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CAMBRIDGE CULTURAL QUARTER

TECHNICAL MASTERPLAN

CCQ792-THP-ZZ-ZZ-RP-YT-000003 Revision: S2-P04

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Document History

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S2-P04	Lara Kerrison	31 Oct 2024	Capacity clarified for standing events
Notes:			

Glossary

AD	Audio Description
ALS	Assistive Listening System
AVN	Audio Video Network
BGM	Background Music
BOH	Back of House, or Backstage
BYOD	Bring Your Own Device
CCU	Camera Control Unit
DCI	Digital Cinema Initiatives
DLP	Digital Light Processing
DMX	An industry standard protocol for control of stage and other lighting (a subset of RS-485)
DSC	Down Stage Centre
DSL	Down Stage Left
DSR	Down Stage Right
DVS	Dante Virtual Soundcard
FOH	Front of House, including Foyers
FP	Facility Panel
GUI	Graphical User Interface
HLCP	House Light Control Panel
HLCS	House Light Control System
IEC	International Electrotechnical Commission
I/O	Input / Output
IWB	Internally Wired Bar
LCP	Lighting Control Panel
MCC	Motor Control Cabinet
MET	Main Earth Terminal
MIS	Matrix Intercom System (matrix production communications)
MM	Multi-Mode (fibre)
OPS	Open Pluggable Specification
PDU	Power Distribution Unit
PLB	Production Lighting Box
PSU	Power Supply Unit
PTZ	Pan, Tilt, Zoom
RCD	Residual Current Device
RCP	Remote Control Panel
RCS	Room Control System
Redundant Network	A network with all critical components duplicated such that the network continues to function following any single failure of one of its component parts (wired or fibre link, network switch, router, etc.)
RIS	Ring Intercom System (partyline)

SCR	Sound Control Room
SI	Simultaneous Interpretation
SL	Stage Left
SLCS	Stage Lighting Control System
SM	Single Mode (fibre)
SMD	Stage Managers Desk
SR	Stage Right
SVC	Sound, Video and Communications
SWL	Safe Working Load
TWG	Tension Wired Grid
TMS	Theatre Management System: software for managing the essential operations of cinemas
UCI	User Control Interface
UPS	Uninterruptible Power Supply
USC	Up Stage Centre
USL	Up Stage Left
USR	Up Stage Right
WIS	Wireless Intercom System
WLCP	Work Light Control Panel
WLR	Work Light Rack

1 Introduction

This Technical Masterplan relates to the interventions proposed for the Cambridge Cultural Quarter. The Cambridge Cultural Quarter project involves the redevelopment of the Guildhall building, Marketplace and Cambridge Corn Exchange.

There are a number of public spaces used for events and performances across the project, these include:

- Large Hall (Guildhall)
- Small Hall (Guildhall)
- Marketplace (Outdoor cinema, Christmas Light switch on etc).
- Corn Exchange (operated by Cambridge Live)

This report will only focus on Cambridge Corn Exchange.

The present Cambridge Corn Exchange building is Grade II listed and was opened in 1875 and as well as its use as a corn exchange it intermittently held events such as performances by the Coldstream Guards and LSO. It was not until the 1970s where the building ceased to be used for trading grain and instead shifted to house performances more regularly.

After a refurbishment period in the 1980s the venue reopened in 1986 and has operated as a performance venue ever since.

As part of the Cultural Quarter redevelopment project Cambridge City Council are looking to enhance the Corn Exchange in order to strengthen its financial prospects. The key aims within the Corn Exchange are:

- Refresh foyer and bar space to encourage higher spend per head.
- Improve accessibility for both audiences and artists.
- Enhance technical provision to futureproof venue. Including:
 - New PA System
 - Upgraded Follow Spot System
 - Infrastructure Upgrade
- Assess egress routes and seating provision to look to increase capacity particularly for standing events.

2 Procurement

Experience on other similar projects leads us to recommend the following methods of procuring the specialist installations and equipment:

2.1 Specialist Installations

Several specialist contractors will be required to work with the Main Contractor. Coordination is necessary with other sub-contractors. For instance, with the project Electrical Contractor (power supplies, containment, interfacing with equipment) and the Steelwork Contractor (supports and fixings for stage engineering installations).

