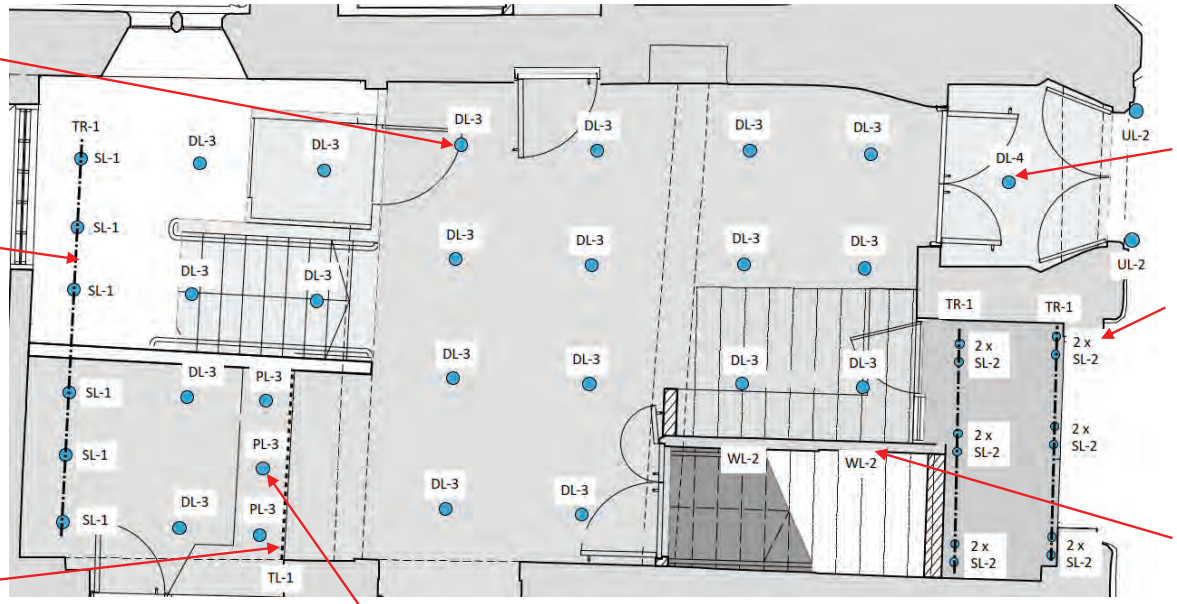
Entrance Reception Concept

1. An array of direct view decorative lights providing ambient light and visual interest.

2. Good vertical illumination to the back wall provides a bright backdrop seen from the window vitrine. A track system provides a flexible solution with wall washers & accent spots.

3. Accent lighting to the reception desk helps visually emphasize its' position. Downlights above the reception provides hidden functional lighting, or pendants can accent the desk with light and physical presence.



4. Decorating the reception desk allows it to stand out. Lighting integration or decorative table lamps provide additional task lighting and visual accent.

7. Surface mounted downlight within each entrance vestibule provides a welcoming ambient glow illuminating the interior surfaces. Spill light bleeds out through the threshold providing visual activity to passing public. Luminaire ideally not visible from outside.

6. Track & spot system providing flexible accent lighting can be concealed at high level. Vertical runs of track maybe used to provide additional coverage around the window frame.

5. Accent downlight to banquette provides a brighter seating area. Decorative wall sconces can provide a visual anchor & softer aesthetic to the nook.

Refined metallic material palette

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Guildhall Space inspiration

Decorative diffused lights providing ambient light & visual interest
Neville Holt opera

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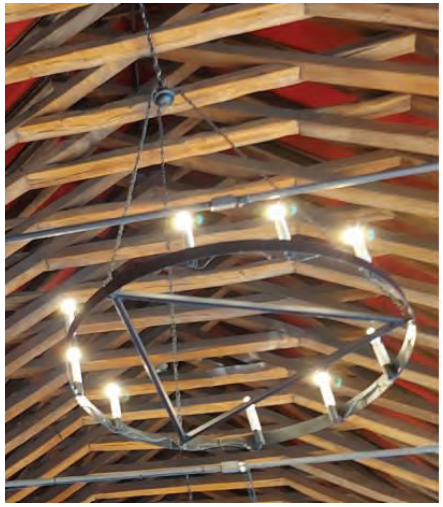
Guildhall Space Stair Inspiration



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Guildhall Stair Chandelier Options

Single circle - Small

Single circle - Large
(Preferred)

Double circle - Concentric

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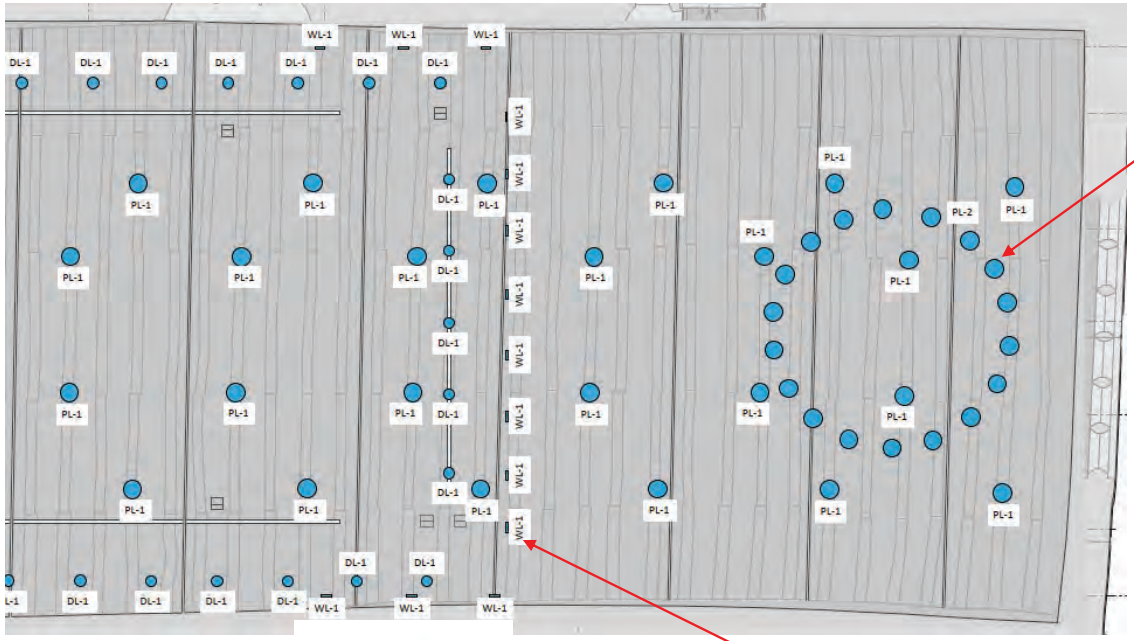
Guildhall Space Stair Concept – Single Circle Large (preferred)



1. Large scale decorative pendant above “lobby” space and stairs provides general ambient illumination. To be aesthetically linked to the main auditorium feature pendant light.

Small wall recessed floor washer. Square form with indirect light or round with direct light

2. Stairs and balcony tread illuminated with low level floor wash/graze. Treads can be individually accented with smaller products or several washed with a larger product placed at higher position.

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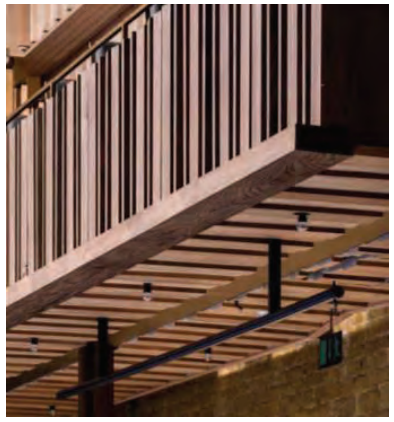
Guildhall Space Auditorium Inspiration

Decorative diffused lights providing ambient light & visual interest
Neville Holt opera



Surface mounted can downlight below balconies – family of mesh fittings, simple or texture finished options

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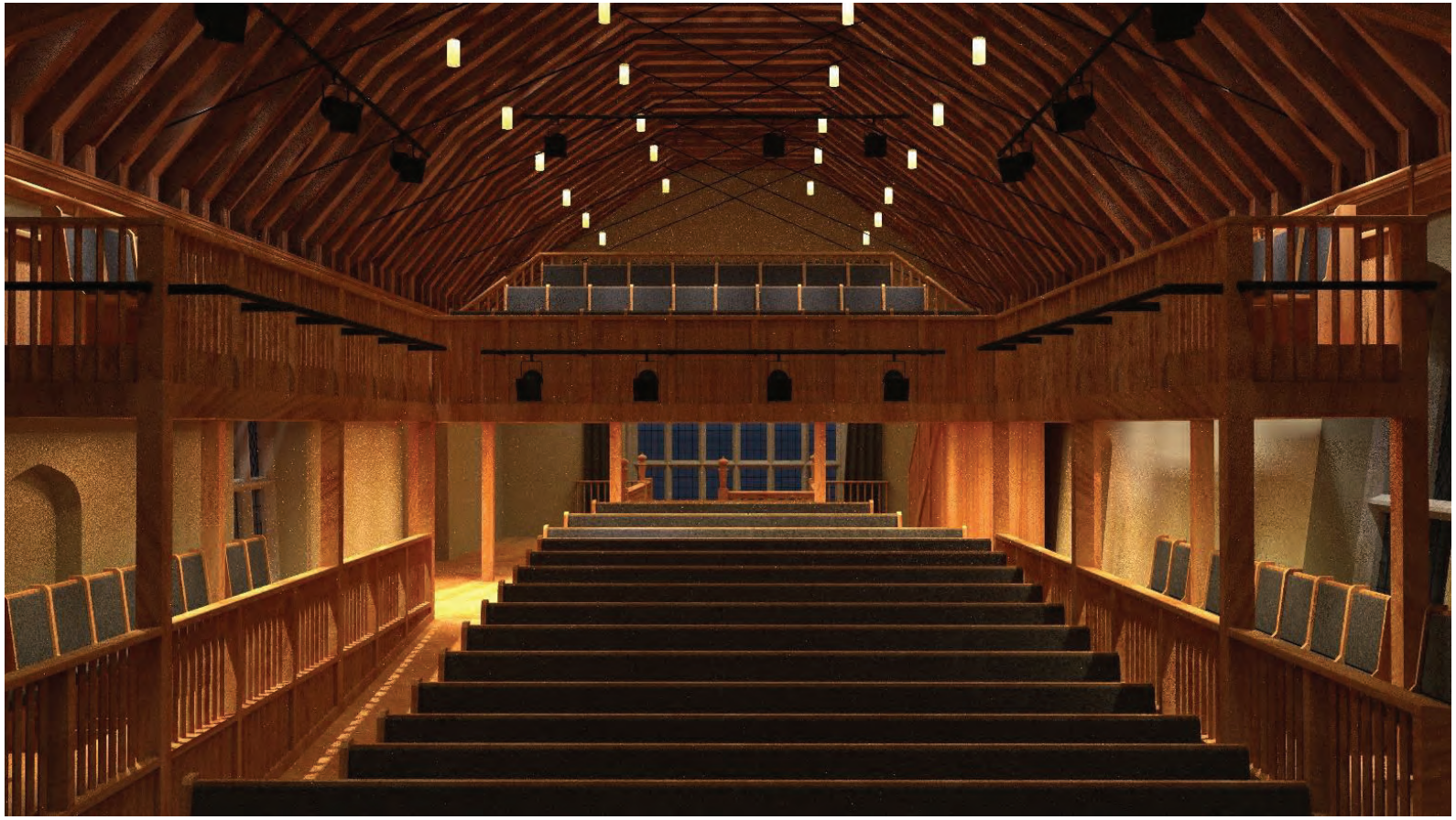
Guildhall Space Auditorium Visual- Linear Pendant Option (preferred)



Lighting principles

- Provide house lighting integrated within the fabric of the structure.
- Create visual interest throughout the space whilst enhancing the overall ambiance.
- Subtly emphasise the interior architecture.
- Linear pendant provides continuous feature the length of hall providing consistent levels of illumination whilst avoiding theatrical lighting

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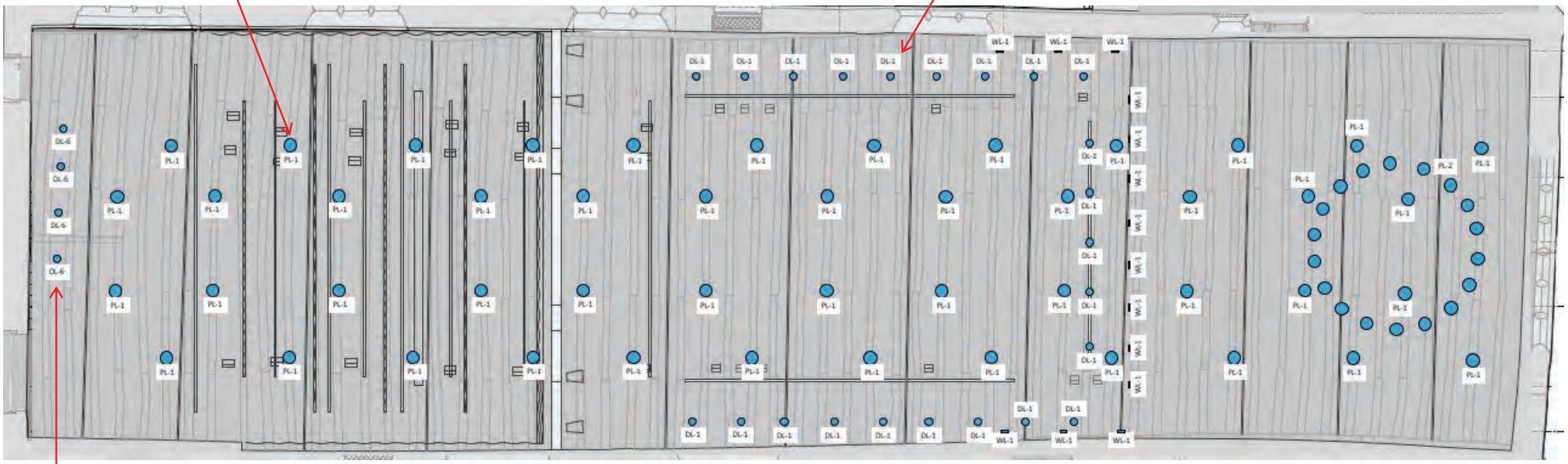
Guildhall Space Balcony & roof – Linear Pendant Option (preferred)

1. Large scale feature pendant expands across the auditorium. The diffused light source provide direct & indirect lighting subtly illuminating the roof structure.

2. Additional cleaning/ house lighting concealed up within rafters illuminates the balcony & ground level for cleaning and set-up as required.



