

Cranleigh Village Hall

Specification



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CRANLEIGH PARISH COUNCIL



Stage Lighting, Stage Engineering & Audio Visual Systems Specification for Tender

Prepared for: Beverley Bell - Parish Clerk, Cranleigh Parish Council
SE Reference: 22119-SE-1-Specification

Date Issued: 18th April 2024
Version: 001

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1. Introduction & Overview

1.1 Introduction

This specification and the accompanying documentation is provided to offer Cranleigh Village Hall a description of the desired technical performance systems so that they may be tendered for procurement.

These systems include Stage Lighting, Stage Engineering and Audio Visual Systems.

The final scheme is to be developed and coordinated by the chosen specialist integrator as a Contractor Design Portion (CDP).

It shall be noted that Stage Electrics are not precluded from bidding for this package of works.

1.2 Accompanying Information

This document is part of a wider package of documentation that provides the information for the Stage Lighting, Stage Engineering & Audio Visual Systems that will be installed at Cranleigh Village Hall.

This document must be read in conjunction with the supporting documents identified below;

<u>Document Reference</u>	<u>Document Title</u>	<u>Revision</u>
23119-SE-101-1001	Hall & Stage Ground Floor Overview Plan	P01
23119-SE-104-1001	Hall & Stage Section Detail	P01
23119-SE-Cranleigh-RM	Responsibility Matrix	V01
23119-SE-Cranleigh-FPS	Facility Panel Schedule (FPS)	V01
23119-SE-Cranleigh-AR	Acousticians Report (provided by a third party)	V01

1.3 Primary Objectives

There is no dedicated primary function for this space.

It is multipurpose and aims to facilitate various events such as theatre, live music, conference and presentations, community events, weddings and private functions.

We understand the primary objectives of this project to be:

- An improved stage lighting and audio visual infrastructure to facilitate a wider programme of events.
- To reduce working at height, specifically over the stage for more frequent changes.
- To offer flexibility and greater connectivity in the hall for current and future equipment.
- To offer multiple levels of system control for community users and more complex technical users.
- To improve the acoustics in the hall.

2. Instructions to Tenderers

2.1.1 Disclosure

Stage Electrics have undertaken the task of initial design development for the specialist systems and offered budget advice for the scope of works.

Stage Electrics are not in receipt of any formal designs or Employers Requirements from the end user or a third-party consultant.

This design has been specified by Stage Electrics with reasonable skill and care and is based upon discussions whilst attending the venue to meet with the project stakeholders and users of the hall.

We have considered how the hall is used now and what will be achievable in the venue moving forwards.

Systems have been designed to meet the end users requirements, whilst considering budget constraints, coordination with other trades and services and restrictions imposed by the fabric of the existing building.

The final scheme is to be developed and coordinated by a specialist integrator as a Contractor design Portion (CDP).

It is the responsibility of the chosen specialist integrator to complete the design and ensure that all items required to deliver a fully functioning system (as per the specification) are included.

To clarify, design responsibility for this package of works shall be with the installing contractor.

The design of the systems will be completed in accordance with relevant legislation, this specification and appropriate codes of practice.

It shall be noted that Stage Electrics are not precluded from bidding for this package of works.

E&OE (errors and omissions excepted).

Whilst every effort is made to ensure accuracy, Stage Electrics does not accept liability for errors.

2.1.2 Programme

The specialist successful contractor shall be expected to install these works before the end of 2024.

The venue will close in July 2024.

The works must be completed in December 2024.

It is anticipated that this specialist package shall take place between October – December 2024.

Whilst access may be available for enabling works before October, consideration must be given to other trades working in the hall. Any works to be carried out alongside others must be carefully coordinated.

2.1.3 Alternative / Equivalent Products

Where particular makes and/or models of equipment are specified in this document or accompanying documents this forms the basis for the design and any associated budget advice.

Key product choices have been discussed and agreed with the end users and compatibility between products has been considered as a part of the design process.

Where specific makes and/or models of equipment are identified in this document, tenderers must provide in their base tender a cost for supply of this equipment. Tenderers are welcome to make a separate offer for the supply of alternative but equivalent equipment. Any such alternative offer is to be issued as a separate document or schedule to avoid confusion and aid comparison between tenderers.

Where specific makes and / or models of equipment are not identified in this document, it is the tenderers responsibility to choose a suitable product to fulfil the design intent of the project to a high standard.

After contract award, in the event of equipment becoming unavailable or obsolete though the contract period the SSC reserve rights to substitute equipment for a suitable equivalent. Written agreement should be sought from the client team before procurement of alternative items.

2.1.4 Drawing & BIM

The design output and documentation associated with this design package is limited to the documents detailed in the previous document reference table. The responsibility (if required) for the incorporation of these works into any BIM systems or collaboration software is currently outside of this scope.

2.1.5 Return Documentation

For those wishing to provide a tender return for this package of works, a blank BoQ template is issued;

23119-SE-Cranleigh-BoQ	Cranleigh BoQ Template	V01
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This document must be completed in Excel and issued with Excel and PDF versions.

If the tenderer believes any items have been omitted from the specification or BoQ and are required to provide a fully functional system, these should be identified in the Additional Items section.

If the bid is not compliant or includes alternative products, these deviations from the specification must be shown on a separate addendum giving additional cost, design and product information.

Tenderers are encouraged to issue documentation that demonstrates their ability to complete this package of works.

2.1.6 General Information to Tenderers

The cost of preparing the tender shall be borne solely by the Tenderer, including attendance at site visits if deemed necessary.

Tenders that omit any part of the specified requirements may be deemed non-compliant.

Any material of a confidential nature submitted by a tenderer as part of their tender should be clearly marked as such.

The tenderer acknowledges that the contract might not be let to the lowest / cheapest return.

The Tenderer agrees upon submission of their return that they have reviewed all tender documents and that the tender submitted is inclusive of all labour, materials and supplies required to deliver the complete operational systems as specified.

Tenderers must have capacity to complete the package of works in the programme detailed above

Tenderers must, if requested to do so, provide proof of their financial ability to complete the project.

Tenderers must be able to evidence completed projects of a similar type, scale and value to those described within this specification for a period of at least five years.