An initial list of specialist contractors follows. They are normally direct sub-contractors to the Main Contractor.

2.1.1 Technical Equipment Contractor (TEC)

Specialist lighting, sound, video and communications. This work may be split in to two contracts depending on its complexity.

2.1.2 Stage Engineering / Rigging Contractor (SEC)

Counterweight and other flying systems, orchestra pit decking installation, stage floor trap system, get-in platform.

2.1.3 Theatre Seating Contractor (TSC)

The seating systems in the theatre.

2.2 Loose Equipment (FF&E)

We recommend that cost allowances are made for loose equipment early in the project, and that the allowance is retained outside the main contract for direct purchase by the client (via a competitive tender if required).

This approach has several benefits which include:

- No contractors overhead – this maximises the use of the money
- Decisions on equipment can be delayed until a lot closer to practical completion – this ensures that current equipment which is relevant to future working practices can be purchased

3 Strip Out & Removal of Equipment

Most of the current installed infrastructure and equipment will need to be removed by the Main Contractor.

Storage will be required for equipment that is to be retained from the existing systems (the removal and storage of the equipment to be retained is probably best done by client).

Cost allowances should be made for the above.

4 Corn Exchange

Cambridge Corn Exchange hosts a varied programme of events including:

- Live Music both amplified and unamplified in seated and standing configurations
- Stand Up Comedy
- ‘An evening with’ style conversational events
- Circus
- Ballet and Opera
- Pantomime
- Conferencing and other events

4.1 Auditorium

4.1.1 Seating

The Corn Exchange currently seats:

- Up to 637 on the flat floor
- 228 on the retractable seating unit
- 42 on the mezzanine behind the retractable seating unit
- 490 at balcony level
- 12 in the balcony side boxes

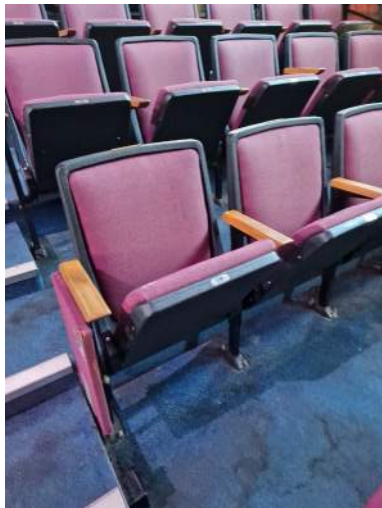
This gives a total seated capacity of up to 1409. The capacity was previously higher but was recently reduced by the local fire authority due to the condition of the seating and the number of exit doors. With a standing audience at stalls level (and a seated audience at balcony level), the overall capacity is around 1550.

The Corn Exchange are exploring a complete like-for-like reseating of the venue within the next 6-12 months. Given the proposals contained within this document, there are likely to be interventions for the Cultural Quarter project which will see further alterations made to the seating scheme and arrangement. Theatreplan would not recommend undertaking abortive works reseating the venue if further works are to be undertaken as part of the Cultural Quarter Project as this would not represent value for money.

Throughout the auditorium there are varying types of seating, each with different aesthetics leaving a fragmented appearance across the venue.



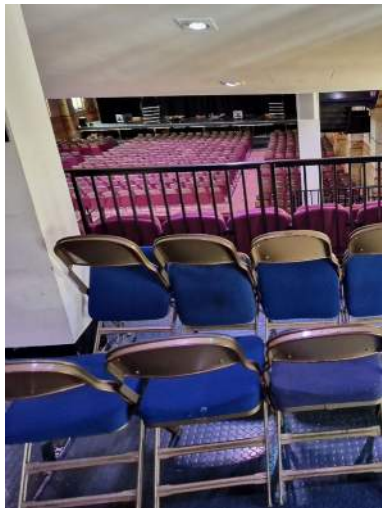
Stalls Seating



Balcony Seating



Balcony Seating



Rear Stalls Mezz Seating

(a) Front Stalls The lower stalls seating is made up of Sandler tip-up loose seats attached to floor bars. These require a lot of space to store and are labour intensive to deploy. The current seat centres are around 460mm. For seats without armrests, the ‘good practice’ recommendation in the ABTT Technical Standards for Places of Entertainment is a minimum of 500mm centres.