3. Surface mounted downlight with narrow beam to illuminate the staircase underneath.

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Guildhall Space Auditorium Visual - Circular Pendant Option

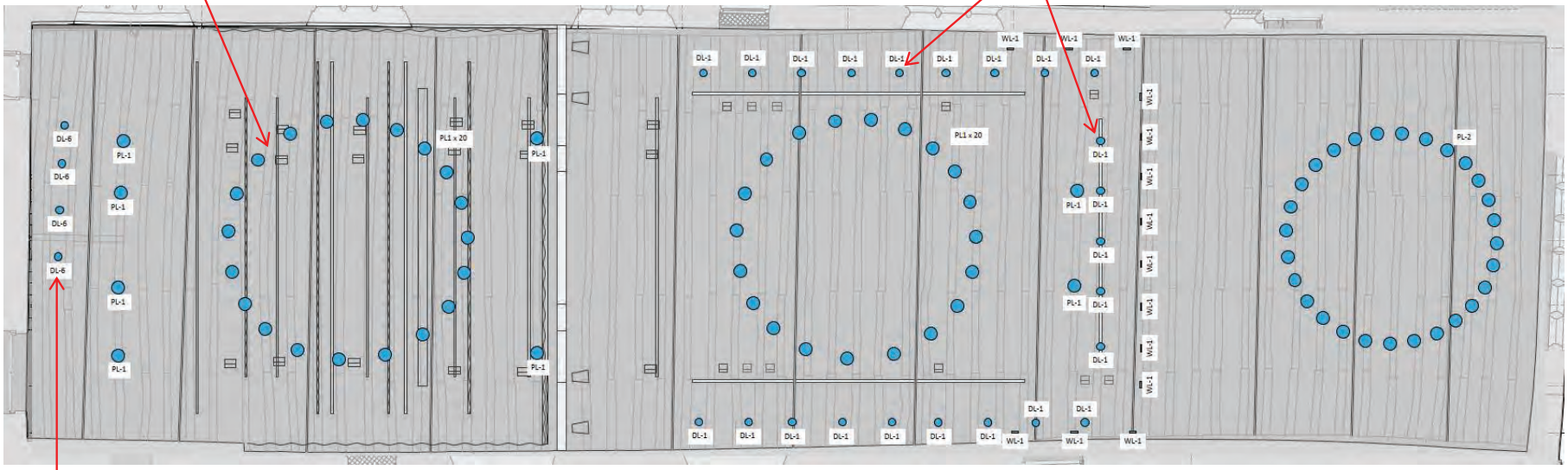
Lighting principles

- Provide house lighting integrated within the fabric of the structure.
- Create visual interest throughout the space whilst enhancing the overall ambiance.
- Subtly emphasising the interior architecture.
- Circular pendants provides good level of lighting over lower seating area
- Circular pendant very visible over stage

Guildhall Space Balcony & roof - Circular Pendant Option

1. 2 circular pendants similar to the existing suspended above the theatrical lighting . The diffused light source provide direct & indirect lighting subtly illuminating the roof structure.

2. House lighting concealed up within rafters illuminates the balcony & ground level for cleaning and set-up as required.



3. Surface mounted downlight with narrow beam to illuminate the staircase underneath.

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Guildhall Space Pendant Arrangement

Linear arrangement (preferred)

False colour render

Uniform distribution of light in seating areas and on beams and higher light levels on the balcony.

Circular arrangement

False colour render

Generally lower uniformity in seating areas and on beams and lower light levels on the balcony.
Circular pendant very visible above the stage

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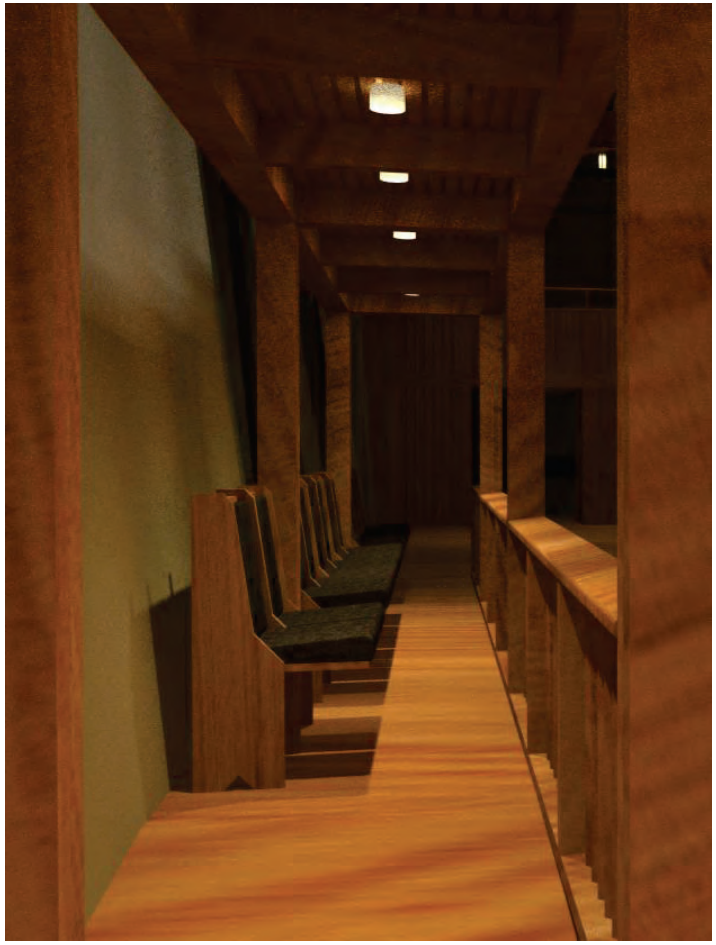
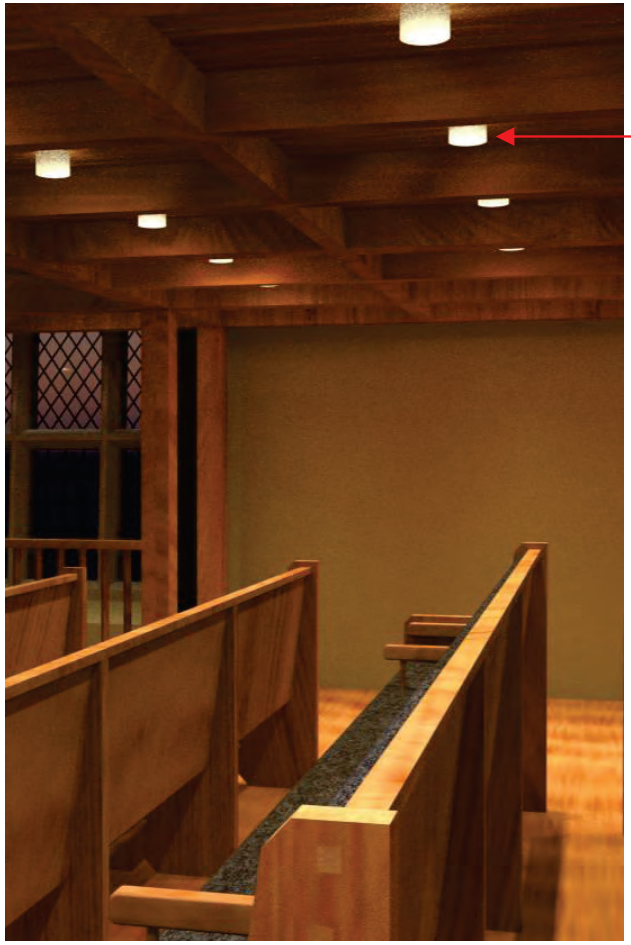
Guildhall Seating under balcony Visual





Recessed downlight with special copper mesh shroud .

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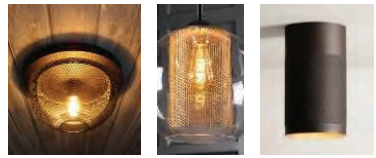
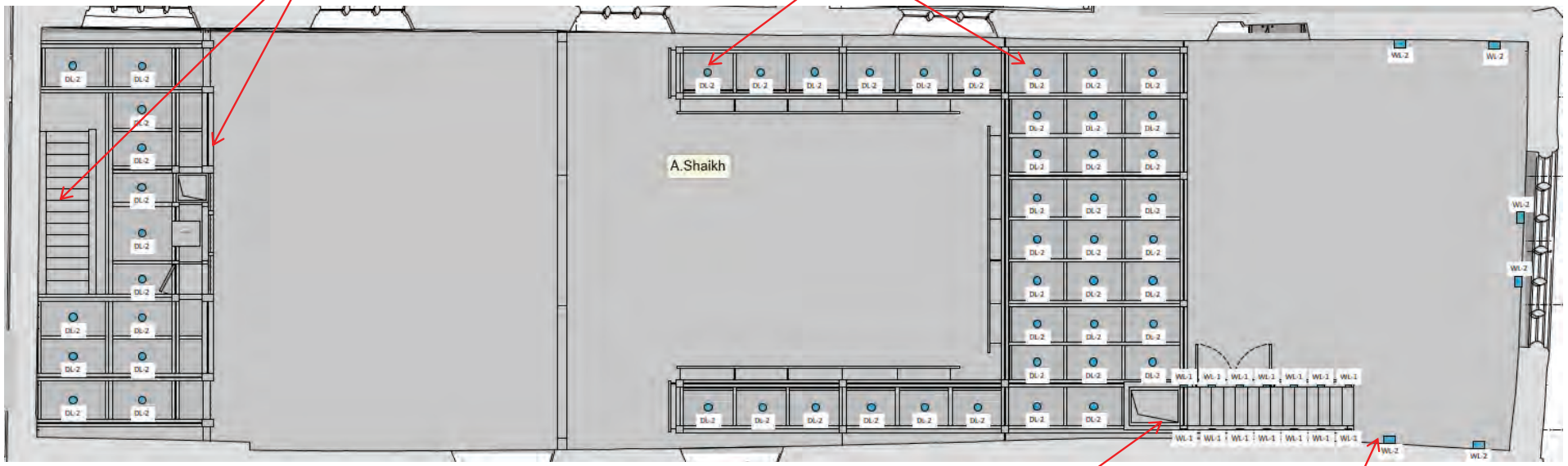
Guildhall Space Auditorium low level

1. Screen and stair illuminated from high level fittings in ceiling

2. Lighting to the underside of balcony level aesthetically tied to entrance reception. Decorative, direct view elements provide visual interest and ambient lighting.





3. Stairs illuminated with low level floor wash/graze. Several treads washed with a larger product placed at higher position.

4. Decorative wall sconces on half landing and along “lobby” perimeter.

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Guildhall Space Auditorium Balcony Access Visuals

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Guildhall Balcony Visual

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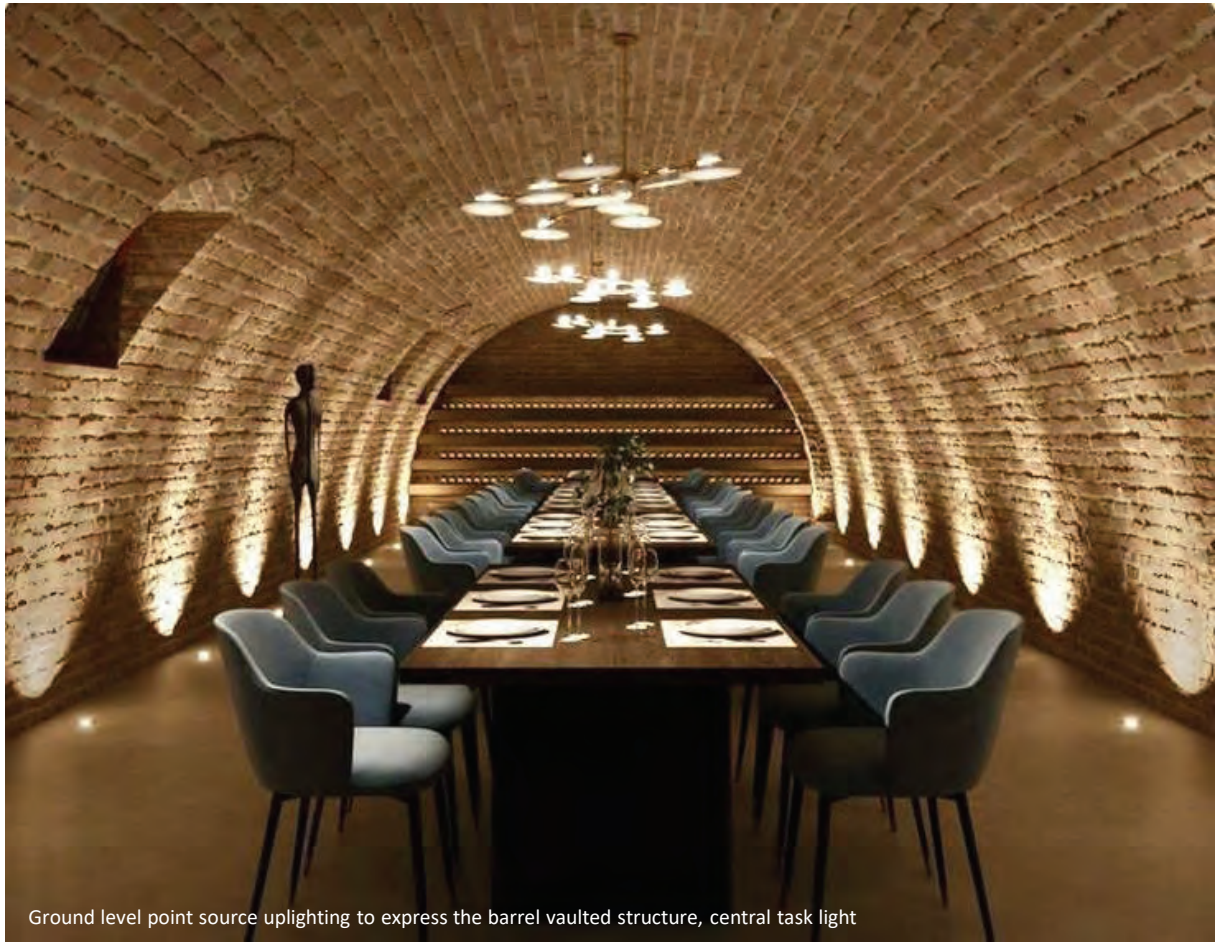
Undercroft Inspiration



Ground level point source uplighting to express the barrel vaulted structure, central task light