All tenderers shall be registered with a recognised competent persons scheme such as NICEIC as suitably qualified to undertake electrical installations of this nature.

As this subcontract includes the design responsibility for a fully functioning system, it is expected that the tenderer will carry Professional Indemnity Insurance cover to a minimum of £1m for each and every claim. Tenderers must, if requested to do so, evidence their professional indemnity insurance and employers liability insurances.

3. Design Responsibilities & Exclusions

The objectives of the project will require some items of equipment and supporting services to be installed as enabling works by others or existing. Any enabling services shall be designed by others with input from the specialist contractor.

This specification and the accompanying information must be read in conjunction with the Responsibilities Matrix -23119-SE-1-Cranleigh-RM. This document breaks down and sets out the responsibilities in respect of the key items within this work package plus related, enabling and accompanying works by others. This tabular presentation method is used to show which specialist and/or trade will have responsibility for which work package and related forms of activity.

As there are several work packages with critical interfaces between trades and other works, it is essential that adequate co-ordination time is allowed within each trade and related work package to enable the efficient delivery of the project: These trades include but are not limited to:

- EC - Electrical Contractor
- SSC – Specialist Sub Contractor - Stage Lighting, Stage Engineering and Audio Visual

As an overview, the main exclusions will include (but are not limited to):

- Incoming power supplies and distribution boards to support the systems
- Surge Protection Device (SPD) for power supplies associated with the systems
- Local 13A power supplies for adjacent to low level facility panels
- Primary steel work to support the over stage lighting and engineering systems (existing)
- Unwired vertical lighting wall booms in the hall (existing)
- Structural engineer approval for loads imposed on the building by SE designed systems
- Structural calculations
- Making good
- Cabled links to other areas of the building (if required)
- Laptops, Smart devices, Audio playback devices and computers (assume end user supplied)
- Radio microphone licences
- Assisted listening systems
- Show Relay and Paging systems
- General / house lighting
- Emergency lighting
- Control of general / house lighting
- PAVA systems
- Fire alarm interfaces
- Control room furniture
- Tiered / bleacher seating systems

These requirements will be advised further during the detailed design phase and shall be subject to coordination at contract award. The overriding requirement at this stage is to capture these items and review any associated costs and to ensure that equipment and services by others are positioned appropriately to ensure that the project realises its functional objectives.

No allowance has been made for the SSC to be The Principal Contractor.

4. Glossary

ABTT – Association of British Theatre Technicians – Authors of the “Yellow Book - Technical Standards for Places of Entertainment”

AFFL – Above finished floor level

AoIP – Audio over IP

AWP - Aerial Work Platform (also MEWP – Mobile Elevated Work Platform)

AV – Audio-Visual

BGM – Background Music

BOH – Back of House Areas

BWS – Black Wool Serge

CWS – Coloured Wool Serge

Dante – Digital Audio Network Through Ethernet

DB – Distribution boards

DMX – DMX512 (Digital Multiplex Lighting Control Protocol)

DSP – Digital Signal Processor

EC – Electrical Contractor

ELV – Extra Low Voltage - Sound, communications, data and audio-visual This is services <1000v.

FCU – Fused connection unit

FOH – Front of House Areas

FP – Facility Panel

FPS – Facility Panel Schedule

HD-Base-T / HDBT – A long range format for HDMI transmission

HD-SDI/3G-SDI/12G-SDI – Professional digital video protocol

IPTV – Internet Protocol Television (Digital signage/streaming media system)

LOLER - Lifting Operations and Lifting Equipment Regulations 1998 (UK Health & Safety Executive).

LV – Low Voltage - greater than 50vAC and less than 1000vAC – 230v/400v wiring.

MC – Main Contractor

MCC – Motor Control Cabinet

PAVA - Public Address and Voice Alarm System

PL – Production Lighting

PLB – Production Lighting Box Facilities Panel

PLR - Production Lighting Rack - Equipment rack for tie line terminus and system equipment

Primary Containment – The main cable containment routes through any given level

PSS – Power Supplies Schedule

PTZ – Pan/Tilt/Zoom, the Axis and auto image functionality of automated cameras and light fixtures

PUWER - Provision and Use of Work Equipment Regulations 1998

RDM –Remote Device Management Lighting Control/Configuration Protocol

sACN – Architecture for Control Networks (ACN) – for lighting data

SCB – Audio-Visual Sound and Communication Facility Panel

SCR– Audio Visual Rack – Equipment rack for tie line terminus and system equipment

SE – Stage Electrics

SEB – Stage Engineering Box

Secondary Containment – The specific route from any primary containment installation to a specific service terminus.

SPL – Sound Pressure Level

SPN – Single Phase and Neutral and Earth

SSC – Specialist Sub Contractor

TPN – Three Phase and Neutral and Earth

WLL – Working Load Limit

5. Specification

5.1 Stage / Production Lighting

5.1.1 Mains Power Distribution

- Incoming mains distribution to include supplies, boards and breakers shall be provided by others to a specification agreed with the SSC.
- These shall support the following equipment:
 - dedicated production lighting power distribution rack
 - audio visual equipment rack
 - projection screen
 - data projector
 - technical power sockets around the venue
 - motor control cabinet
- It is anticipated that the SSC shall provide the following power supplies from the DB by others:
 - Production lighting power rack on stage right
 - Sound, AV & Comms rack on stage left
 - Motor Control Cabinet on stage right
 - Projection screen over upstage
 - 13A sockets at truss advance only (all other 13A sockets by EC)

Please refer to the Responsibilities Matrix to confirm power requirements.

5.1.2 Dedicated Stage Lighting Power Distribution

- One (1) Zero 88 Rigswitch with 12 x 16A channels and RCBO protection shall be installed to support dedicated production lighting power outlets across the stage and auditorium.
- This power rack shall be located installed on stage right
- The rack is a DMX controllable device.

5.1.3 Stage Lighting Power (LV) Cabling

- The power cabling for the stage lighting circuits on the lighting bars and PLBs shall be provided by the SSC.
- The cable type must be chosen to suit the containment requirements, in most instances, open containment will likely to be the most suitable option.
- The cable size should be chosen to suit the length of run for each circuit.
- All LV cable must travel in separate containment to AV signal cables.
- All LV cable shall be LSZH or LSF.