A number of options could be considered for the replacement of the stalls seating. These are explored in greater detail in the Auditorium Layout Options document and will be developed further at the next design stage.

- **Option 1: Floor bar system** (e.g. Audience Systems Matrix or Hussey Logix) – the lowest cost option, consisting of flip-up seats mounted on removable floor bars. The seats and floor bars are stored on bespoke trolleys, specific to the project. Whilst this is the least expensive option, it is the most labour intensive in terms of deploying the seats, and the storage of the trolleys is a big consideration. Ideally, the trolley dimensions would be tailored around at least some of the seats being stored underneath the stage. The under-stage trolleys could potentially be motorised in order to use the full stage depth without manual labour. The detailed design of the trolleys (and an associated study of storage options) can be carried out at the next design stage in collaboration with seating suppliers.
- **Option 2: Floor Rail Seating System** (e.g. Figueras Mutarail) – seating runs in rails recessed into the auditorium floor which can be covered with lids when not in use. As this is an automated system, there are major time and labour savings when reconfiguring the space between seated and standing mode. This system would be reliant upon making the existing lifts into double decker lifts for storage of the seats on the bottom deck. In order to fit all of the stored seating rows, the lift footprint would need to be enlarged, and the pit may need to be deepened. The extent of any excavation is subject to carrying out a measured survey of the existing pit at the next work stage. Option 2 offers major operational savings but is likely to be significantly more expensive than Option 1.
- **Option 3: Wheeled seating system** (e.g. Figueras Mutawheel or Kotobuki K-Roll) – groups of 6/7 seats are set onto a wheelable base. This option sits between Option 1 and Option 2 in terms of cost. It is

probably the least likely option as it retains some of the technical challenges of Option 2, without the operational benefits of automation. This is explained in greater detail in the Auditorium Options Document.

(b) Rear Stalls The upper stalls is currently formed of retractable seating units separated by a central vomitory. Additional loose rows are deployed on the mezzanine at the rear of the retractable seating unit.

The seating in this area suffers from obstructed sightlines due to the structural columns and the deep overhang of the balcony above. Head room is very constrained.

A number of alternative retractable seating unit configurations have been explored for the rear stalls in the Auditorium Layout Options document.

(c) Balcony The overall audience experience in the balcony area is poor, this is due to a number of different issues:

- Compromised sightlines
- Distance from the stage
- Low head height towards the rear
- Limited legroom

Sightlines from the existing balcony seating are poor due to the shallow rake and lack of a seat stagger.

Two options are explored in the Auditorium Layout Options document. The first of these is a reseating of the balcony in its current configuration. The second option involves re-raking the balcony (and relocating the control room here from stalls level) to dramatically improve sightlines and legroom – but at the expense of losing a large number of seats.

It is commonly accepted within the industry and included in publications such as Theatre Buildings: A Design Guide (2024), that for unamplified speech the maximum comfortable distance at which an audience should be seated is 20m from the downstage edge. For amplified or larger theatrical experiences this should not exceed 30m. The current rear row of the balcony is considerably more than 30m from the stage edge, and any efforts to meet these recommendations would see a reduction in seating capacity.



Balcony Sightlines

4.1.2 Forestage Lifts

There are two forestage lifts which can be used to create a stage extension. Each elevator has full height fixed fascia, so the assumption has been made at this stage of the project that the machine pit is at least 995mm.

As space within the venue is at a premium due to the site being constrained on all sides, upgrading the forestage lifts to provide additional storage space would be beneficial.

Instead of a single deck elevator with full height fascia, the structure would be replaced with a “double deck” elevator. The top deck would serve as the auditorium / stage floor in the same way as the existing. The lower deck would be used as an area for seat storage. Removable fascia could then be deployed when the elevators are used as a stage extension.