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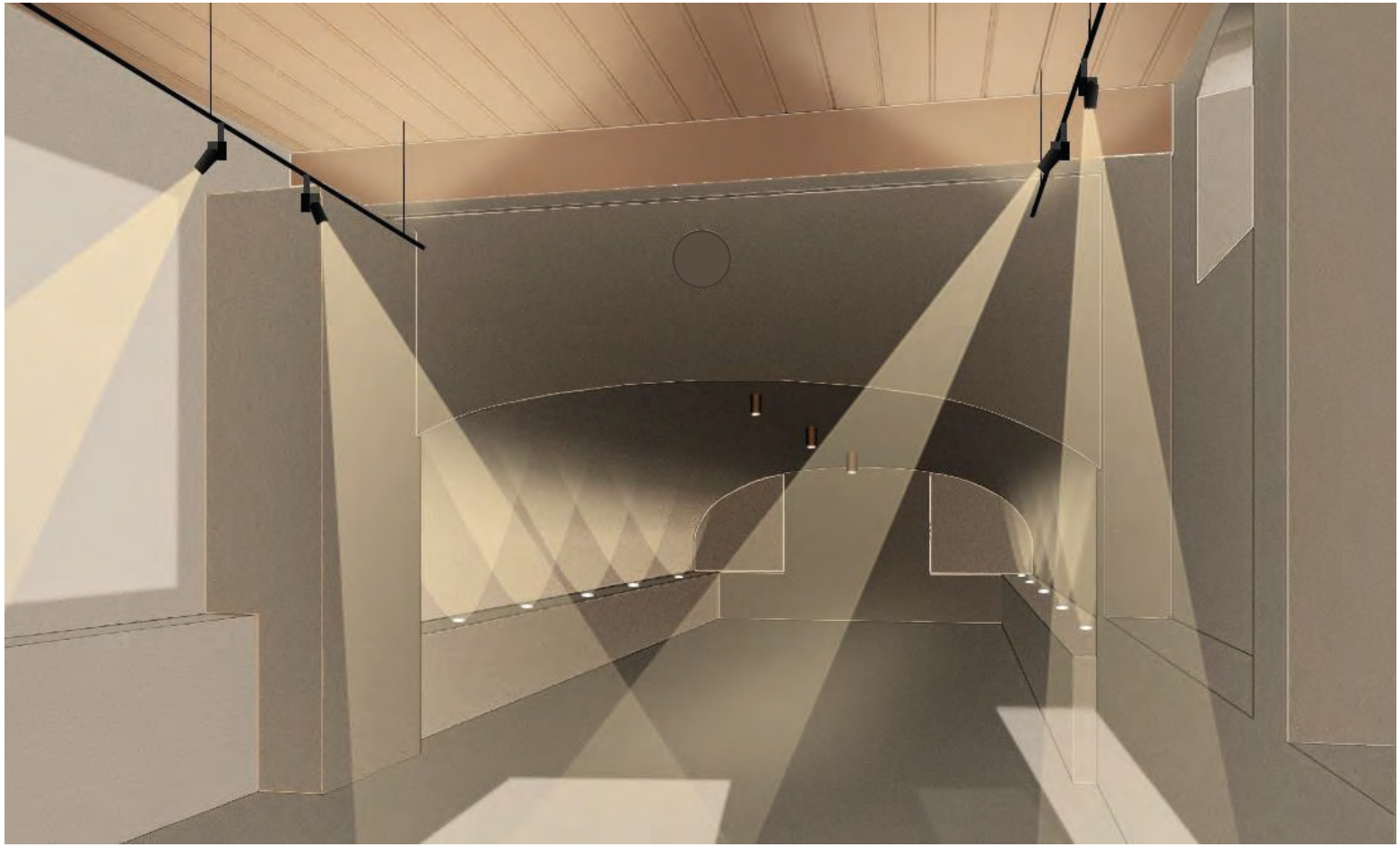
Undercroft Visual



Lighting principles

- Highlighting the barrel vault structure to lift the ceiling.
- Provide a forgiving or flexible lighting solution within the mixed-use space.
- Create an adaptable lighting scheme to accentuate various displays.
- Subtly emphasizing the interior architecture and building materials such as the wood beam ceiling and brick barrel vault.
- Use cracks between beams to suspend suspension wires through so architectural fabric remains intact.

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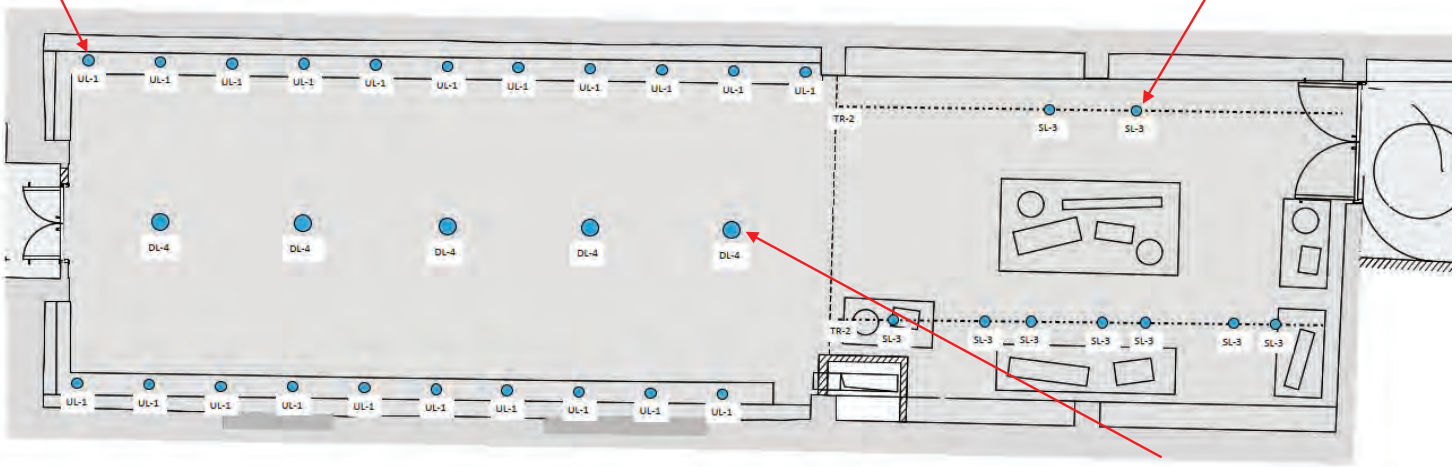
Undercroft Concept

1. Lighting integration along the perimeter edges highlight the barrel-vaulted ceiling. Point sources create a dramatic sculpted lit effect.

3. Super track & spot system providing flexible accent lighting to display cases and indirect ambient uplight lighting to highlight the wood beam ceiling.



2. A central lighting system at ceiling level provides functional task lighting to the space.
An ambient led approach can be achieved with diffused light sources with a more decorative aesthetic.
Alternatively a low profile track & spot can provide flexible accent & ambient light.

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St George’s Passage Inspiration

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St George's Passage Visual

Lighting principles

- Highlighting the timber ceiling
- Flexible track lighting system to illuminate exhibits and artwork on walls with the potential of adding linear uplighting and ambient downlighting fittings as required
- Wiring to fittings to be taken through existing gaps between timber ceiling slats, or designed as beautifully detailed visible surface mounted conduit

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St George's Passage Concept

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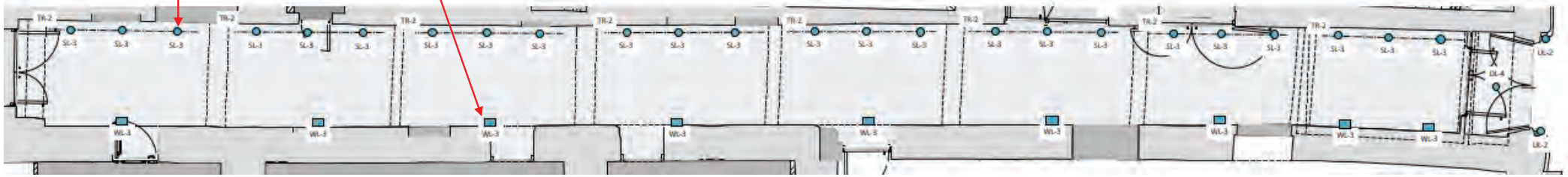
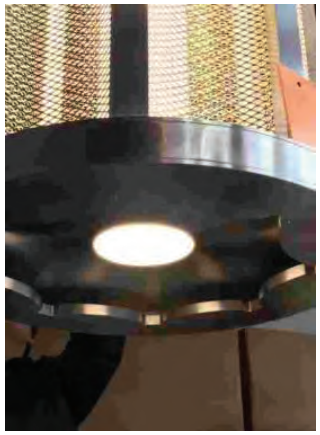
1. Track mounted from suspension points between timber slats, enables placement of spotlight fittings to illuminate exhibits. Flexibility of track system allows the introduction of uplighting and ambient downlighting to be added as required

2. Wall mounted uplight washes light across timber ceiling providing ambient light levels



Café Bar Inspiration



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Café Bar Concept

1. Sparkly surface mounted downlights provide general illumination

2. Decorative wall lights positioned adjacent to tables to provide ambient light levels on tables

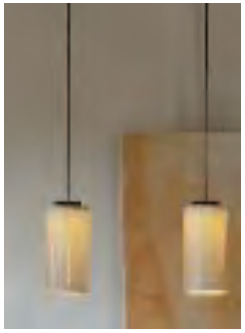
3. Special high output surface mounted downlights provide general illumination

4. Suspended glowing glass pendants, provide ambient light levels in café and over bar









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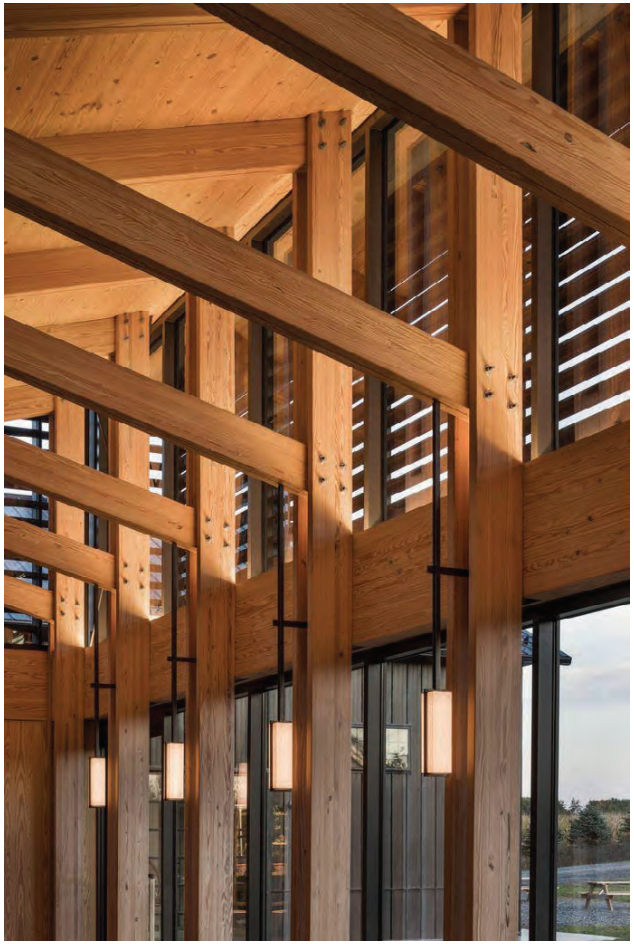
Foyer inspiration



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Foyer visual - Linear Option (preferred)

Lighting principles

- Suspend glowing glass pendants from beams to generally illuminate the space
- Possibility to integrate concealed linear uplight at base of roof to softly wash the ceiling

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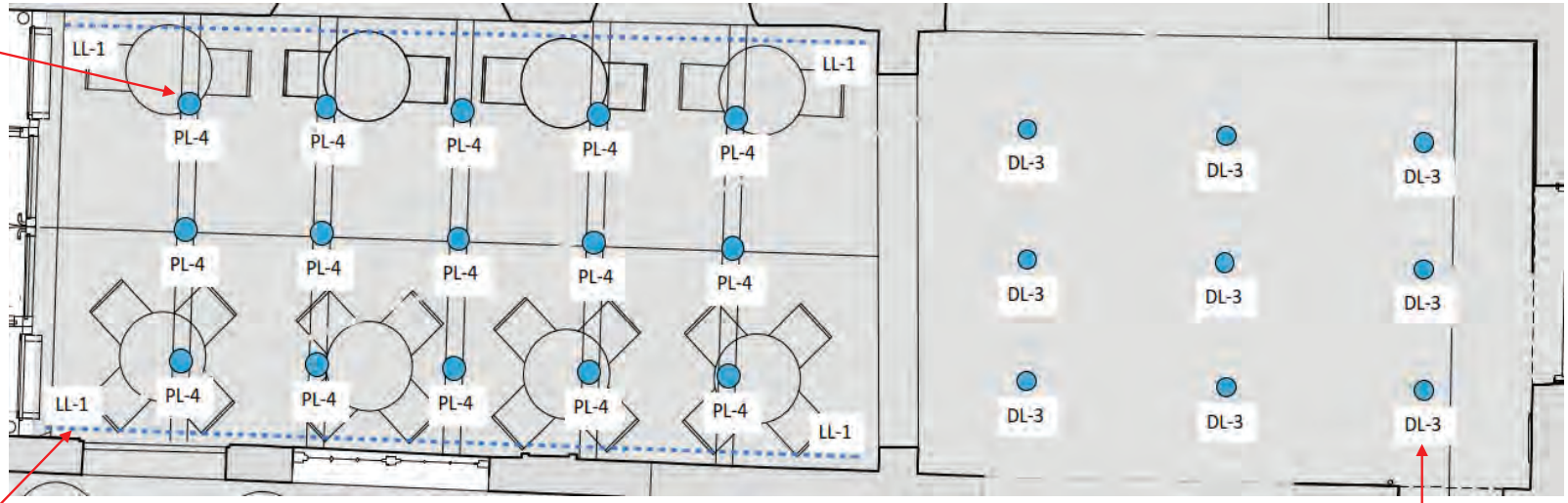
Foyer Concept - Linear Option (preferred)

1. Suspended glowing glass pendants provide ambient light levels



2. Possibility to integrate linear uplight into detail at base of ceiling to graze light up timber ceiling

3. Sparkly surface mounted downlights provide general illumination

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Foyer visual - Concentric Pendants Option

Lighting principles

- Suspend glowing glass pendants from beams to generally illuminate the space
- Possibility to integrate concealed linear uplight at base of roof to softly wash the ceiling