Note: some circuit locations are paired – please see FPS for more detail.

5.1.4 Power Containment

- The power containment for the dedicated production lighting circuits and the SSC installed power distribution detailed in section 5.5.1 shall be provided by the SSC.
- The containment type must be chosen to suit the requirements of the building.
- Where appropriate, existing containment may be re-used.
- The containment must include flexible kopex to the over hall truss position any boxes at wall boom locations.

Note: the ceiling in this venue contains asbestos. Any additional penetrations must be authorised before commencement of works. An extensive asbestos report is available from the client on request.

5.1.5 Over Stage Lighting Bars

Note: Included as a part of the over stage hoist solution. No additional requirement in this section.

5.1.6 New Auditorium Wall Booms

- Two (2) unwired plain lighting bars shall be installed to the walls in advance positions to the stage.
- These bars shall be in addition to the existing six bars that are already installed.
- These additional lighting positions shall offer closer cross and front light the stage opening and more flexible lighting positions to any apron stage or catwalk style configurations.
- Each bar shall be RAL painted to match (or closely match) the existing bars and walls.
- Each bar shall have a minimum of Three (3) wall fixings.

5.1.7 Over Auditorium Truss

- One (1) length of Prolyte H30V square truss shall be installed over the hall / auditorium to suspend advance lighting fixtures, delay speakers and a projector.
- The truss shall be 8m long and suspended in two locations through existing apertures in the ceiling.
- This shall be a fixed / static truss. There are no flying systems in advance of the proscenium arch.
- Strong points / anchor points for the truss fixings above the ceiling are to be supplied and installed by the SSC.
- The client's structural engineer shall be responsible for approving the design of this truss and any over stage suspended equipment to ensure that the building is capable of taking the loads imposed by these installed systems and any anticipated additional load from deployable equipment such as fixtures, speakers, projectors and drapes.

5.1.8 Stage / Production Lighting Boxes

- Twelve (12) Production Lighting Boxes (PLBs) shall be installed at various locations around the stage and hall to provide dedicated production lighting power outlets for LED fixtures.
- These boxes are referenced as PLBs (Production Lighting Boxes) on the drawings and specification documents. Please refer to the facility panel schedule for allocation of services. As aforementioned, some of the circuits are paired.
- Production Lighting power circuits shall be presented as Powercon True 1 connections.
- Each of the panels shall be entirely of metal construction and wall, bar or truss mounted at positions indicated on the drawings.
- On stage facility boxes and faceplates shall be black
- Boxes and faceplates in the hall shall be white, with the exception of the box at truss level which shall be black.
- All facility panels are surface mounted unless instructed otherwise.
- PLB back boxes shall be installed to the containment systems by the SSC.
- PLB faceplates shall be installed and terminated by the SSC.
- *Note: DMX control services for these locations are co-located on adjacent SCBs to reduce multiple containment drops.*

5.1.9 DMX Distribution Devices

- As detailed above, each lighting position shall have an adjacent DMX control output(s). These are integrated into the SCBs. Please refer to the FPS for allocation of services.
- Lighting desk inputs are also provided on stage left, at the hall control panel at floor level and on the gallery at the rear of the hall.
- DMX control inputs and outputs shall be presented as 5-pin XLR connections.
- Lighting control inputs and outputs shall be supported by rack mounted DMX distribution housed in the equipment rack on stage left.
- Patch bays shall be clearly labelled with printed paper labels installed into the rack panel or engraved traffolite labels. Printed stick on labels are not acceptable.
- DMX patch bays shall have lacing bars on the rear to neatly manage the incoming / outgoing cables.

Note: there is no separate production lighting rack, these devices are housed in the AV rack.

- The distribution devices shall include Three (3) Chauvet Professional RDM enabled 1:8 / 2:4 way splitters.
- A minimum of Twenty-Seven (27) 600mm DMX patch cables shall be provided, each with red cable or red ident collars.

5.1.10 Stage Lighting Control (ELV) Cabling

- The lighting control cabling for each production lighting position shall be provided by the SSC.
- The cable type must be chosen to suit the containment requirements, in most instances, open containment will likely to be the most suitable option.
- The cable shall be 500V rated to travel in power and AV containment systems. However, where possible, it is preferred that DMX control cable is installed in AV containment with any shared containment being within the final metres of the run.
- All DMX control cable shall be wired to the AV rack on stage left.
- All ELV cable shall be LSZH.

5.1.11 Stage Lighting Control Console

- One (1) Varilite FLX S48 lighting desk with 2 DMX universes shall be supplied, complete with:
 - One (1) flight case,
 - Two (2) 5m DMX cables
 - One (1) 24" touchscreen monitor

5.1.12 LED Fixtures

- A package of LED fixtures shall be provided to include:
 - Four (4) Chauvet Professional Ovation E910FC profile engines with 15-30 degree zoom lenses
 - Two (2) Chauvet Professional Ovation E-2 FC profile fixture with integral 25-50 degree zoom lenses
 - Two (2) Chauvet DJ Intimidator Spot 475ZX moving head
 - Two (2) Chauvet Professional Rogue R1X moving wash head
- Each fixture shall be fitted with Powercon True 1 power cables, 2m 5-pin DMX cables, half coupler(s) and a safety bond.

5.2 Raise & Lower System for Over Stage Bars

5.2.1 High Level Unistrut To Span Steels

- There are Four (4) existing primary steels installed from downstage to upstage. These are approximately 3m apart. These primary steels shall provide the main fixing points to suspend the flying hoists for lighting and scenery bars and the curtain tracks.
- The SSC shall provide required secondary steelwork to obtain appropriately spaced fixings points for the hoist systems.