The storage elevators would free up space elsewhere in the venue where seating trolleys are currently stored.

Further surveys will need to be undertaken during the next work stage to establish whether the existing pit depth is sufficient or whether additional excavation works would be required. With a seating system like the Figueras Mutarail system, the footprint of the lifts would likely need to be enlarged to be able to store all of the seating rows.

The installation of double deck elevators would be useful for any of the flat floor seating approaches. However, it would be critical for the Option 2 (Mutarail) or Option 3 (Mutawheel) approaches.



Existing under-stage storage provision

4.1.3 Control Position

A small, dedicated control booth, mostly used for lighting control, can be found on the rear auditorium mezzanine. The sightlines to the stage from this area are good, but the upward sightline is poor due to the balcony overhang. A number of options have been explored for the control position in the Auditorium Options Document. The chosen approach is influenced by the seating layout adopted. The options within this document include:

- An option keeping the control room more or less the same size but slightly repositioning it to suit the new rear stalls seating layout.
- An option which slightly widens the control room to improve the operating experience and to allow for use of larger equipment in the future. The booth is slightly repositioned but remains at the rear of the stalls.
- An option which relocates the control room to balcony level, removing the upward sightline constraint currently imposed by the balcony overhang.

4.1.4 Lighting Bridges

There is no proposal to change the existing lighting bridges and technical galleries.

4.1.5 Live Sound Mixing Position

The existing live sound mix position is deployed at the back of the flat floor seating (in front of the central vomitory).

The Auditorium Layout Options document explores a number of different options for the mixing position, depending upon the stalls configuration. It would remain towards the back of the flat floor zone. As the seating behind is on the first raised row of the retractable seating unit, the sound desk would not impact upon audience sightlines.

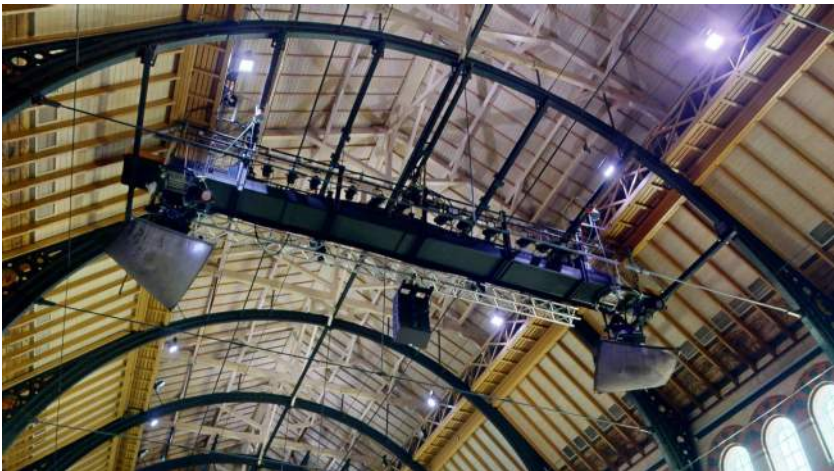
4.1.6 Follow Spot Positions

The existing follow spot position is difficult to access and maintaining the follow spots is labour intensive. Currently the two Robert Juliet Manon Follow Spots can only be operated by trained in house operators. Significantly developments have been made in recent years which allow for follow spots to be remotely operated.

The existing follow spot positions should be decommissioned, with remotely operated follow spots utilised. Sufficient network tielines should be provided in key locations back of house including:

- Lighting & AV Store
- Green Room
- Loading Dock
- Storage Dock

From these locations remote control base stations can be patched in to allow operates outside of the auditorium to control the follow spots in a safe and comfortable environment.



Existing Follow Spot Position

4.1.7 Auditorium Suspensions

Consideration will be given to suspension points for temporary trusses in the auditorium. The current arrangement only allows for the position of chain hoists in a few locations, which is very restrictive. The access to these positions is also poor.

The maximum capacity of any rigging point is currently 500kg, it should be investigated as to whether there is sufficient capacity within the roof, or what work could be undertaken to increase the rating on each point to 1000kg. The installation of load monitoring should be considered.