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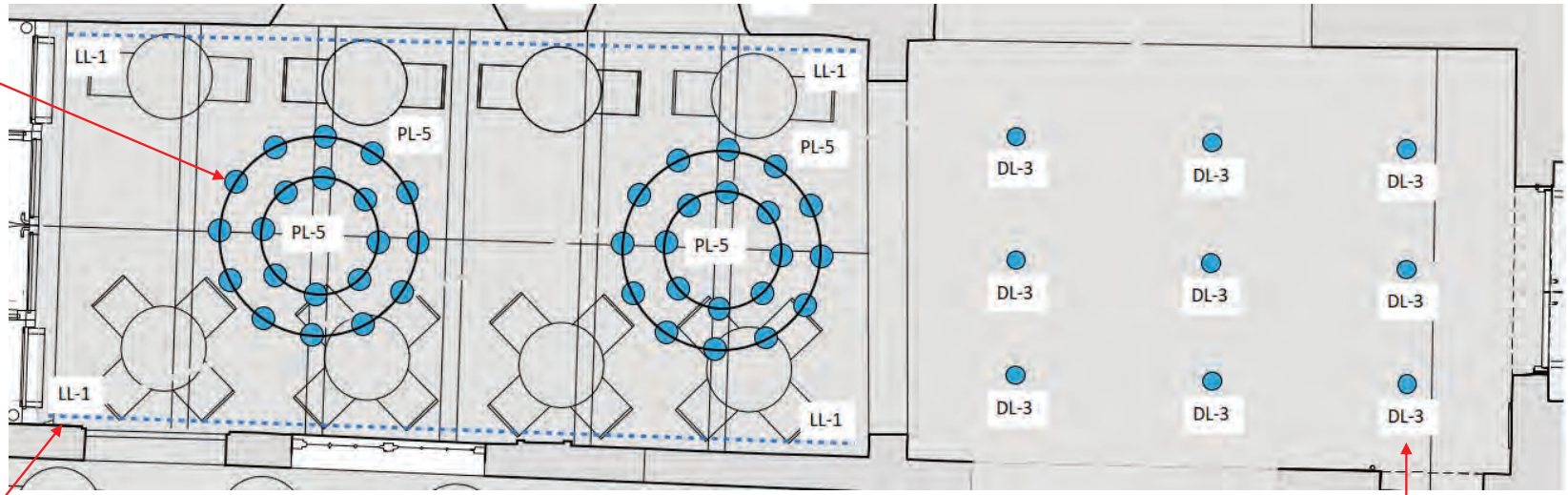
Foyer Concept - Concentric Pendants Option

1. Suspended glowing glass pendants provide ambient light levels



2. Possibility to integrate linear uplight into detail at base of ceiling to graze light up timber ceiling

3. Sparkly surface mounted downlights provide general illumination

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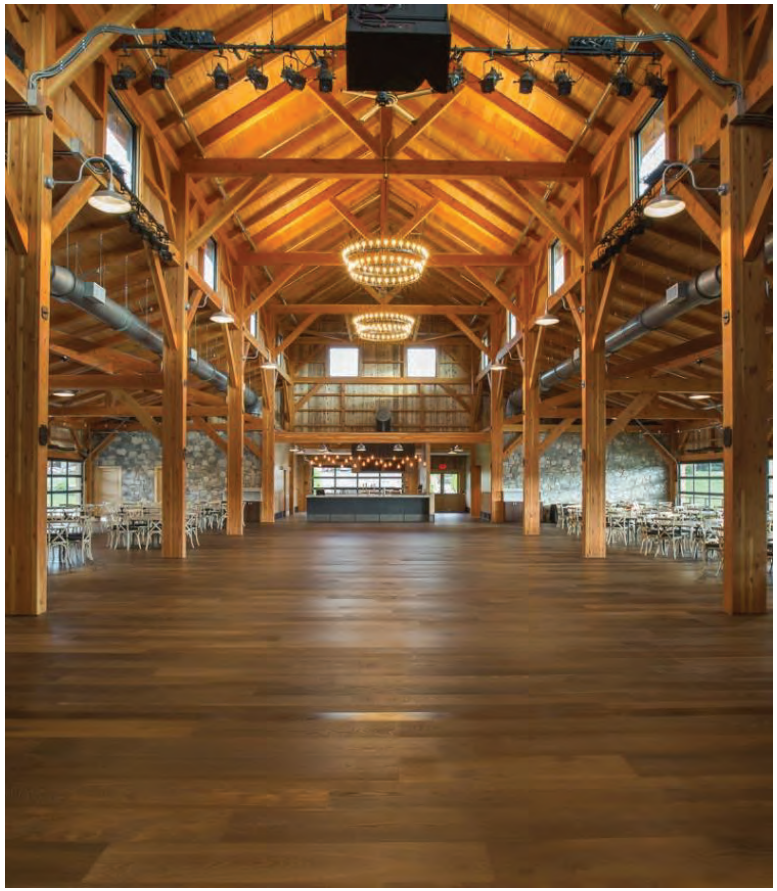
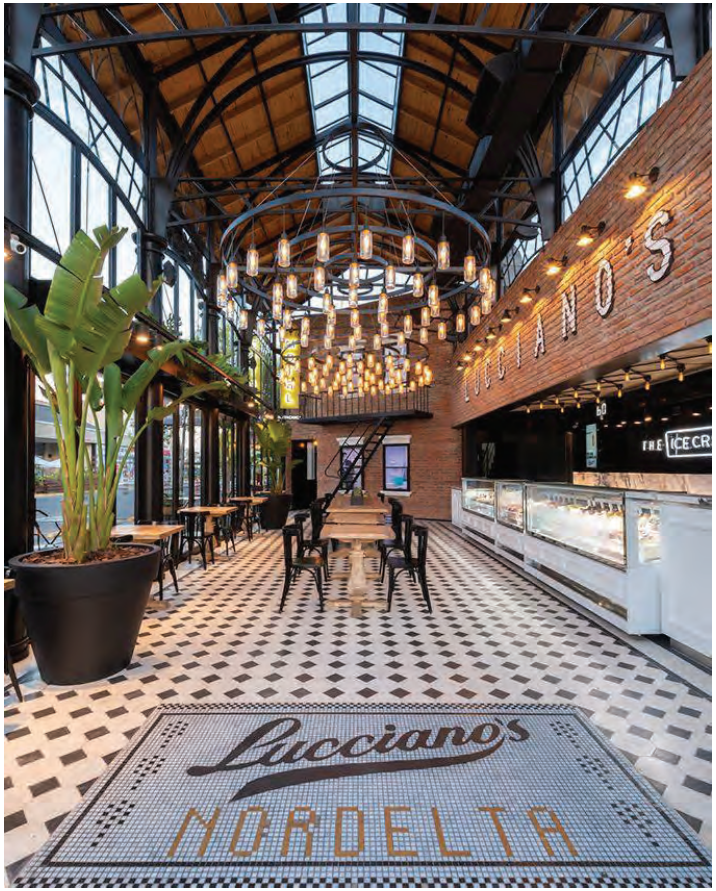
Red Barn Inspiration



Large scale decorative feature pendants
Chautauqua Hall, Pensilvania



Luciano’s Ice cream shop, Tigre Argentina

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Red Barn Visual

Lighting principles Single Hoop (preferred)

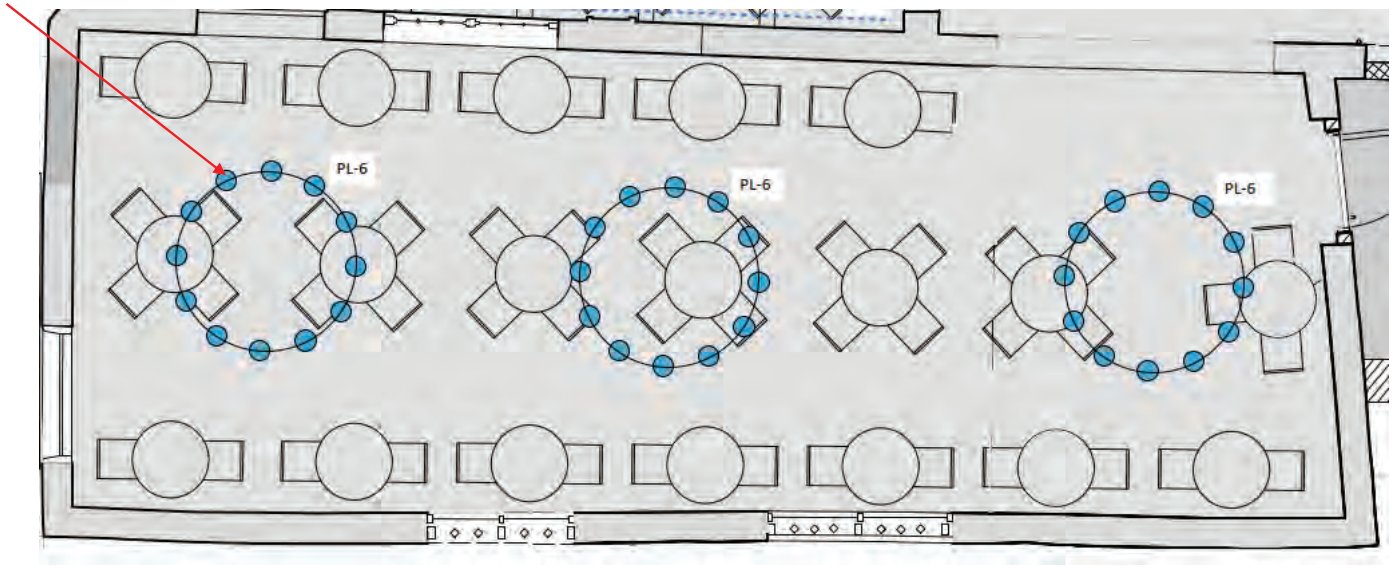
- Suspend large scale hoop pendants from ceiling. Possibility to re-use 3no. existing hoop pendants, replace candle type lit elements with glowing glass shades to match other glowing glass shades within adjacent spaces
- Uplighting to roof LED strip fittings mounted at top of wall/ bottom of rafters

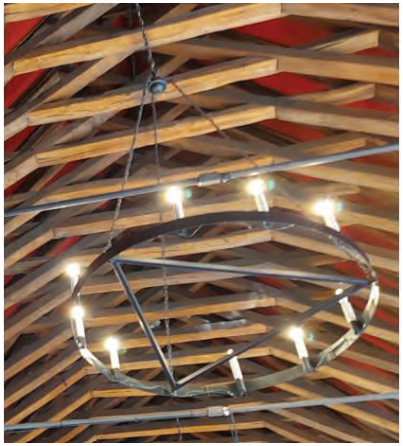
Lighting principles Double Hoop

- Suspend large scale hoop pendants from ceiling. Possibility to re-use 3no. existing large hoop pendants and 3no. Small hoop pendants, replace candle type lit elements with glowing glass shades to match other glowing glass shades within adjacent spaces
- Uplighting to roof from LED strip fittings mounted at top of wall/ bottom of rafters

Red Barn Concept – Single Hoop Option (preferred)

1. Recycled Large and small suspended hoops updated with glowing glass shades provide ambient light levels





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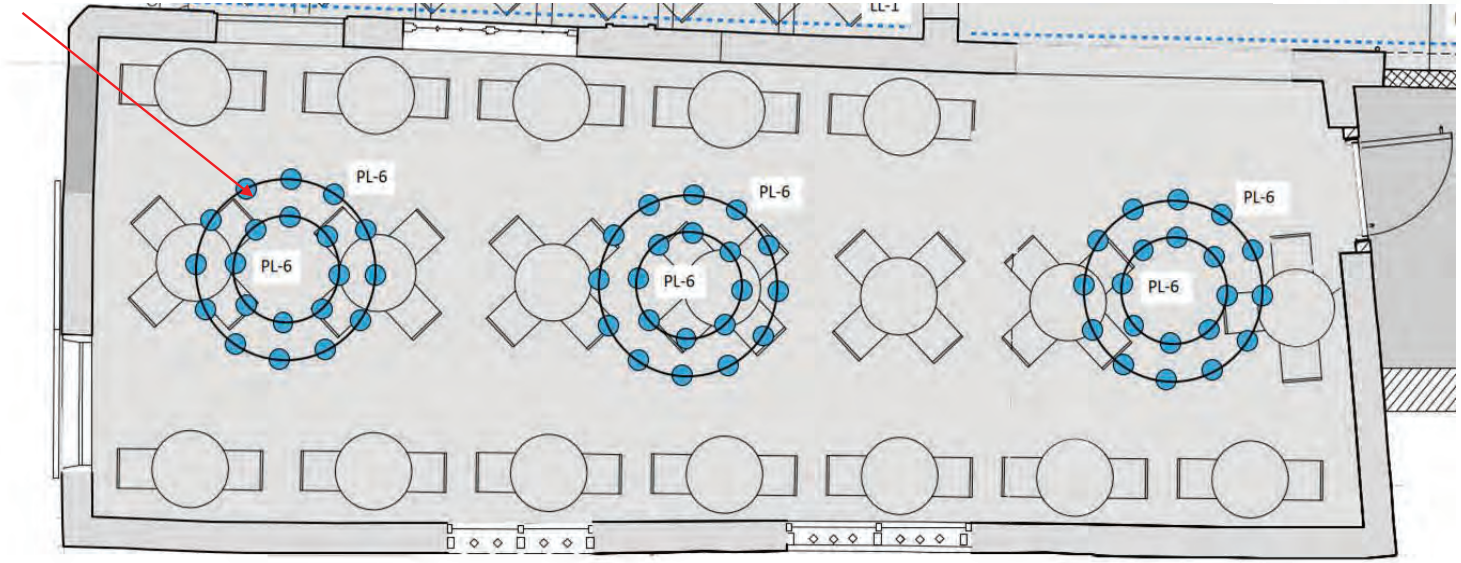
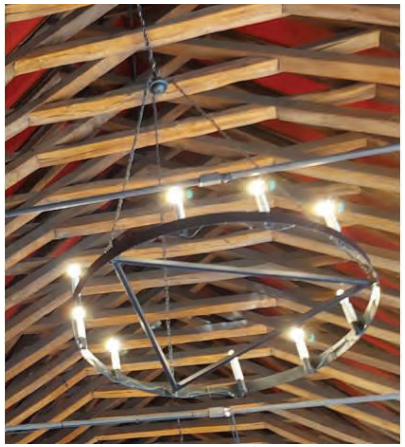
Red Barn Concept - Double Hoop Option