5.2.2 Overhead Hoists, Pulleys and Lines

- Three (3) Doughty Hoist systems (special spec) shall be provided over stage.
- Please see the accompanying layout drawing 23119-SE-101-1001 to see the proposed positions of the flying bars.
- Two of the hoists shall support lighting bars and shall be supplied with suitable socket boxes to support the power circuits and DMX lines as detailed in the FPS.
- These hoists with integral socket boxes shall be wired with cable management systems and services shall be presented with Powercon True 1 and 5-pin DMX connections.
- Above the lighting bar hoists, high level termination chambers shall be fitted to receive the cables from the power rack and AV rack.
- One of the hoists shall support a scenery bar to hang backdrop cloths, drapes and banners.
- The hoists shall offer a maximum load of 200kg
- The hoists shall be fitted with 48.3mm diameter bars. Each of the bars shall be approx. 9.5m – 10m long. Setting out and exact dimensions shall be established by the installing contractor.
- Each hoist includes overload and slack rope sensors and top and bottom travel limits.

5.2.3 Electric Control System

- One (1) Doughty Hoist controller shall be installed on stage right.
- This unit shall be a metal wall enclosure.
- The controller shall have:
 - Raise and lower buttons (one set per hoist)
 - Emergency stop mushroom switch
 - Power indicator light
 - Antichatter circuitry

Note: this cabinet will require a 16A TPN supply to be installed by the SSC. As detailed in section 5.1.1

5.2.4 Containment Systems

- The SSC shall provide suitable containment to house the power and control cables from the stage right cabinet to each hoist location.

5.2.5 Hoist Cabling Systems

- The SSC shall provide suitably sized power and control cables for the Doughty Hoists.
- Minimum power requirement to each hoist:
 - 4-core 400V 1.5mm sq
- Minimum control requirement to each hoist:
 - 3-core 24VAC 1.0mm sq
 - *Note – most 3-core cables have a green/yellow core, if this is used for control, this core ought to be sheathed or coloured as it is not being used as an earth core.*

5.3 Curtain Tracks and Drapes

- Curtain tracks and drapes shall be installed on stage for performance requirements only.
- This scope does not include any window coverings or auditorium black out. It is assumed that blinds shall be supplied by others to cover the windows.
- Please see the accompanying layout drawing 23119-SE-101-1001 to see the proposed positions of the curtain tracks.
- All drapes shall be flame retardant (IFR or NDFR depending on chosen fabric)
- All tracks are fixed, installed as static equipment with no flying systems. The only cloth that utilises a flying bar is the cyc cloth.

5.3.1 FOH Replacement Track

- One (1) pulley operated crossover track shall be installed downstage to provide a fabric divide between the seated audience and the stage area.
- This track shall replace an existing system that is old and sticks when being pulled.
- Where appropriate, the existing upper fixings to the proscenium wall may be re-used. The SSC should ascertain if additional or new fixings are required.
- This FoH track shall be Doughty Six Track supplied with required components as follows:
 - Track lengths
 - Runners – standard and master carriers
 - Joint bolt sets
 - End stops
 - Overlap clips
 - Line guide
 - Header and return pulleys
 - Sash Cord
 - Manually operated cord system with a weighted pulley system
- The front of house track is manually operated. A single person can pull the curtains open and closed from the pendular pulley at the side of the stage.
- The existing drapes are in very good condition and shall be re-used.
- The existing FoH border or valance is in very good condition and shall be re-used. The fixing method for the border is directly to the back of the pros opening.

5.3.2 Half Tabs Tracks and Drapes

- One (1) pulley operated crossover track shall be installed mid stage to provide a fabric mid-stage divide, separating upstage and downstage.
- This half tabs track shall be Doughty Six Track supplied with required components as follows:
 - Track lengths
 - Runners – standard and master carriers
 - Joint bolt sets
 - End stops
 - Overlap clips
 - Line guide
 - Header and return pulleys
 - Sash Cord
 - Manually operated cord system with a weighted pulley
- The half tabs track is manually operated. A single person can pull the curtains open and closed from the weighted pulley suspended from the end of the track.
- The fixings for the half tabs track shall be threaded stud drops with upper fixings provided to secondary steelwork provided by the SSC.
- Fixings will need to be installed no more than 1.5m apart with additional fixings at the ends for gathered curtain weight.
- One (1) pair of half tab stage drapes shall be installed to the following specification:
 - Fabric – black wool serge
 - Dimensions – as per the drawings
 - Sewn with 30% gathered fullness
 - Hemmed edges
 - Weighted base
 - Hooks on the top

5.3.3 Half Tabs Track Border

- One (1) border bar will be installed downstage of the half tabs curtain track to suspend a fabric valance across the middle of the stage. This will hide the upper curtain track and fixings.
- One (1) shallow fabric border shall be provided to the following specification:
 - Fabric – black wool serge (BWS)
 - Dimensions - Approx 1200mm drop
 - Sewn with 30% gathered fullness
 - Hemmed edges
 - Hemmed base
 - Tie tapes on the top

5.3.4 Upstage Swipe Track & Backdrop Cloths

- One (1) straight manually operated walk-along track shall be installed upstage.
- This swipe track shall be Doughty Six Track supplied with required components as follows:
 - Track lengths
 - Runners – standard carriers
 - Joint bolt sets
 - End stops
- The swipe track is manually operated as a walk-along. There is no pulley system.
- The fixings for the upstage swipe track shall be threaded stud drops with upper fixings provided to secondary steelwork provided by the SSC.
- Fixings will need to be installed no more than 1.5m apart with additional fixings at the ends for gathered curtain weight.
- One (1) pair of backdrop cloths shall be installed to the following specification:
 - Fabric – black wool serge
 - Dimensions – as per the drawings
 - Sewn with 30% gathered fullness
 - Hemmed edges
 - Weighted base
 - Hooks on the top

5.3.5 Upstage Cyc

- One (1) cyclorama cloth shall be provided to the following specification:
 - Fabric – bleached white filled cloth
 - Dimensions – as per the drawings
 - Sewn flat with 0% gathered fullness
 - Hemmed edges
 - Pocket base (for a pole / conduit)
 - Tie tapes on the top
- The cyc cloth is to be suspended from the flying scenery bar.
- A storage bag shall be provided to keep the cyc protected if derigged for other cloths.