4.2 Stagehouse

4.2.1 Stage

The stage currently measures around 16.8m wide (wall to wall) by 5m deep and sits approximately 1 meter above auditorium floor level.

The depth of the stage can be increased by deploying either one or both of the forestage elevators. The forestage elevators allow the stage to extend to approximately 7.5m deep or 10m deep.

Clearance to the underside of the grid is 7.8m with restricted areas underneath technical walkways which sit at 6.3m above stage level.

To create more useable storage underneath the stage, the replacement of the stage could be considered at the next work stage, in collaboration with the structural engineer and seating manufacturers. Whether replacement of the stage is necessary or sufficiently beneficial depends partly upon the chosen flat floor seating approach - for instance, the unobstructed column-free span required for the Mutarail system would not be feasible and therefore under-stage storage of the seats would be ruled out in this option. Replacement of the stage may not therefore provide a great deal of benefit in conjunction with flat floor seating Option 2. In flat floor seating Options 1 and 3 (the floor bar system or the wheeled seating system), replacement of the stage may possibly offer a benefit if this allows for less frequent supporting columns (provided that this doesn’t make the structural build-up any deeper), thus improving the efficiency of under-stage storage. However, if the benefit is only marginal, the replacement of the stage probably wouldn’t represent the best use of the budget. For flat floor seating Options 1 and 3, the viability of under-stage seat storage should be fully explored in relation to the

existing stage construction before considering whether replacement of the stage is justified.

Should the decision be made to proceed with replacement of the stage, the stage floor build-up needs to be able to support a distributed load of 7.5kN/m², with a sufficiently high point loading. The build-up would consist of something along these lines:

- Structure
- Timber battens (on resilient pads) with noggins between
- 2 layers 18mm plywood
- 6mm sacrificial hardboard, oil tempered, laid smooth finish up, painted matt black.

The existing stage floor thickness is modest (around 170mm) and so realistically, it is unlikely that a thinner build-up than this would be achievable. If the stage were to be reconstructed, the overall thickness should not exceed 170mm as this would reduce the storage height below.

4.2.2 The Grid & Scenery Flying

Cambridge Corn Exchange has no fly tower, instead a localised grid structure overstage accessed by catwalks with a number of across stage walkways which limit where rigging is installed.

Based on current discussions the end users are content with the existing provision of around 15 overstage bars at approximately 400mm centres with 6 meter travel. 400mm-500mm bar centres is common place with a venue of this programme.

Further consideration should be given at the next stage as to whether any suspensions below the across stage catwalks should be investigated.

4.2.3 Safety Curtain & Drencher

There is no provision within the existing venue for a safety curtain and drencher. Due to the form of the venue it is not possible to accommodate a safety curtain.

As the design progresses a Fire Consultant should be engaged to review the current fire strategy alongside proposed interventions in order to ascertain whether any additional fire control or life safety measures need to be introduced.

4.2.4 Backstage Circulation

The backstage circulation areas, doorways and lifts should allow for technical equipment to be moved around between stores, workshops and venues with ease. Equipment in flight cases, on trollies, costume rails, and 8’ by 4’ Steeldeck should be allowed for.

4.2.5 Stage Drapes

As there are no proposed alternations to the stage area the existing drapes, which are in good condition, can be retained and reused.

4.2.6 Get-In

The existing get-in is through a door upstage left, off of a flight case store. There is a level access route to this area however this route is constrained between the building and the boundary line. A secondary route is created through the auditorium right get in door.

The size of the existing get in door is 2.16m wide by 2.42m tall.

4.3 Production Lighting, House / Work Light & Control

4.3.1 Lighting Power Control Circuits (Dimmers)

The production lighting installation proposed to have 144 power control circuits (circuits that are switchable between different modes of operation: DMX controlled dimmers and non-dims. This is a slight increase on the existing provision. These circuits provide facilities for stage lighting in the auditorium FOH lighting gallery and side positions, over-stage, and at stage floor level. These will be installed in the Gallery Dimmer Room and wired to production lighting outlet boxes by the Electrical Contractor. Ideally the dimmers should be located as close to the production lighting outlet boxes as possible to minimise the field wiring and containment installations. Reusing the existing Dimmer Room is the preferred option.