1. Recycled Large and small suspended hoops updated with glowing glass shades provide ambient light levels





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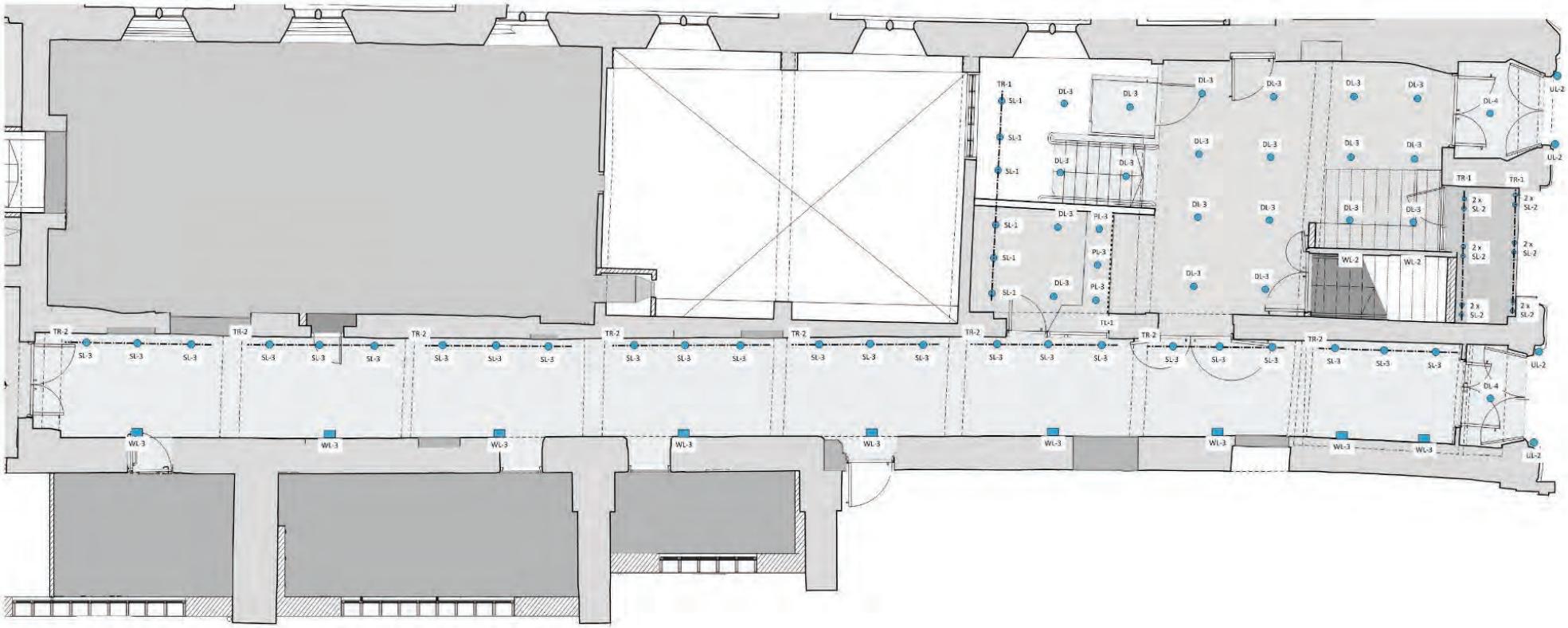

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job no. **7371** | project leader **HRE** | scale at A1 **1:50**

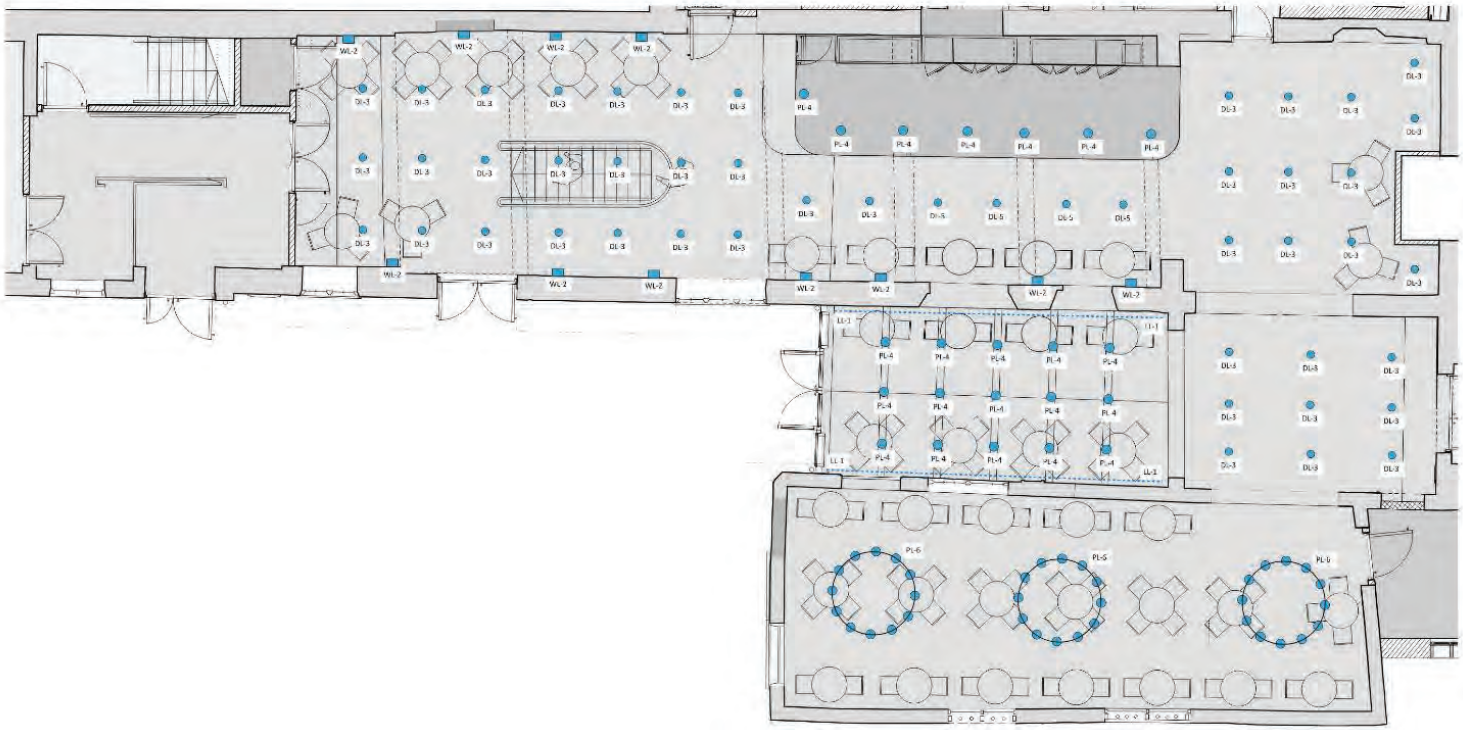
status code and description
S3 - Suitable for Review and Comment

project
ST. GEORGE'S GUILDHALL
KINGS LYNN

issue date **05/02/25** | revision **P02** | classification **SS_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH- LEVEL G + 0

project code **J7371** - originator **MXF** - volume **XX** - level **00** - type **SK** - role **E** - number **30200**



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client
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job no. **7371** | project leader **HRE** | scale @ A1 **1:50**

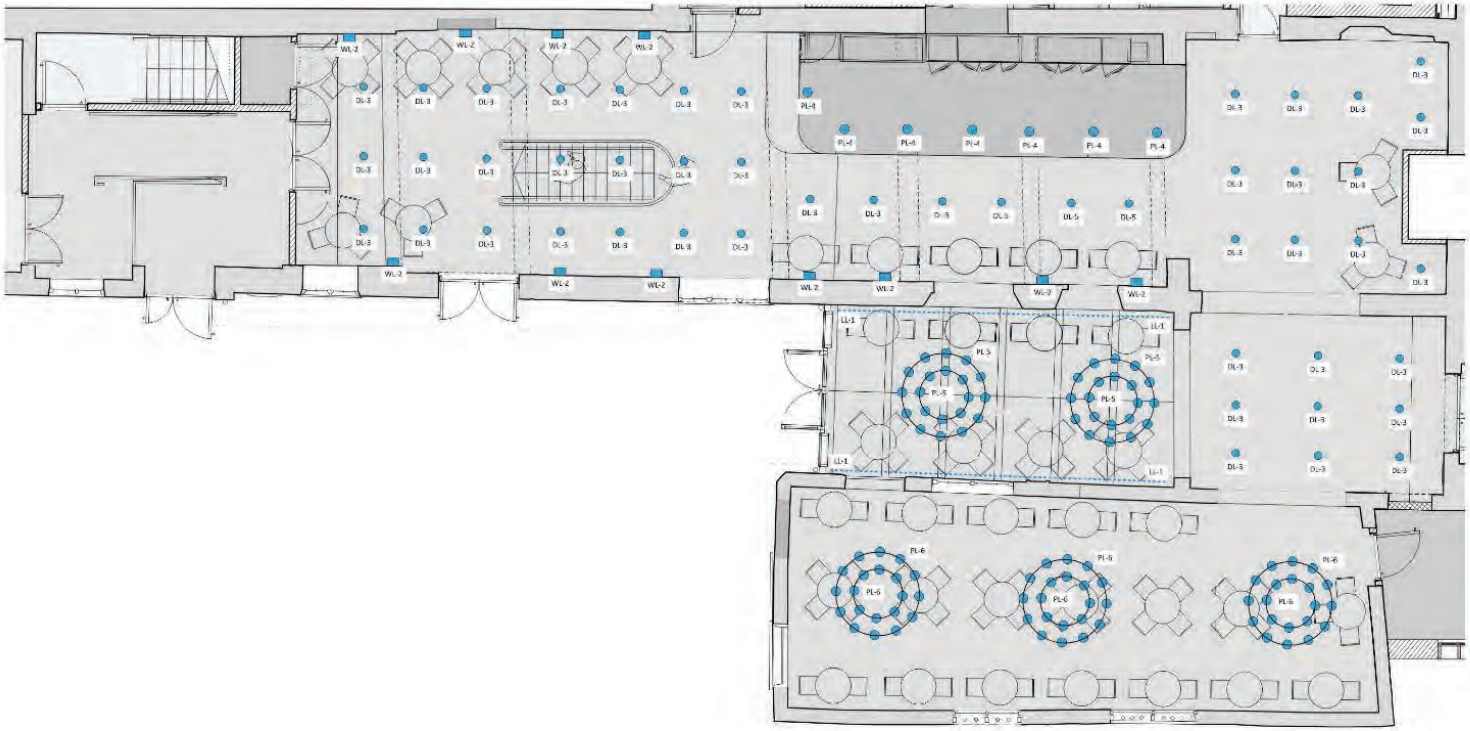
status code and description
S3 - Suitable for Review and Comment

project
ST. GEORGE'S GUILDHALL
KINGS LYNN

issue date **05/02/25** | revision **P02** | classification **SS_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH- LEVEL G + 0
(NORTH WAREHOUSE)

project code **J7371** | originator **MXF** | volume **XX** | level **00** | type **SK** | role **E** | number **30201**



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client		project		drawing title	
HAWORTH TOMPKINS LIMITED		ST. GEORGE'S GUILDHALL KINGS LYNN		LIGHTING STRATEGY SKETCH- LEVEL G + 0 (NORTH WAREHOUSE)	
job no.	project leader	scale @ A1			
7371	HRE	1:50			
status code and description		issue date	revision	classification	
S3 - Suitable for Review and Comment		05/02/25	P02	SS_70_80_00_00	

project code	orig.	volume	level	type	role	number
J7371	- MXF	- XX	- 00	- SK	- E	- 30201

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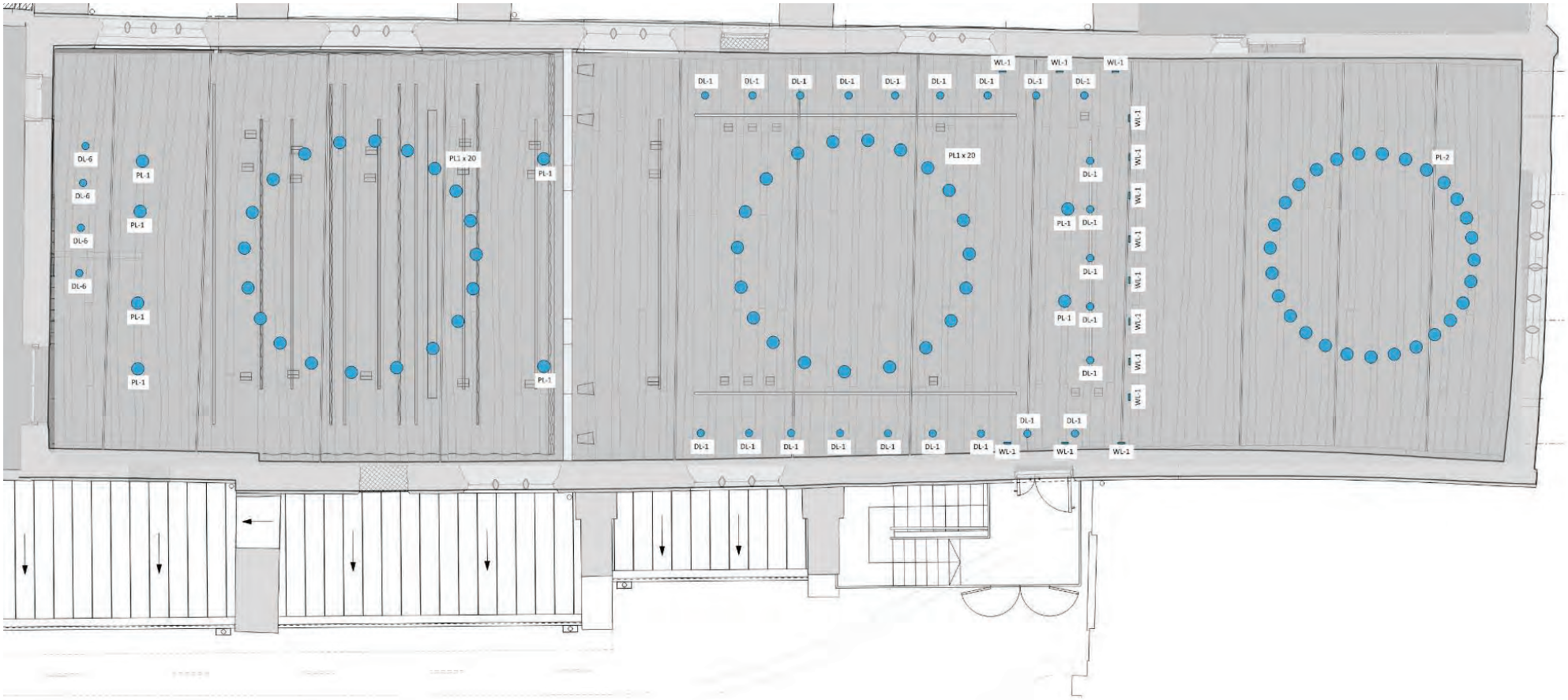
client	project			drawing title	
HAWORTH TOMPKINS LIMITED	ST. GEORGE'S GUILDHALL KINGS LYNN			LIGHTING STRATEGY SKETCH (LINEAR LAYOUT) - LEVEL G + 1	
job no. / project leader / scale at A1					
7371 / HRE / 1:50					
status code and description	issue date	revision	classification	project code - originator - volume - level - type - role - number	
S3 - Suitable for Review and Comment	13/02/25	P03	SS_70_80_00_00	J7371 - MXF - XX - 01 - SK - E - 30200	