5.3.6 Wing Masking and Legs

- A variable wing masking track system shall be installed above stage left and right to suspend flexible leg drapes.
- The layout of the wing masking and the intended movement of the swivel arms is shown on the layout drawing. It comprises of:
 - Two (2) fixed upstage / downstage curtain tracks installed between the FoH track and the upstage swipe track on each side of the stage.
 - Four (4) swivel arms – two on each side of the stage
- This masking tracks shall be Doughty Six Track supplied with required components as follows:
 - Track lengths
 - Joint bolt sets
 - End stops
 - Braked swivel arms with tube
- One (1) 5.5m operating pole shall be supplied to move the legs into position from low level.
- The fixings for the wing masking tracks shall be threaded stud drops with upper fixings provided to secondary steelwork provided by the SSC.
- Fixings will need to be installed no more than 1.5m apart with additional fixings at the ends for gathered masking weight.
- The setting out of these masking tracks (both position and height) must be carefully carried out to ensure that the flying bars do not clash with any fixed masking during the flying in and out of lighting and scenery bars.
- Once the bars are rigged and flown out, the deployable masking may be positioned for the show. If applicable, it will be the end users responsibility to ensure that the flexible masking is clear of the flying systems before the hoists are activated.
- Four (4) fabric masking legs shall be installed to the following specification:
 - Fabric – black wool serge
 - Sewn with 30% gathered fullness
 - Hemmed edges
 - Weighted base
 - Ties on the top

5.4 Audio Visual Systems

5.4.1 Facility Panels

- Seventeen (17) facility panels will be installed at low and high level around the venue. Each of the panels shall be entirely of metal construction and wall, bar or soffit mounted at positions indicated on the drawings.
- These panels are referenced as SCBs (Sound and Comms Boxes) on the drawings and specification documents. Please refer to the facility panel schedule for allocation of services.
- SCBs provide connection points throughout the venue for the following services; analogue audio (paralleled), AV data, loudspeaker, comms, assisted listening and production lighting control services.
- Connectors are to be Neutrik or of an equivalent quality with proven reliability and robust build quality for professional venues.
- All SCBs are bespoke. Where possible, they are to be designed with standard backbox sizes and if required may be grouped with a modular configuration.
- Backboxes for most SCBs shall be a minimum of 100mm deep. Larger boxes may have 150mm deep back boxes to allow for a suitable data cable bend radius.
- On stage facility boxes and faceplates shall be black
- Boxes and faceplates in the hall shall be white, with the exception of the box at truss level which shall be black.
- All facility panels are surface mounted unless instructed otherwise.
- PLB back boxes shall be installed to the containment systems by the SSC.
- PLB faceplates shall be installed and terminated by the SSC.
- AV services and panel identifications shall be engraved Traffolite labels, fixed to the face plate. Printed labels are not acceptable.
- Terminations shall be by solder bucket or approved crimp tool only and where crimped termination is used, the crimp; die and insert shall be suitable for use together.
- For XLR connectors, these shall conform to the universal or D shell type and mounting holes. Soldering of solid core cables directly to XLR type connectors is deemed unacceptable, e.g. CAT5E or CAT6A
- Where AV Data outlets are specified for the SCB connections, these shall be an EtherCON type connector comprising of an CAT6A RJ45 connection within an XLR D shell style housing.

5.4.2 Sound and Audio-Visual Signal (ELV) Wiring

- The selection and specifications of installed AV cabling shall be as defined below.
- The supply and installation of the ELV cables (<230v) shall be completed by the SSC.
- All wiring shall be LSZH in suitable containment systems which shall be designed, supplied and installed by the SSC.
- Where ELV cables are to be installed for the production lighting control and audio-visual systems, the following conventions shall be adhered to:
 - Cable Length at End-Point Locations:
 - Panels – Leave 2m length from point of entry into the panel or three times the length of the longest dimension on the panel, whichever is the longer.
 - Racks – Leave 7m length from point of entry into the rack
 - Labelling standards:
 - Cables to be labelled in accordance with the Cable Schedule
 - Cables to be labelled using printed wrap around cable identifications.
 - Cable ident labels to be installed within 200mm from the entry to the rack or panel and within 500mm from the end of the cable (at each end)
 - Cables to be grouped where possible in cable types when at endpoint location.
 - Installation Standards:
 - Cables shall be installed in containment systems as defined in the cable schedules.
 - Bend radius standards on cables shall be in accordance with the cable manufacturers recommended standard.
 - All cables shall be installed in a manner that ensures its full performance characteristic can be realised.
- All required signal and control cable to support the facility panel services above and the control systems shall be provided.
- Cable specifications shall include (but are not limited to):
 - FST & FSJ screen multicores – audio tie lines / comms
 - ZHP225 2.5mm 2 core speaker cable – loudspeaker tie lines
 - S/FTP CAT6A – AV data / HDBT
 - 500V rated DMX – lighting control
- All ELV cable shall be screened where appropriate.
- All ELV cable shall be LSOH / LSZH.

5.4.3 ELV Containment

- The ELV containment for the dedicated audio visual and lighting control cabling as detailed in section 5.4.2 shall be provided by the SSC.
- The containment type must be chosen to suit the requirements of the building.
- Where appropriate, existing containment may be re-used.
- The containment must include flexible kopex to the over hall truss position any boxes at wall boom locations.
- *Note: the ceiling in this venue contains asbestos. Any additional penetrations must be authorised before commencement of works. An extensive asbestos report is available from the client on request.*

5.4.4 Equipment Rack and Patch Bays

- One (1) 42U 600mm x 800mm deep equipment rack shall be positioned on stage left to house all the Audio-Visual processing and amplification equipment, as well as the aforementioned DMX distribution for the Production Lighting system.
- This rack is also a central patch location for any AV tie lines services, enabling audio and data to be transferred from point to point within the venue.
- The rack is referenced as SCR1-001 on the general arrangement drawing
- The rack shall be of steel construction, floor mounted and finished in black.
- It shall feature an identification label with a logo panel and labelling to identify sections of the rack applicable to production lighting and AV services.
- The rack shall be fitted with internal cable management to neatly loom and separate all LV and ELV services within.
- The rack shall feature removable side and rear panels and typically the front mounted equipment shall remain without a door to aid airflow. Vent panels also shall be fitted where appropriate.
- Necessary vents and blank panels shall be fitted for spaces left once the rack has been populated.
- This rack shall house the following items:
 - DMX distribution and patch bays (as detailed in section 5.1.9)
 - GPO audio patch bay for analogue tie lines
 - CAT6A Data patch bay for AV data tie lines
 - Network switch
 - Radio microphones
 - AV switcher
 - Audio system processor and system controller
 - Audio systems amplification
 - Blank and vent panels
 - Internal power distribution
 - A 2U rack drawer to house radio microphone receivers when not in use
 - Internal equipment connections and wiring