Existing Dimmer Location

4.3.2 Production Lighting Boxes

Purpose-made outlet boxes fitted with mains, DMX and Ethernet sockets. 3kW production lighting outlets will use 16A sockets. In the stage and fly loft production lighting boxes, some of the 3kW circuits will be paralleled to Socapex multi-pin connectors to make it easy to feed multiple circuits to overhead lighting bars and similar. Production Lighting Boxes will be fitted and wired by the Electrical Contractor.

4.3.3 Lighting Control System

The existing lighting desk will be retained and reused.

4.3.4 Lighting Data and DMX Infrastructure

Lighting boxes will contain dedicated ethernet and DMX nodes for the transmission of lighting data. Due to fittings becoming increasable more channel heavy, integrated nodes offer a more granular distribution of DMX universes.

The production lighting Ethernet network will extend to the technician's office to allow for the backup lighting desk to be set up for pre-programming of shows, and backup of show files.

4.3.5 House & Work Light Control

A DMX-based preset control system will be provided to adjust the auditorium and stage area House and Work Lights. Controls will be installed in the lighting Control Room and backstage, but the system will also be controllable via the production lighting desk.

4.3.6 House Lighting System

The existing house light system is already predominantly LED and offers a flexible provision for incoming productions. The light levels should be assessed by the project services engineer and the existing system supplemented or enhanced as required.

Any additional fittings The house lights may be supplemented with higher power luminaires to provide a higher light level for cleaning of the auditorium. Typically, the control system will include conveniently located cleaners' buttons which will turn on the cleaners lighting for a predetermined amount of time. After this time, the cleaners lighting will slowly fade off, or down to a low level. These buttons will be deactivated during show times.

4.3.7 Work Light System

Low-energy, high-brightness general lighting for fit-ups, maintenance, and cleaners. Performance "blues" will be installed for use during productions. Sockets for portable Work Lights will be installed around the stage area and technical galleries.

4.3.8 Production Lighting Luminaires

Some of the existing luminaire stock should be retained and supplemented with a range of more up to date spotlights, follow spots and moving lights. Each will be provided with a plug, colour frames, barn doors, hook clamps, safety bonds and other accessories as appropriate.

4.3.9 Lighting Rigging & Accessories

All fittings should be specified ready to hang, complete with associated rigging and other accessories.

The existing venue supply of other rigging accessories should be reused.

4.4 Sound, Video & Communications Systems

4.4.1 Wiring Infrastructure

The wiring infrastructure will consist of Facility Panels and the wiring that connects them to the permanent equipment racks. The use of industry standard connectors will permit touring company equipment to be easily plugged up to house systems. It is envisaged that there will be an equipment rack and patch in the Control Positions and that the main amplifying equipment will be installed in an Amplifier Room. The Facility Panels will incorporate sound and communications outlets (microphone and audio tie-lines, ring intercom, cue light, video, Ethernet (as CAT6) and similar) and will be located in a number of convenient locations around the stage, auditorium and foyers. Loudspeaker outlets will be installed in the auditorium for delay and surround loudspeakers.

Some Multi-Mode fibre may be considered, mainly for the transport of high-quality video signals using video-to-fibre baluns. The site-wide IP backbone will be utilised for IP traffic – possibly for show-critical control and content. The IP backbone should be resilient and allow for specialist IP traffic. See: [5.3 Site-Wide Corporate IT Network](#).

The containment for the sound and communications wiring shall be installed by the Electrical Contractor.

Note: this excludes any allowance for general ICT wiring and facilities (structured cabling by Electrical Consultant, active equipment currently by Client).