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job no. **7371** | project leader **HRE** | scale at A1 **1:50**

status code and description
S3 - Suitable for Review and Comment

project
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KINGS LYNN

issue date **05/02/25** | revision **P02** | classification **SS_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH (ALTERNATIVE CIRCULAR LAYOUT) - LEVEL G + 1

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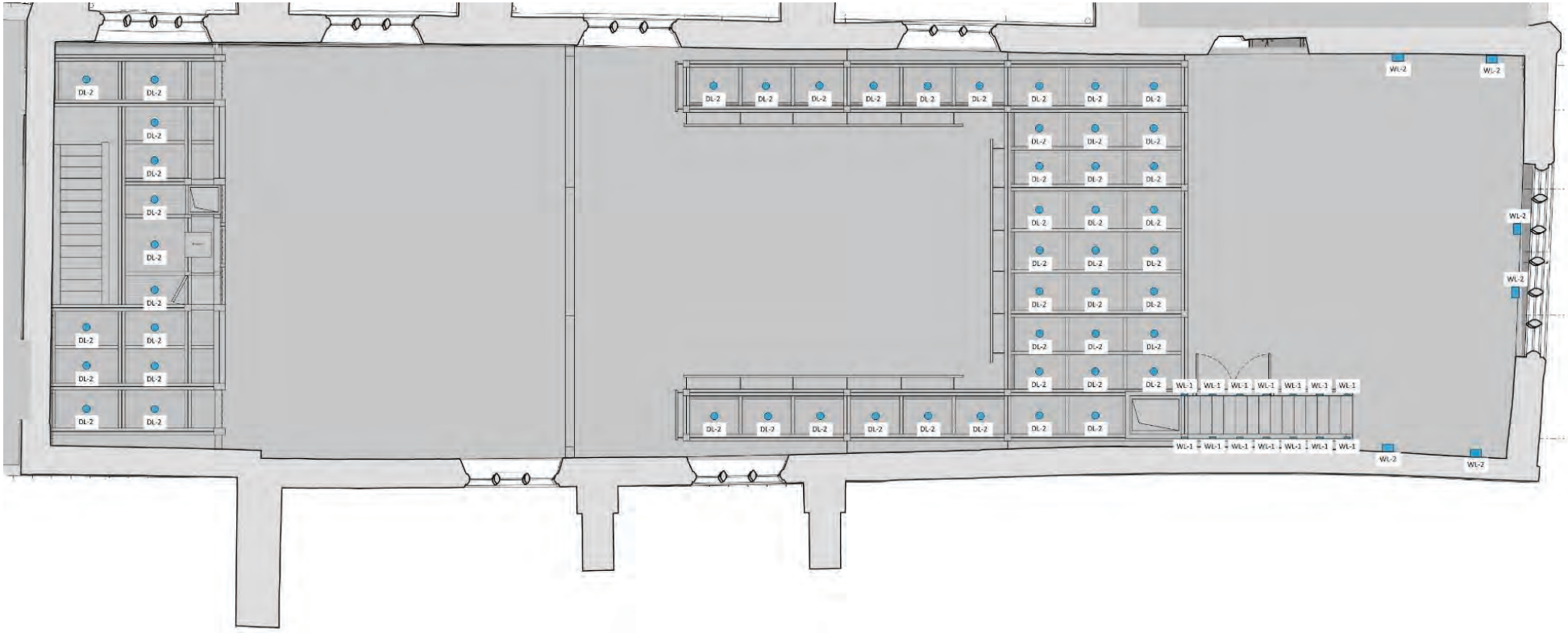

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status code and description
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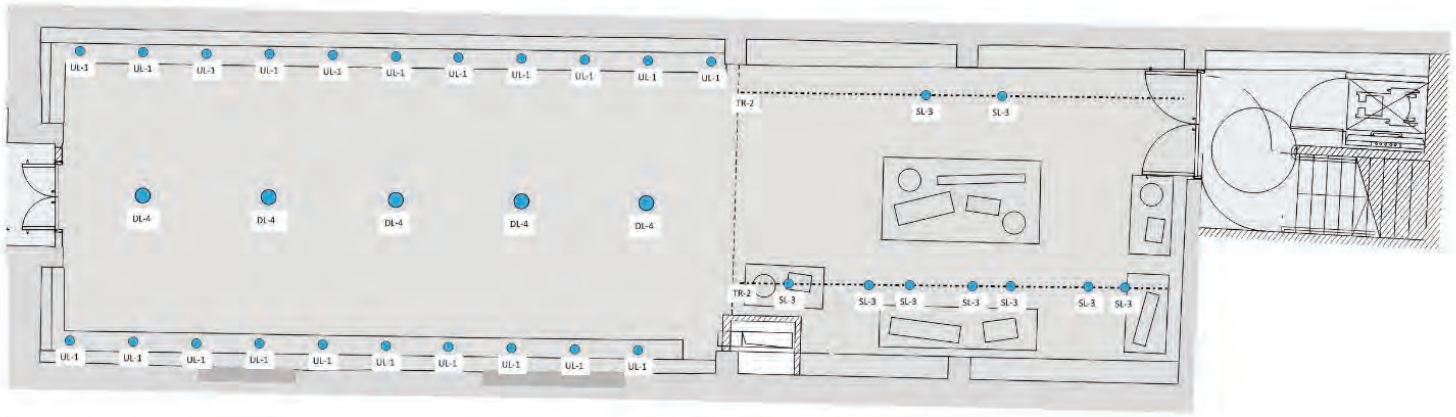
ST. GEORGE'S GUILDHALL
KINGS LYNN

issue date **05/02/25** | revision **P02** | classification **SS_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH- LEVEL G + 1 MEZ

project code **J7371** | orig. **MXF** | volume **XX** | level **M1** | type **SK** | role **E** | number **30200**



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job no. **7371** | project leader **HRE** | scale at A1 **1:50**

status code and description
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project
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KINGS LYNN

issue date **05/02/25** | revision **P02** | classification **S5_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH- BASEMENT LEVEL

project code **J7371** - orig. **MXF** - volume **XX** - level **B1** - type **SK** - role **E** - number **30200**

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job no. | project leader | scale @ A1
7371 | **HRE** | **1:50**

status code and description
S3 - Suitable for Review and Comment

project
ST. GEORGE'S GUILDHALL
KINGS LYNN

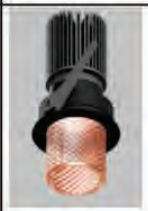
issue date | revision | classification
05/02/25 | **P02** | **SS_70_80_00_00**

drawing title
LIGHTING STRATEGY SKETCH- BASEMENT LEVEL

project code | orig. | volume | level | type | role | number
J7371 - MXF - XX - B1 - SK - E - 30201

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
DL-1	Surface mounted adjustable projector Auditorium ceiling	GDS/ Phos Surface mounted adjustable downlight with remote rack mounted DMX drivers	10.6 9	497 584	3000	Cocoa Bronze Architect to confirm RAL colour finish	Remote DMX		Fitting to be supplied with remote rack mounted DMX driver
DL-2	Bespoke recessed downlight Auditorium under balconies	GDS/ Phos/ Chantelle Lighting Recessed downlight with special copper mesh shroud and remote rack mounted DMX driver	14	801	3000	Architect to confirm RAL colour finish	Remote DMX		Fitting to be supplied with remote rack mounted DMX driver and special copper mesh shroud
DL-3	Surface mounted downlight Reception/ ticket area	Phos/ Chantelle Lighting Surface Mount with remote DALI driver and special copper mesh shroud	14	801	3000	Architect to confirm RAL colour finish	Local DALI		Fitting to be supplied with special copper mesh shroud
DL-4	Surface mounted downlight Entrance lobby	Phos Surface mount IP54 rated downlight with remote DALI driver in antique bronze finish	9	584	3000	Architect to confirm RAL colour finish	Local/ integral DALI		IP54 rated

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Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
DL-5	Surface mounted downlight Café bar	Phos/ Chantelle Lighting High output surface mounted downlight with narrow beam, remote DALI driver and special copper mesh shroud	c.30W	c. 2500	3000	Architect to confirm RAL colour finish	Local DALI		Fitting to have a high output, narrow beam and be supplied with special copper mesh shroud
DL-6	Surface mounted downlight Auditorium ceiling	Phos Surface mount downlight with narrow beam and remote DALI driver	c.30W	c. 2500	3000	Architect to confirm RAL colour finish	Local/ integral DALI		
LL-1	Linear ceiling uplight Cafe foyer	LEDLINEAR Linear grazing uplight with 10-degree beam angle	10w/m	1264lm/m	3000	Fixing clips	Remote DALI		Fitting to be provided with mounting clips, accessories, and adjustable bracket. Remote drivers to be in concealed accessible location
PL-1	Feature pendant Auditorium ceiling	Santa & Cole Cirio Simple special high-output version with remote rack mounted DMX driver	c. 14	c. 800	3000	Porcelain shade	Remote DMX		Special high-output version with 3000K LED light source and remote rack mounted DMX driver. To be utilised for emergency lighting.

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Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
PL-2	Feature pendant over stair	Santa & Cole Cirio Circular special with remote rack mounted DMX drivers.	103.6	c. 3416	3000	Porcelain shade	Remote DMX		Special version with 3000K LED light source and remote DMX drivers. To be utilised for emergency lighting.
PL-3	Feature Pendant over reception Reception	Phos/ Chantelle Lighting Suspended pendant with special copper mesh shroud	c. 14	c. 800	3000	Architect to confirm RAL colour finish	Local DALI		Fitting to be supplied with special copper mesh shroud
PL-4	Feature Pendant in Café Bar Café Bar	Santa & Cole Cirio Simple with porcelain lamp shades	7.7	752	2700	Porcelain shade	Local DALI		

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Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
PL-5	Feature pendant in Foyer	Santa & Cole Cirio Circular S & M with 12 + 18 porcelain lamp shades	44.4 + 103.6	1464 + 5124	2700	Porcelain shade	Local DALI		
PL-6	Feature pendant in Red Barn Recycled Hoop Chandeliers from existing building	Large fittings to be taken down, re-wired and new porcelain shades attached to match Santa & Cole shades.	7.7	752	2700	Porcelain shade	Local DALI	 	
SL-1	Track mounted wall wash To rear of reception/ ticketing	Reggiani Wall wash drop 250mm	8.7	988	90/3000	Black finish	Integral DALI		

Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
SL-2	Track mounted spotlight Within window vitrine	Phos 230V track mounted spotlight with bronze finish and medium beam angle	9	571	90/3000	Colour finish to be confirmed by Architect	Integral DALI		
SL-3	Track mounted spotlight Within St Georges Corridor and the Undercroft	Phos 230V track mounted spotlight with bronze finish, high efficiency module and wide beam angle	13	989	90/3000	Colour finish to be confirmed by Architect	Integral DALI		
UL-1	Recessed Uplight Undercroft	LuxR (supplied by Light ideas) Modux 4 round	4	360	90/3000	Architect to confirm exact finish	Local DALI		
UL-2	Recessed Uplight IP67 Main entrance	LightGraphix Inground uplight with 13-degree beam angle. Deep recessed low glare in classic bronze finish	11.6	853	93/3000	Architect to confirm exact finish	Local DALI		
WL-1	Floor level eyelid wall light Auditorium stair and balcony	Nocturnal Lighting Wallaroo Bullnose with ages brass finish to be supplied with remote rack mounted DMX drivers	3.9	120	3000	Architect to confirm exact finish	Remote DMX		Special version with remote rack mounted DMX drivers

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Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

Luminaire REF	DESCRIPTION	MANUFACTURER / MODEL / REF	SYSTEM LOAD (W)	LUMINAIRE LUMENS (LM)	COLOUR TEMPERATURE (K)	TRIM / FINISH / ACCESSORIES	CONTROL	IMAGE	NOTES
WL-2	Decorative wall light Auditorium, cafe bar and entrance reception	Santa & Cole Cirio Wall	9.2	164	3000 in auditorium and 2700 in café bar	Porcelain shade	Local DALI/ remote DMX		Special version with 3000 K LED light source and rack mounted DMX drivers in auditorium area
WL-3	Wall mounted uplight St George's Passage	Chantelle Lighting Antique brass effect wall uplight	c. 14	c. 1500	3000	Architect to confirm exact finish	Local DALI		Fitting to be supplied with DALI driver and custom finish
TL-1	LED tape light Integrated into reception desk	LEDLINEAR Opal extrusion incorporating LED strip	6w/m	460lm/m	3000	Fixing clips	Remote DALI		To be integrated into reception desk in architectural detail with remote DALI drivers in concealed accessible location within desk
TR-1	Surface mounted track To rear of reception/ ticketing/ within window vitrine	Stucchi 3-circuit surface mounted track	N/A	N/A	N/A	Black	DALI		
TR-2	Suspended mounted track St George's Passage and the Undercroft	Stucchi 3-circuit suspended mounted track	N/A	N/A	N/A	Black	DALI		

Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

St. George's Guildhall- Kings Lynn

Architect: Haworth Tompkins
Issue Status: P02

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Notes

1. Contractor to ensure that the catalogue number is consistent with the description prior to order.
2. Contractor to ensure that quantities of equipment are consistent with Architects layout.
3. All items identified as 'contractor to choose' – contractor required to submit proposals to the Architect/Engineer a minimum of 2 weeks prior to placing an order.
4. All connected non-linear loads below 16A per phase (3.7kW single phase, 11kW three phase) must comply with the harmonic emission limits given in BSEN:61000-3-2.
5. All connected non-linear loads above 16A per phase (3.7kW single phase, 11kW three phase) must comply with the harmonic emission limits given in BSEN:61000-3-4.
6. Emergency conversion is to be carried out in accordance with ICEL 1004 by an approved supplier, to comply with BS EN 60598-2-22:1999.
7. All light fittings and gear must have a minimum power factor of 0.9.
8. Contractor to provide samples of all fittings.
9. All Lighting control gear / ballasts to operate safely on 230V +10%/-6% unless otherwise indicated. Contractor to verify & confirm compliance prior to ordering & installation on site.

Rev	Date	Status	Description	Designer	Project Leader
P02	05/02/25	S0	Initial Status	GP	NC
P01	31/01/25	S0	Initial Status	GP	NC

Schedule of Interior Light Fittings
J7371-MXF-XX-ZZ-SH-E-30000

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St Georges Guildhall - Kings Lynn

Light Impact Assessment

13/02/2025

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ISSUE HISTORY

Issue	Date	Description
P01	13/02/2025	Draft issue for comment

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CONTENTS

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1.0 INTRODUCTION

St George's Guildhall in Kings Lynn is a Grade I listed historic landmark and the largest surviving medieval Guildhall in the UK. Built between 1410 and 1430 the Guildhall is renowned for its architecture and rich history, including its status as the oldest working theatre in the UK.