- All Patch panels shall be complete with a front panel with a labelling area, labels shall show the corresponding outlet box / location and facility number.
- All patch bays shall be fitted with printed paper strip labels or traffolite style engraved labels to identify facility locations. Labels on the panel and the patch bay shall match.
(installed cable ends shall also be labelled accordingly)
- **DMX Patch Bays (production lighting control)**
 - 5-pin XLR patch bays shall be fitted in the rack to support the DMX inputs and outputs around the venue.
 - The quantity provided shall reflect the number of DMX tie lines in the venue, plus any required connections to power racks.
 - DMX patch bays shall be standard 1U 16-way panels with D-series cut outs for panel mounted plugs and sockets
 - DMX inputs and outputs shall be presented at the rack as 5-pin XLR plugs and sockets
 - A minimum of Twenty-Seven (27) 600mm DMX patch cables shall be provided, each with red cable or red ident collars.
- **Analogue Audio Tie Line Patch Bays**
 - 1U 2x24-way GPO patch bays shall be installed to receive the analogue audio tie lines in the space.
 - The quantity provided shall reflect the number of audio tie lines in the venue, plus any required connections to rack mounted equipment.
 - GPO sockets have been chosen rather than 3-pin XLR connections to enable the lines to be normalised or half-normalised into the audio DSP. This means that audio connections to integral devices for presentation are permanent unless deliberately patched otherwise.
 - As well as routing audio to the main audio system, the GPO will also enable point to point transfer of audio between facility panel locations in the space. E.g. from stage end to control end.
 - As aforementioned in section 5.4.1, some 3-pin XLR connectors on the facility panels are paralleled, meaning that they can be used for either send or return. A paralleled line on the panel is presented as a single GPO socket on the rack patch.
 - Forty (40) 600mm GPO patch cables shall be provided. These shall be a mixture of black and red cables.

▪ **Data Tie Line Patch Bays**

- 1U 24-way CAT6A keystone patch bays shall be installed to receive the AV Data tie lines in the space.
- The quantity provided shall reflect the number of Data tie lines in the venue, plus any required connections to rack mounted equipment.
- Not all Data lines in the space will appear on the patch bay. There are some data lines (such as those at the projector or touchscreen) that are un-patchable. This means that presentation devices are not accidentally disconnected.
- Those data lines that do appear on the patch enable point to point transfer of audio and video over data between facility panel locations in the space. This would offer possibilities to use digital audio or Dante enabled consoles and stage boxes in the space or to plug in cameras with conversion boxes to capture live events.
- Thirty (30) 1m CAT6A patch cables shall be provided.

▪ **Network Switch**

- One (1) 24-way PoE enabled Gigabit network switch is to be included to support the AV control and digital audio devices as required.

▪ **Ring Intercom Buss**

- Ring Intercom buss panels (din-rail) shall be installed to the rear of the equipment rack and shall feature a passive distribution of wiring to star configuration.
- This is for the end users to plug in party-line intercom systems.

Note: no speaker patch is required, as connections to installed speakers are wired directly to the amplification.

5.4.5 Audio System – Loudspeakers

- The audio system is multipurpose to provide reinforcement for live theatre, music and comedy performances, music playback and presentation audio. It is not ideally suited to very large scale music events such as rock bands who require a larger sound. In these instances, touring musicians may bring their own equipment and use the installed cable infrastructure to connect their equipment and run digital audio over AV data services on the SCBs.
- Ten (10) RCF Compact M Series loudspeakers shall be installed as follows:
- Two (2) white full range 300W point source loudspeakers with 10" woofer + 1.4" voice coil are to be installed to the proscenium wall either side of the stage opening.
- Two (2) white full range 200W point source loudspeakers with 8" woofer + 1.4" voice coil are to be installed half way along the hall at the second lighting boom position to provide delays / reinforcement.
- Two (2) white full range 200W point source loudspeakers with 8" woofer + 1.4" voice coil are to be installed to the rear of the hall at high level at the fourth lighting boom position to provide balcony fill.
- Two (2) black full range 200W point source loudspeakers with 8" woofer + 1.4" voice coil are to be installed to the over hall truss rear to provide delays / reinforcement.
- Each wall or truss mounted loudspeaker shall be supplied with model specific hanging accessories, secondary safety devices (on truss) and connection cables.
- Two (2) 500W Sub bass loudspeakers with 15" high power woofer + 2.5" voice coil shall be supplied as portable items that can be floor or stage positioned to suit the needs of the performance. Each sub shall be provided with a 5m cable.

5.4.6 Audio System – Amplification

- Five (5) RCF IPS Series 2-channel amplifiers shall be housed in the equipment rack to support the loudspeakers detailed above.

5.4.7 Audio System – Processing

- One (1) 16x16 Digital Sound Processor (DSP) shall be fitted in the rack. This device shall set the limits and EQ parameters for the audio system. It is also the main control hub of the touchscreen control system detailed later.

5.4.8 Audio System – Digital Console and Stage Box

- One (1) Allen & Heath QU-16, 16 input digital mixing desk shall be provided for use at the control positions in the hall.
- These plug in points are on the gallery, at the rear of the hall at floor level and there is an additional input on stage left for technical rehearsals.
- At each of these console locations, a dedicated L&R audio input shall be fitted to the SCB boxes to connect the main audio outputs from the console directly and permanently to the DSP. This feature will free up the standard audio tie lines for source equipment and fold back. It will also offer the ability for users to plug in basic external audio devices, such as MP3 players / iPods for simple audio playback (like aerobics / yoga classes etc), DJs or smaller music acts with local analogue mixers.
- One (1) Allen & Heath AB168 stage box to connect multiple audio sources on stage to the control console location shall be provided. This will facilitate 16 sends and 8 returns over one data cable.
- The console shall be provided with One (1) 3m EtherCON cable and Eight (8) 3m 3-pin XLR cables.
- The stage box shall be provided with One (1) 5m EtherCON cable.