4.4.2 Installed Theatre Sound System

Whilst the venue has an existing loudspeaker system, the provision of delay loudspeakers within the balcony area is not sufficient. In order to enhance the existing provision consideration will be made to supplement the existing system with additional loudspeakers to improve the quality and coverage across the auditorium. The existing installation utilises industry leading products and should be supplemented rather than replaced in its entirety. This may be used by visiting companies for a small charge instead of touring productions being required to rig their own. Such decisions would be taken on a show-to-show basis and as such income from such should not be relied upon.

The complete installation will include loudspeakers, amplifiers, digital sound mixing consoles for front of house and onstage monitors, signal processing and replay equipment.

New digital mixing consoles should be considered, and the existing mixing consoles will be re-tasked to another venue.

4.4.3 Monitor System

A monitor system will be provided to enable the sound in the auditorium to be played in the Control Room and for it to provide the quality signal source for show relay, assistive listening systems and backstage feeds.

4.4.4 Assistive Listening Systems

The assistive listening systems will include a two-channel assistive listening system, providing a relay of show sound for the hearing impaired and a description channel for the visually impaired. The existing system is infrared and appears to suit the venue and patrons well; therefore, elements of the existing equipment will be reused where possible.

A change to a RF system will be considered.

The system must include a storage / charging unit for the receivers. Different systems / headsets are available which may be preferred by the user group.

The installation of an auditorium-wide induction loop system is now impractical, as it relied on the removal and renewal of the floor and / or ceiling finishes (induction loops are best installed directly under the floor finishes or built into the floor / ceiling structure). Therefore, several induction neck loops will be included. The neck loops are worn around the patron's neck, receive signal from the infrared system, and provide a local induction loop to the wearer, allowing their hearing aid to be switched to the "T" position and receive the show relay feed.

4.4.5 Captions & Surtitles

Data and video tielines throughout the venue will enable the future installation or temporary installation of captioning and/or surtitle systems.

4.4.6 Video Systems

High-quality low-light-level and colour cameras will be mounted in a suitable position in the auditorium to provide video feed of activities on stage to areas around stage and backstage.

Locations of outlets and displays on the fly floor will be considered. These are always needed, but often not considered as an integrated part of the fly floor environment design.

Additional wiring and outlets will enable other cameras and monitors to be plugged in.

Several tie-lines will be provided for integration into FOH systems (latecomers' monitors, etc.). Links to archive facilities will enable the theatre's output to be recorded for future use.

4.4.7 Projection

No fixed projectors will be provided. However, locations to hang projector(s) will be provided.

No provision has been made for a satellite dish / decoder for the reception of "Event Cinema" live transmissions (from the National Theatre, Royal Opera House, Metropolitan Opera, etc.).

4.4.8 Conferencing

There are no specific technical requirements for conferencing, such events will be able to use the renewed technical infrastructure to transport audio and video signals between stage, control locations and display equipment. It is anticipated that additional screens (whether projection screens or physical display screen) will be hired in on an event by event basis as the requirements may change depending on the hirer. The venues existing projection and display equipment will be retained and reused.

4.4.9 Lectern

A lectern will be provided to house controls and power to supply and connect laptop computers as well as projection control facilities, microphone links and incorporate local dimmable lighting.

4.4.10 Performance Communications

The Show Caller position will include intercom, paging microphone, show relay loudspeaker, video relay monitors, Work Light and miscellaneous controls. This shall be movable with infrastructure for use stage left, centre of the auditorium, or in the Control Room.

The intercom will be a multi-channel wired system with outstations, belt packs and single- / double-sided headsets; the extent of the wireless comms system coverage will be defined following discussions with the users.

A wireless system will be considered in the next RIBA Stage.

Infrastructure and outlet panels will be installed for the wired comms system. The outlet locations will include stage area, and other technical galleries, follow spot positions, Control Rooms, etc.

4.4.11 Paging & Show Relay Systems

Audio and video feeds will be provided to integrate into the building-wide facility. See: [5 Building-Wide Systems](#).

4.4.12 Technical Power & Earth

The sound and communications installations require several power supplies all derived from a single isolator on the main switchgear and not from "noisy" subsidiary circuits. In addition, a low-impedance technical earth will be required in the Control Room. The same earth and phase

should be used for these services throughout the building. See: [5 Building-Wide Systems](#).