As part of ongoing refurbishment efforts, the Guildhall complex is set to become a heritage visitor attraction, education resource, and creative hub, as well as a vibrant theatre and entertainment venue.

The proposed landscape lighting design aims to highlight the Guildhall's historic architecture while remaining sensitive to the site and local biodiversity.

This report outlines the planned lighting strategy, which adheres to key industry guidelines and standards to reduce obtrusive light, protect wildlife habitats, and enhance the Guildhall's iconic structure without compromising the surrounding environment.

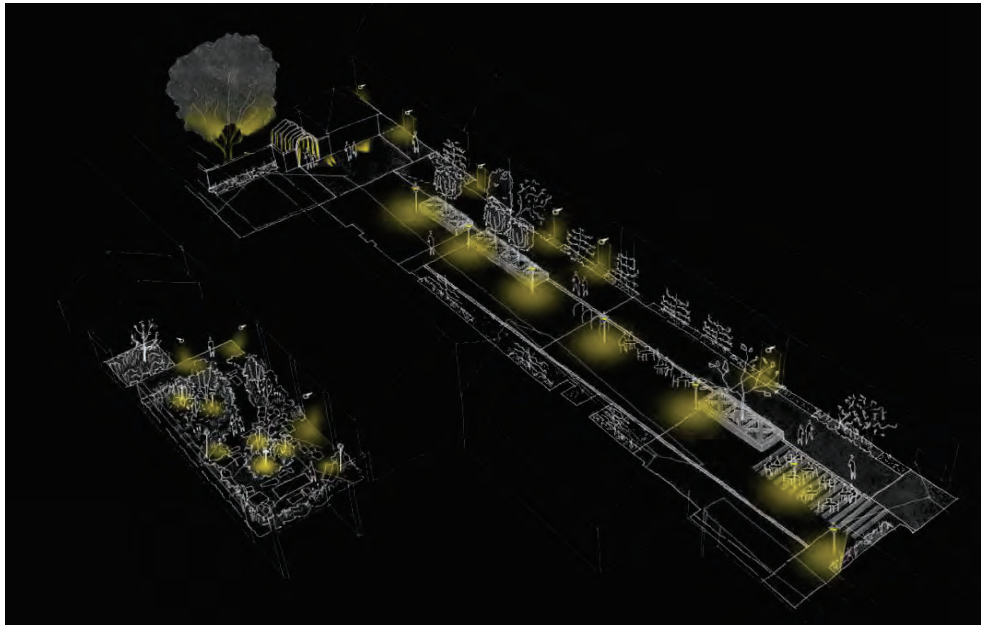

Figure 1 Overview of Lighting Scheme

1.1 Site location & context

St. George's Guildhall is located between the River Ouze and the town centre of King's Lynn. As the UK's oldest working theatre, the building deserves exterior lighting which accentuates its aesthetic appeal and heritage status. As the site acts as a buffer zone between the river and the centre of town, it's important that the exterior lighting limits any obtrusive lighting whilst having an attractive lighting design. A nearby residential property which is most at risk at being impacted by the proposed lighting scheme has been identified and is highlighted below in yellow.

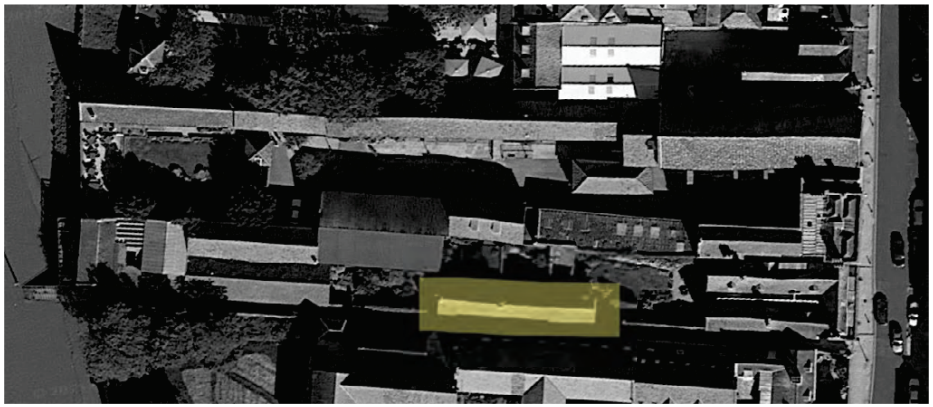

Figure 2 Site Location & Context

1.2 Executive summary

This report has outlined and assessed the proposed exterior lighting scheme against the recommendations found in CIE 150:2017, ILP Guidance Note 01/21: The reduction of obtrusive light, and ILP Guidance Note 08/23: Bats and artificial lighting. A nearby residential property has been identified and simulations have been performed to examine if the proposed scheme causes unacceptable illuminance or glare onto the building.

The site has been split into two environmental zones, with the area nearer the river being treated as a more environmentally sensitive and thus rural space. This is a cautious approach, with the local planning office stating that the whole site could be treated as suburban area.

The proposed scheme was simulated using Dialux Evo 13 with any assumptions being made using worst case scenarios. The maintenance factor of light fittings was set to 1 and the reflectance of surfaces were set to cautiously high levels.

The proposed scheme complies with the recommendations found in the beforementioned guidance and there are no known risks of unacceptable obtrusive light or sky glow.

Table 1 Summary Table

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2.0 DESIGN CONSIDERATION

2.1 Guidance

This document examines the site in regard to the following standards and reports:

- CIE 150: 2017: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition
- ILP Guidance Note 01/21: The reduction of obtrusive light.
- ILP Guidance Note 08/23: Bats and artificial lighting.

Other design consideration and regulation standards applicable to the lighting strategy include:

- CIBSE SLL Lighting Guide 4: Sports lighting.
- CIBSE SLL Lighting Guide 6: The exterior.
- CIBSE SLL Lighting Guide 16: Lighting for stairs.
- BS EN 12464-2:2014: Light & lighting - Lighting of workplaces Part 2: Outdoor workplaces.
- BS 8300-2/2018: Design of an accessible and inclusive built environment.
- BS 5489-1-2020: Design of road lighting.
- BS EN 13201-2-2015: Road lighting performance requirements.
- BS 5266-1/2016: Emergency lighting - Part 1: Code of practice for the emergency lighting of premises.
- Secured by Design: Lighting against crime.
- Building regulations L2A.
- CIE: Lighting of roads for motor and pedestrian traffic.
- HSG38: Health & Safety Executive Lighting at work.

The aim is to ensure a responsibly designed lighting scheme sourcing economically viable products that are fit for purpose and achieve current best practice.

2.2 Reduction of obtrusive light

The exterior lighting concept is to provide safe, functional lighting to aid wayfinding and heighten the legibility of the landscape whilst enhancing architectural features to create ambiance which supports the aspiration of having night-time activities. To provide this amenity without excessive impact to the local environment, ecology, and the night sky, the proposed lighting scheme will respect the best practice and the latest guidance. There are several aspects to light pollution and ways to mitigate its impact as set out in the **ILP Guidance Note 01/21: The reduction of obtrusive light** and summarised here.

Key guidance notes:

- Provide adequate levels of light to external areas, allowing spaces to be used effectively and safely, while avoiding "over-lighting" by turning off or dimming lights at times when they are not required.
- Limit visible light source intensity to minimise glare by reducing the angle of the luminaire to no greater than 70° from a downward vertical position. Where the design requires fittings that do not intrinsically comply with this requirement are necessary, using the building or other fixed structures to obstruct spill light can aid glare reduction.
- Limit light spill above the horizontal plane that causes "Sky Glow" and may be harmful to the local bats flying by the site.
- Limit illuminance of adjacent buildings to an acceptable level.
- To reduce the levels of light trespass after a curfew.

Types of obtrusive light can be seen in Figure 23 (extract from the **ILP Guidance Note 01/21: The reduction of obtrusive light).**

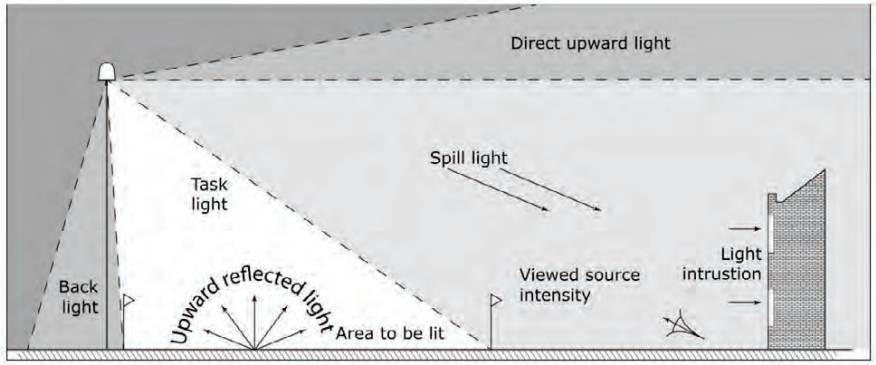


Figure 3 Obtrusive Light

The following extracts are taken from the **ILP Guidance Note 01/21: The reduction of obtrusive light** and offers guidance on the reasonable constraints for external lighting installations in a range of different environmental classifications.

St. Georges Guildhall is located in a well inhabited town centre location with moderate activity and medium district brightness and can therefore be classified as being located in an Environmental Zone of E3. This zone has been suggested by the local planning department. However, because the site is long and narrow and backs onto the river Ouze, an area of low to dark district brightness, a transition within the site between Zone E3 to E2 could be suggested to exist.

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 2 Environmental Zones

2.3 Control of obtrusive light

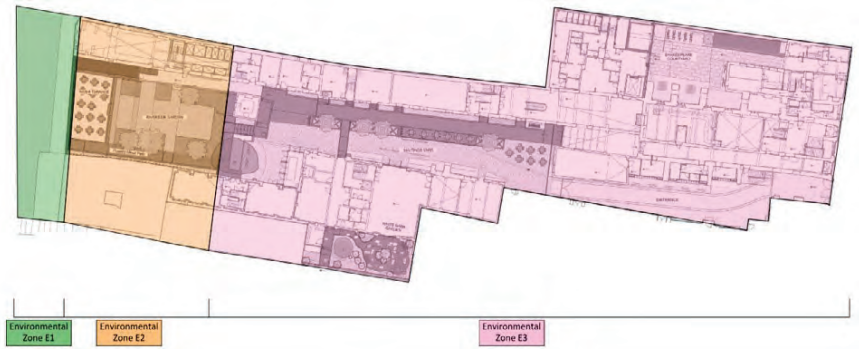


Figure 4 Suggested Environmental zoning of St Georges Guildhall

The exterior lighting scheme should limit the vertical illuminance on nearby dwellings, specifically spill light onto windows on premises as indicated in the previous site location & context section.

Table 3 indicates the maximum permitted vertical illuminance on premises based on the environmental zone selection.

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Table 3 CIE 150 Table 2

The lighting proposals will ensure the correct placement of luminaires with good optical control to minimise unnecessary spill light on to adjacent premises.

There is an existing residential property adjacent to the Guildhall site. To ensure that there was no chance of an obtrusive amount of illuminance on any windows of the property, a test was run using Dialux Evo. The building is within environmental zone E3, therefore 10lx is the permissible pre-curfew illuminance.

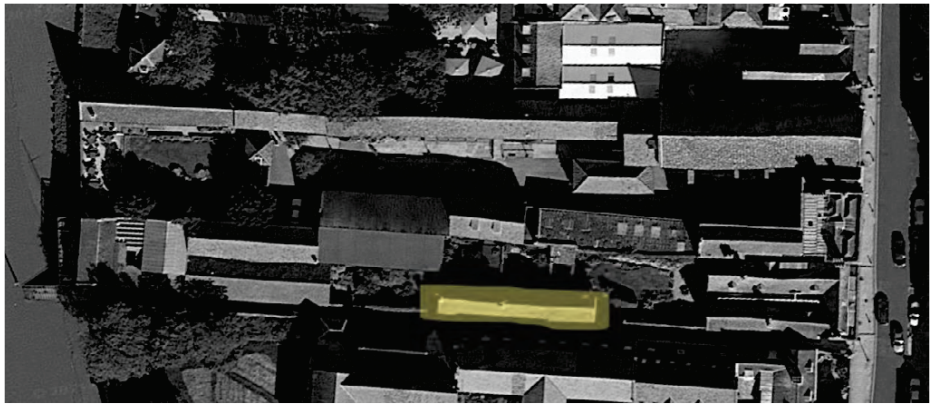


Figure 5 Location of Residential Property

There is no risk of an obtrusive amount of illuminance falling on any window or opening on the residential façade. The maximum illuminance measured on the façade was 0.37lx, below the recommended level for both pre and post curfew illuminance within the E3 zone, which is 10lx and 2lx respectively as seen in Table 3.

Figure 6 False Colour Illuminance Plot of Residential Property

Properties	Ē	E_{min}	E_{max}	U_0 (g_1)	g_2	Index
Residential Property Facade Perpendicular illuminance (adaptive) Height: 2.250 m	0.040 lx	0.006 lx	0.37 lx	0.15	0.016	RS2

Figure 7 Illuminance Results Table of Residential Property

2.4 Limiting luminaire intensities

Table 4 below provides guidance on permissible intensity of light from the lamp of a luminaire from the perspective of nearby residents or from positions where such views are likely to be maintained. As there are no angles at which residents of the nearby property would be able to see the lamp source of a luminaire, there is no risk of residents being impacted by the luminous intensity of a lamp source.

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m²)					
		$0<A_p \leq 0.002$	$0.002<A_p \leq 0.01$	$0.01<A_p \leq 0.03$	$0.03<A_p \leq 0.13$	$0.13<A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd)[5]	E0 Pre-curfew Post-curfew	0 0	0 0	0 0	0 0	0 0	0 0
	E1 Pre-curfew Post-curfew	0.29 d 0	0.63 d 0	1.3 d 0	2.5 d 0	5.1 d 0	2,500 0
	E2 Pre-curfew Post-curfew	0.57 d 0.29 d	1.3 d 0.63 d	2.5 d 1.3 d	5.0 d 2.5 d	10 d 5.1 d	7,500 500
	E3 Pre-curfew Post-curfew	0.86 d 0.29 d	1.9 d 0.63 d	3.8 d 1.3 d	7.5 d 2.5 d	15 d 5.1 d	10.000 1,000
	E4 Pre-curfew Post-curfew	1.4 d 0.29 d	3.1 d 0.63 d	6.3 d 1.3 d	13 d 2.5 d	26 d 5.1 d	25,000 2,500

Table 4 CIE 150 Table 3

There exists a sightline from the nearby residence into the maltings yard above one of the buildings. Maltings yard is within environmental zone E3. Due to this, no luminaires at a height which could be visible have been placed within any possible field of view by the residents into the maltings yard.