5.4.9 Radio Microphones

- One (1) Audio Technica System 10 combo system shall be provided to be used and controlled predominantly with the AV presentation system.
- The microphones can also be used with the main audio console if patched to the control positions.
- The system shall come with unipak and handheld transmitters and a lavalier / tie clip microphone
- The aerials of the radio mic system shall be fitted to the front of the AV rack on stage left.

5.4.10 Projection System – Projector

- One (1) Panasonic WUXGA, 7000 Ansi lumens data projector shall be provided complete with:
 - Suitable zoom lens to support a 4m wide image from hanging position on the truss
 - Unicol model specific hanging bracket and upper fixings to suspend the data projector from the over auditorium truss.
 - Required CAT6A data cables to connect the projector to the high level facility panel for video signal and projector control.
- The main on / off operation and the video source select of the projector shall be operated via the touch screen control system (detailed below). Alternatively, the handheld remote control may be used for greater function control.

5.4.11 Projection System – Screen

- One (1) 4m wide electrically operated projection screen with 16:10 aspect ratio shall be fitted in a downstage position. This is shown on drawing 23119-SE-101-1001.
- The exact hanging height of the screen box is to be determined during the detailed design phase of the project.
- The up / down operation of the screen shall be operated via the touch screen control system.
- The power supply for the projection screen shall be provided by the SSC at high level as detailed in section 5.1.1.
- Any control cable and interface requirements shall be provided by the SSC.

5.4.12 Laptop Connectivity & AV Switching

- Three (3) Kramer HDMI plug in points shall be installed in key locations in the hall.
- These plug in points are on the gallery, at the rear of the hall at floor level and on stage left. In the same locations and plug in points for the lighting and sound consoles. Adjacent to SCB1-001, SCB1-005 & SCB1-111
- These shall receive a video and audio over HDMI feed from the end user supplied laptop.
- The plug in positions enable long-distance transfer of HDMI content over CAT6A data cables, also referred to as HDBT.
- The HDMI transmitters in the hall shall be PoE acceptors, meaning that no local power supply shall be required to support the HDMI panel.
- The HDMI receivers in the rack shall be bi-directional PoE acceptor / providers.
- One (1) Kramer AV switcher is fitted in the AV rack in the store. This device receives the HDMI signals either via direct HDBT connections or via plug in receiver devices.
- This switching device shall de-embed and route the audio content from the HDMI sources to ensure that when the picture switches, the audio switches to match the picture.
- The AV switcher source selection and audio content volume shall be controllable via the touchscreen controller.

5.4.13 Touchscreen Control System

- As detailed above, the venue control systems are designed to be flexible for different types of users.
- For the more complex technical performances, lighting and sound consoles can be used by trained / competent technicians.
- For more basic day to day uses, such as presentation or functions, simple system functionality can be accessed via a touchscreen by users with less technical ability.
- **User Interface**
- The user interfaces for the control system shall be:
 - One (1) 7" touch screen shall be fitted at stage left.
This will be either wall mounted or fitted in the front of the equipment rack.
This will be an accessible position for building staff and authorised operators to use.
- The touchscreen shall be accessed with PIN code authorisation.
- The touchscreens present the system control as a graphical user interface (GUI) that looks like a basic internet screen or as simple as a cashpoint screen.
- *Note: the hall users have decided that a single fixed position is more appropriate for their use, as a wireless device is likely to be lost, damaged or uncharged before events.*
- The touchscreen shall provide remote operation of the following items:
 - Projector – source switching and on/off
 - Electric projection screen – up/down
 - Recall of pre-programmed production lighting pre-sets for presentation lighting states or venue colour washing / theming.
 - AV Switching equipment (to swap HDMI inputs)
 - Audio DSP – basic commands to include:
 - Pre-set recall – to set room configuration
 - Overall loudspeaker system volume control
 - Radio microphones volume control and muting
 - AV content volume control

Note: the specified control system does not offer control to the general lighting / house lighting system in the space.

▪ **Control System Devices**

- The control system is made up of a number of devices, as detailed above, some of which are integral to other parts of the AV systems.
- One (1) 8-port network switch to be fitted in the rear of the equipment rack will offer Power Over Ethernet (PoE) to the fixed touchscreen device. This is an un-patchable device ensuring power cannot be accidentally unplugged.
- This network switch shall also support networkable devices that require control, such as the projector, AV switcher and audio processor.
- The 16 x 16 audio DSP as detailed in section 5.4.7 provides the main hub for the control system.
- A DMX lighting interface shall be provided to trigger up to 6 pre-set production lighting states.

5.4.14 Intercom

- To facilitate communication around the stage and at the control positions for members of backstage crew, a wired intercom system shall be installed.
- One (1) Altair master station shall be installed in the rack
- Four (4) 1-channel belt packs, complete with 5m XLR cables and single muff headsets shall be provided for use by the technical team.

5.5 Complete Project Installation & Commissioning Labour (SL, SE, AV)

Please refer to the Responsibilities Matrix – 23119-SE-Cranleigh-RM, to confirm the full installation and commissioning requirements.

5.5.1 Installation

On-site labour shall be required to complete the works as detailed above and to include (but not limited to):

- Installation of the technical power services to support the systems detailed above.
- Installation of stage lighting power distribution rack, load cabling and dedicated stage lighting circuits, including termination and electrical testing and certification.
- Installation of LV containment systems for dedicated production lighting circuits and technical supporting power services.
- Installation and termination of DMX lighting control infrastructure to include cabling, facility panel connections, patch bays and distribution equipment.
- Installation of lighting bars, booms and trusses to include fixings to walls, soffit or hoists.
- Installation of stage lighting fixtures and peripherals.
- Installation of all secondary steelwork above the stage to support production lighting and stage engineering.
- Installation of raise and lower / flying systems for lighting and cyc bars above the stage, complete with electrically operated low level control system.
- Installation of curtain tracks, pulley systems, masking solutions and all drapes and masking.
- Installation of the specialist audio visual cabled infrastructure to include cabling and termination of facility panels, control racks and patch bays.
- Installation of loudspeakers and associated amplification and processing.
- Installation of radio microphone systems
- Installation of projection screen and projector and all required power, signal and control connections.
- Installation of HDMI / HDBT connectivity and switching / control devices.
- Installation of control systems and all supporting infrastructure in the hall to enable system control by non-technical users.
- Installation of a party-line wired intercom system.