5 Building-Wide Systems

There are number of services mentioned in the descriptions above which should be considered as building-wide services. These include:

5.1 Technical Earth

A distinct isolated earth is required for all sound and communications applications throughout the complex. This will include installations for sound, video, broadcasting or recording.

5.2 Tie-lines

A small number of audio, video and communications tie-lines between the Proscenium Theatre, Learning Studio and Events Space is proposed. Other meeting and office spaces should be included in this infrastructure network. The tie-lines will return to a central location to allow for the patching of signals.

These tie-lines could be traditional copper point-to-point connections, but considering the scale of the site, the number of rooms to be connected (and therefore the possible combinations to allow for) and the need to future-proof the installation as much as possible, an IP-network-based solution should be considered. Some fibre may be installed for the transmission of high-quality video and multichannel audio.

5.3 Site-Wide Corporate IT Network

There is an opportunity to implement a “converged”, site-wide, resilient IT network to allow for a flexible approach to site-wide connectivity. In order to adopt this methodology, the high bandwidth IT backbone would have to be set up with QoS to allow for traffic such as:

- [AES67](#)
- [AVB](#)
- [ACN](#)
- [Dante](#)
- [Q-SYS Q-LAN](#)

Consideration should be given to the requirements of the technical departments when defining and configuring the site-wide corporate network, with particular consideration being given to the allocation of bandwidth and priority of traffic.

5.4 Paging & Show Relay Systems

The paging, show relay and bar bells systems will allow announcements across BOH and FOH areas, and audio show relay where required. Bar bells will indicate to the audience in the foyer that a performance is about to start.

The detail of this system will be agreed during the design stages. Initial discussions have revealed the need the following features:

- Paging stations:
 - Show Caller Position
 - Box Office / FOH Office
- Background music (BGM) and input points:
 - Stalls Bar
 - Mezzanine Bar
 - St Johns Bar
- Loudspeakers and controls (volume, venue selection, local input, isolate)

- Bar bells

The loudspeakers will be integrated into the building architecture and finishes. The loudspeakers will likely be circuited into “zones” (particularly in the FOH areas) to allow paging and BGM to be sent to specific areas, along with the isolation of certain areas (for public events, etc.):

- Main foyer areas / public spaces / toilets, etc.
- BOH Dressing Rooms (loudspeakers with show relay volume control)
- BOH circulation
- Theatre stage (paging to stage during day / fit-up operational modes)

The paging and show relay system shall include:

- Loudspeakers with controls to adjust volume of show relay, paging cut switch (where applicable), local input selection (where applicable); discussions with users will define which areas / loudspeakers require the different controls
- Bells to warn the audience that the show is about to commence; these shall be installed in foyers and audience toilets

5.5 Video & Audio Systems

Beyond the main performance space, fixed video relay screens are required in key locations:

- Green Room
- FOH Manager’s office
- Technical offices

Screens in other locations are desirable (for instance in Dressing Rooms), and the infrastructure should be installed to provide this functionality, although the screens themselves have been omitted.

5.6 Assistive Listening Systems

Local infrared or RF transmitters will be installed at the latecomers monitor positions to allow the hearing impaired to listen to the audio from the venue as they are waiting to be seated if arriving late.

An infrared / RF testing station will be supplied / installed at the point where the headsets are issued to allow users to check the equipment. Usually this is done with a two-channel recorded message and / or music running on a loop.

5.7 Loose Equipment Pool

Basic production equipment – access equipment, stage weights, braces, aluminium tube, tools, rigging accessories, portable staging, stage ironmongery and the like – will come from the existing stock and be reused across the facility.

5.8 Broadcasting Facilities

Provision is required for the parking of broadcasters’ vehicles, their powering, and the access ways for temporary sound and camera cables to all parts of the complex.

Planning and provision of cable routes for temporary cabling is essential whether it is internal for a production or external for an Outside Broadcast (OB). These routes include:

- Touring sound multicore from stage to live sound control position
- Stagehouse to OB truck location
- Amp room to stagehouse

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