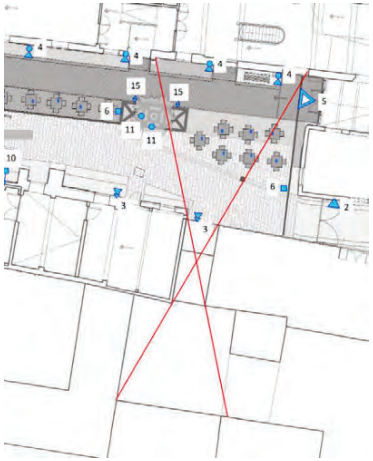


Figure 8 Viewing Angles into Maltings Yard

2.5 Limiting skyglow

Table 5 defines the maximum upward flux ratio of an installation. This takes into account the effects of both direct and reflected upwards components of luminaires across the whole installation. As we have split the Guildhall into two zones, a maximum of 6% and 12% UFR is permissible in zone E2 and E3 respectively.

Light technical parameter	Type of installation	Environmental zones				
		E0	E1	E2	E3	E4
Upward flux ratio (UFR) / %	Road	n/a	2	5	8	12
	Amenity	n/a	n/a	6	12	35
	Sports	n/a	n/a	2	6	15

Table 5 CIE 150 Table 6

A select few uplights within the hard landscape will be detailed under structures and where required have adjustability, such that they will be focusable into the underside of structures and tree canopies to limit light spill and reduce the effects of sky glow.

A UFR calculation has been made for both zones within the site. These calculations were taken under worst case secnarios. The maintenance factor of light fittings was set to 1, the simulation includes uplight fittings and material reflectance is set cautiously high. The E3 zone has a simulated UFR of 3.1% under the proposed plan and the E2 zone has a simulated UFR of 3.7%. These are both within the acceptable limits.

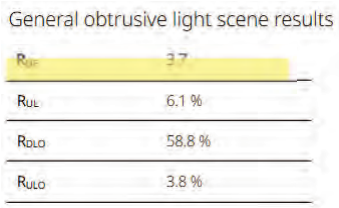


Figure 9 Results for Zone E2

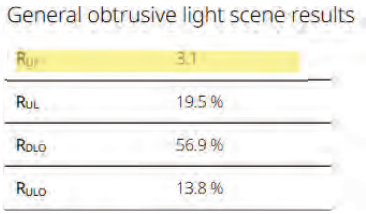


Figure 10 Results for Zone E3

2.6 Mitigating effects of light pollution on ecology

The scheme aims to minimise the impact on biodiversity, whilst specifically taking consideration in the protection of bats. Bats have been detected on site but it is believed they do not roost there. The following notes are taken from the **ILP Guidance Note 08/18: Bats and artificial lighting**.

Key guidance notes:

- Use LED light sources with no UV, as insects are attracted to light sources which emit UV radiation.
- Careful application of light ensuring it is only where required, fit for purpose (not over illuminated), and minimising spill light onto adjacent properties.
- Limiting the times that lights are on to provide some dark periods for wildlife. Dimmable lighting presence detection and/or timed control will be used to ensure lighting is only operating when required.

The following principles will be implemented as part of the landscape lighting scheme:

- Utilising LED luminaires with controlled performance specifications (output, optics, LEDs attributes).
- Use of controlled directional luminaires to provide lighting only where required.
- Use of lights with 0% upward light ratio where possible.
- LEDs to have a peak wavelength greater than 550 nm.
- Utilise a warm white spectrum < 3000K (Ideally <2700K).

2.7 Limiting surface luminance

Table 6 from the **ILP Guidance Note 01/21: The reduction of obtrusive light** notes the maximum permitted average surface luminance. The maximum permitted average within environmental zone 2 is **5 cd/m2** (applied to the back part of site- close to the river) and **10 cd/m2 for zone 3** (applied to the front part of site- close to the entrance of the building).

Light technical parameter	Application conditions	Environmental zones				
		E0	E1	E2	E3	E4
Building façade luminance (L_b)	Taken as the product of the design average illuminance and reflectance divided by π	< 0.1 cd/m²	< 0.1 cd/m²	5 cd/m²	10 cd/m²	25 cd/m²

Table 6 CIE 150

The façade near the residential property is the only part of the development which is close enough to potentially be impacted by the exterior lighting of the guidhall. It sits within environmental zone E3 and results show that it receives an average luminance of 0.19cd/m². This is well within the values given in CIE 150 of 10cd/m².

Figure 11 Facade Investigated

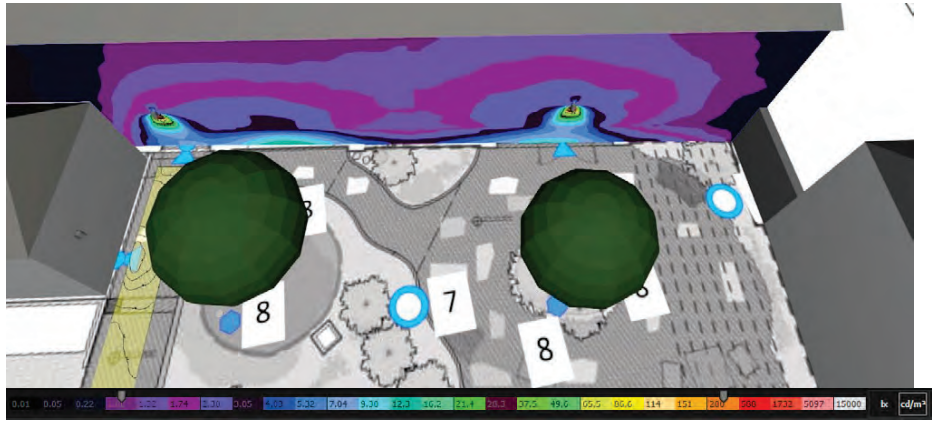


Figure 12 False Colour Luminance Plot of Façade

Properties	Ø	min	max	U_0 (g_1)	g_2	Index
Facade near residential property Luminance Height: 2.587 m	0.19 cd/m²	0.043 cd/m²	76.7 cd/m²	0.23	0.001	RS5

Figure 13 Luminance Results Table of Façade

Environmental Zone	**Sky Glow ULR (max %)**	**Maximum values of vertical illuminance of premises E_v (lux)**		**Luminaire Intensity I (CD)**		**Building Luminance Pre-curfew**
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L(cd/m^2)
E2	6	5	1	7500	500	5
Pass/ Fail	Pass – Results show a ULR of 3.7	Pass - No properties immediately adjacent in this zone	Pass - No properties immediately adjacent to building	Pass - No properties immediately adjacent to this zone	Pass - No properties immediately adjacent to this zone	Pass – Facades are not directly lit in this zone
E3	12	10	2	10,000	1000	10
	Pass – Results show a ULR of 3.1	Pass – Results show a maximum worst case illuminance of 0.37 on the nearby premises	Pass – Results show a maximum worst case illuminance of 0.37 on the nearby premises	Pass – No luminaires within view have a visible lamp source.	Pass – No luminaires within view have a visible lamp source.	Pass – Façade near premises has an average luminance of 0.19

Table 7 Summary of Mitigating Effects of Light Pollution Across Project Exterior

3.0 DESIGN ILLUMINANCE LEVELS

3.1 Requirements to provide street lighting

In the UK, the provision of street lighting is not a duty, however, there is statutory protection afforded to bats, their roosts, and commuting routes through the Conservation of Habitats and Species Regulations 2017. With this in mind, the proposed lighting scheme has focused on lighting for wayfinding rather than illuminating surfaces to high levels. This has resulted in a scheme which has minimal obtrusive light.

3.2 Illuminance Levels

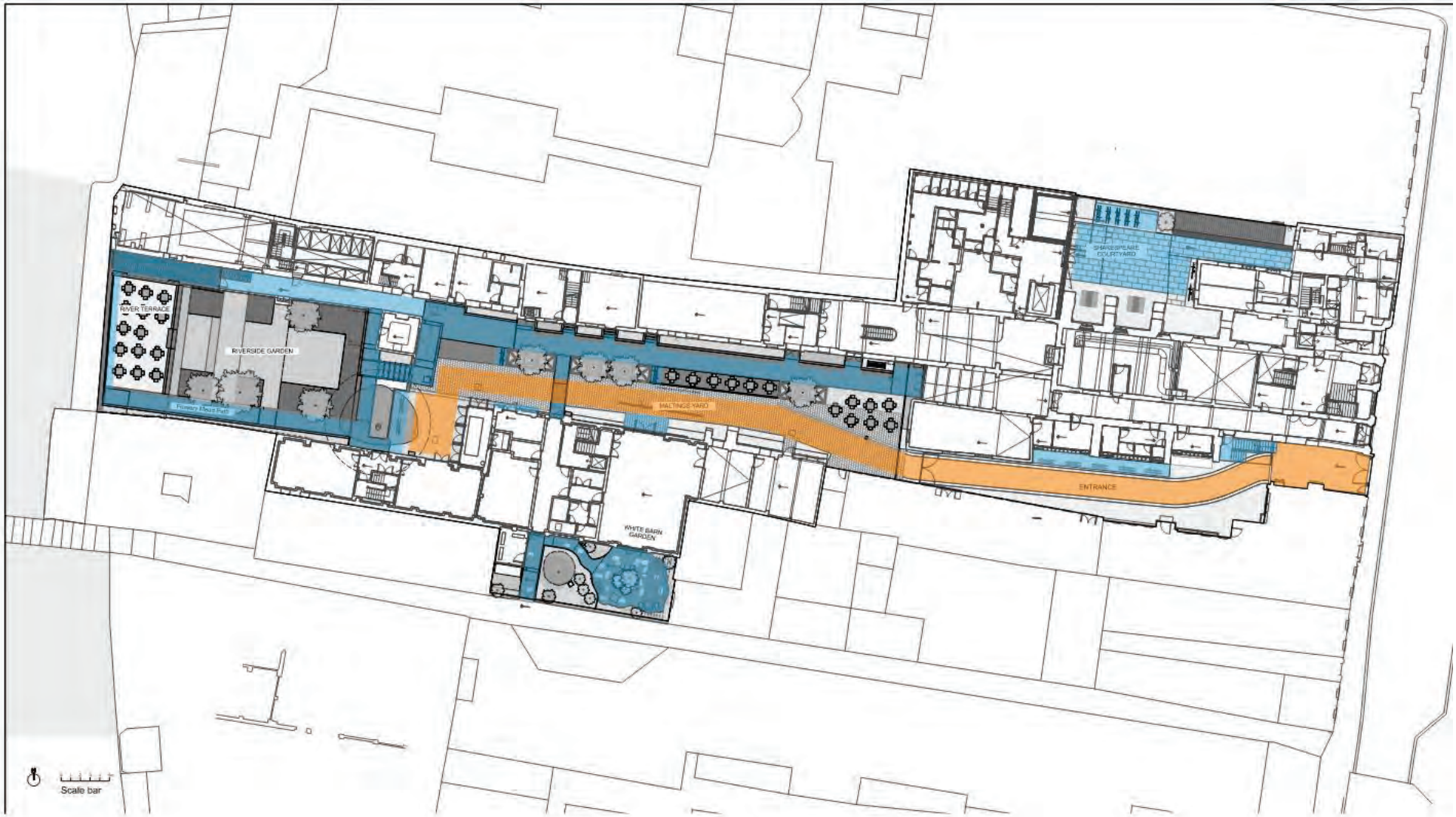
Due to the presence of bats on the site, the statutory requirement is to create a lighting scheme which takes this into account. There is no legal duty requiring any place to be lit, therefore design illuminance levels are intentionally low to comply with these regulations. Appropriate wayfinding lighting has been included in the scheme as well as ensuring that suitable pole-top light fittings are installed for vehicles.

3.3 Lighting controls

All fittings specified will be controlled via timeclock to ensure minimal lighting post curfew. It will also ensure that fittings are not left on during the day and thus wasting energy. If the exterior is closed to visitors, the fittings can be set to a wayfinding scene which limits façade lighting and focus only on allowing workers conduct their tasks in the exterior space. The controls can be adjusted or can be manually overridden to suit future needs of the space.

3.4 Lighting products

The fittings specified are high quality and the majority do not send any light above the horizon. Exceptions to this are decorative, low power fittings such as the catenary lighting. Adjustable, dimmable spotlights pointed towards the building façade will be specified alongside cowls and other accessories to ensure that direct light is only hitting the façade instead of heading directly into the sky.



KEY

5 - 15 lx Minimum, Conflict Area

5 lx Average, Wayfinding Luminaires

Figure 14 Design Illuminance Levels

4.0 LIGHTING PLAN

Figure 15 Lighting Plan

MAX FORDHAM

5.0 PROPOSED LIGHTING PRODUCTS

Ref	Description	Manufacturer / model	Image	Notes	Mounting Angle (°)
1	Existing Wall Lights within King Street entrance	-		To be cleaned, re-wired, re-lamped, and re-installed.	0 (facing straight down)
2	Mast wall light	Original BTC River Terrace		Sandblasted weathered bronze TBC	0 (facing straight down)
3	Wall light framing doors	Bega Wall Luminaire Lantern		TBC	90
4	Mast wall light	Original BTC River Terrace		TBC	0 (facing straight down)
5	Feature wall light	TBC		TBC	90
6	Column	Aldo Bernardi Acelum		3m pole TBC	0 (facing straight down)
7	Floor task accent light	Bega Recessed Wall Luminaire		TBC	90 (Shielding element blocks upwards light)

Ref	Description	Manufacturer / model	Image	Notes	Mounting Angle (°)
8	Spike mushroom light	Stoane Lighting Mushroom		TBC	0 (facing straight down)
9	Soft uplight	Bega Compact floodlight		Shields/louvres/lenses TBC TBC	150 To be adjusted on site. No direct light to be spilled into the sky.
10	Soft planter uplight	Bega Compact floodlight		Shields/louvres/lenses TBC Installation method TBC TBC	150 To be adjusted on site. No direct light to be spilled into the sky.
11	Tree festoon lighting	TBC		TBC	N/A
12	Uplight to arbour passage	Bega In-ground luminaires		TBC	180 (upward light blocked by arbour structure)
13	Low level wall light to perimeter wall	Bega Recessed luminaire for wall and staircase		TBC	90 (Shielding element blocks upwards light)
14	Decorative bulkhead	Bega Ceiling and wall luminaire		TBC	90 (Shielding element blocks upwards light)
15	Low level wall light	Bega Recessed luminaire for wall and staircase		TBC	90 (Shielding element blocks upwards light)

Ref	Description	Manufacturer / model	Image	Notes	Mounting Angle (°)
16	Low level wall light/flood level marker light	Bega Recessed wall luminaire		TBC	90
17	Wall mounted pole top	Aldo Bernardi Acelum		TBC	0 (facing straight down)

Table 8 Proposed Lighting Products

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