5.5.2 System Commissioning

When installation is complete, system commissioning will take place, to include (but not limited to):

- Certification of supporting power supplies electrical installation.
- Certification of production lighting electrical installation.
- Testing and commissioning the DMX network.
- DMX addressing of all LED stage lighting fixtures and loading into consoles and pre-sets
- Approximate focus of stage lighting fixtures
- Testing and certification of over stage flying systems to include machinery sign off
- Hanging drapes and masking
- Line testing the cabled AV cable infrastructure
- Audio systems set up and programming to include signal routing, EQ, limits, room configuration pre-sets, touchscreen volume control and muting.
- Commissioning of audio console and stage box
- Setting up of stand-alone performance system networks
- Testing the projector and screen and all HDMI connectivity and switching, alongside audio system.
- Developing and building a bespoke touchscreen control system for non-technical users to operate the basic room functionality. To include end to end function testing
- Set up of microphone frequencies and testing radio microphone systems
- Set up and testing of the intercom system

5.6 Design, Project Management & Preliminaries (SL, SE, AV)

The following minimum level of professional services are to be provided to deliver this project.

5.6.1 Design

Design tasks will include (but are not limited to):

- Venue layout drawing showing facilities and equipment locations
- Section drawing showing facilities and equipment locations
- Facility panel layout drawings or diagrams for setting out
- Equipment rack drawings
- LV & ELV cable schedules
- Lighting, Audio and Control Schematics
- Containment system design
- Electrical design
- Mechanical system design for suspended solutions
- Bespoke control solution design
- Liaison with client team and other trades for coordination with special consideration for coordination with the electrical contractor and structural engineer.

This project is a Contractor Design Portion (CDP) and the following should be taken into consideration;

- Ensure designers are competent and adequately resourced to address health and safety issues likely to be involved with their design.
- When designing, avoid foreseeable risks to those involved in the construction and future use of the structure by eliminating hazards and managing residual risk.
- Provide adequate information about residual risks that could not be designed out.
- Co-ordinate the work with others to improve the way overall risks are managed and controlled.
- Ensure the design is compliant with the Workplace (Health, Safety & Welfare) Regulations 1992.
- Ensure that end users of the building including the general public will not be adversely affected by any design element.

Where possible, designs will eliminate hazards for future maintenance and use. It is, unfortunately accepted that this is not always possible. Where hazards are identified and cannot be designed out, these will be discussed with the client before proceeding and shall be detailed in O&M documentation.

To fulfil CDM obligations the chosen contractors engineering department and project managers should have an extensive knowledge of designing and developing these systems.

The SSC design team shall be responsible for the design output for the project. This team will include design engineers, commissioning engineers, the technical project manager and a CAD function to ensure that the project is designed and coordinated to a high standard.

Professional CVs, case studies for recent projects and testimonials shall be made available on request.

5.6.2 Project Management

A Project Manager should be assigned to the delivery of the project. Project Managers should demonstrate high levels of competence in their field, as a technical project manager and engineer.

The Project Manager will be responsible for the overall management of the project delivery, engineering and installation resource and financials.

They will have practical hands on experience in the technical theatre installation industry and have a strong understanding of integration processes and a detailed knowledge of technical systems for the Production Lighting, Stage Engineering, Audio, Visual & Control technology stacks.

The project manager will have excellent commercial acumen, will fervently promote good Health and safety working practices and have a proven track record of positive collaboration with a wider project design and delivery team.

The Project manager should be the main point of contact for the project.

Their tasks include (but are not limited to):

- Pre-works design and coordination meetings (online and visits)
- During works progress visits and overall site team management
- On site presence during commissioning and client handover
- Health and Safety documentation to include risk assessments & method statements
- Off-site administration to include programme and procurement

This project will require coordination with other trades and key stakeholders. It is the level of coordination between the adjacent parties that will result in project success. Careful planning between the client team, structural engineer, electrical contractor and the specialist sub-contractor will specifically be required.

5.6.3 Plant and Access

- Plant and Access equipment to install the above package of works shall include:
 - Mobile Access Towers
 - Podiums
 - MEWPs (if approved by the venue)
 - Equipment lifts
 - Cable jacks
 - Tool vaults
 - Floor protection
- *Note: not inclusive of standing / birdcage scaffolding.*
- *No allowance shall been made for skips, it is assumed these are client supplied a part of the wider scope of refurbishment works.*

5.6.4 Deliveries and Mobilisation

- All deliveries to site and manual handling / off-loading of goods onto site
- Personnel transport shall be included

5.7 Training & O&M Documentation

The following minimum level of professional services are to be provided to deliver this project.

5.7.1 O&M

- Operation and Maintenance documentation shall include as a minimum:
 - System descriptions
 - Operation instructions and screen shots on touchscreen control systems
 - Manufacturers instruction manuals and data sheets
 - As Fitted drawings
 - As fitted schedules
 - Test certificates
 - Copies of any programmed software configurations

5.7.2 Training

- After commissioning, system training shall be carried out with the end users to demonstrate operation of all the systems provided.
- One (1) full day training session should be provided.
- The precise details of training session may be subject to change after consultation with the end users. Where possible, the specialist contractor shall accommodate specific training requirements within the time allowed.
- All training will be completed at agreed dates between the end user and specialist contractor.

6. Acoustic Treatment

As a part of the Stage Electrics design scope, a third party acoustician has been appointed to provide a report on the internal acoustics in the hall and to provide advice, specifically on controlling reverberation.

This report has been carried out by Ion Acoustics.

This document is included in the Stage Electrics information pack for reference.

In addition to the report, a quotation for works to apply acoustic treatment and reduce the reverberation time has been provided. This information has been given to the client team for direct procurement.

Any acoustic treatment works, procured as a result of this design scope and report are not in the scope of works for the specialist Stage Lighting, Stage Engineering and Audio Visual sub-contractor (SSC).

END OF SPECIFICATION DOCUMENT