To: **All Vendors Bidding on The College of New Jersey**
Dimming System Replacements in Kendall Hall and Music Building Project

From: **The College of New Jersey**

Date: **November 10, 2019**

ADDENDUM NO. 1 **ISSUE DATE: November 10, 2019**

REFERENCE: The College of New Jersey
Dimming System Replacements in Kendall Hall and Music Building Project
Bid No. AB200011

INTENT: This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents and Prior Addenda if any, as identified above. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

SPECIFICATION CHANGES:

Remove Specification Section 265561, Kendall Hall Lighting Control and Dimming Systems, and Specification Section 265561, Music Building Lighting Control and Dimming Systems, and replace with the attached.

END OF ADDENDUM NO. 1

SECTION 265561 – LIGHTING CONTROL AND DIMMING SYSTEMS

PART 1 - GENERAL

1.1 INTENT

A. The specification section covers the fabrication, furnishing, delivery, installation, coordination, and operation of the Lighting Control and Dimming Systems and related equipment.

B. The project drawings are to be considered part of these specifications. Drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment. Exact locations are subject to the approval of the Architect/Owner's Representative.

C. Typical details are shown for the installation of various devices. The details do not apply to all situations.

1.2 DEFINITIONS:

A. For this project, the following entities are referenced:

1. Owner: The College of New Jersey, Ewing, NJ

2. Consultant: Starlite, Moorestown, NJ

3. Contractor: Prime Contractor

4. Subcontractor: Subcontractor to the Prime Contractor

B. For this project, the following terms are defined as:

1. Furnish, shall mean that the Contractor is responsible for acquisition and delivery of equipment and the installation shall be by others.

2. Install, shall mean that the Contractor shall install items or equipment furnished by others.

3. Provide, shall mean that the Contractor is responsible for furnishing and installing said item or equipment.

4. By Others, shall mean work that is not part of this contract.

5. By Owner, shall mean work that will be performed by the Owner or Owner's agents at Owner's cost.

6. As Required, shall mean as required by regulatory bodies, by referenced standard, by existing conditions, by generally accepted construction practice, or by the contract documents.

7. Equal, Accepted Equal, Approved Equal, shall mean as accepted in writing, by Architect/Consultant as being of equivalent quality, utility, function, efficiency, and appearance.

8. Low-voltage, Cabling, Wiring, shall mean low-voltage power or signal cabling and/or wiring to include single or multiple conductor, twisted pair, coaxial, fiber optic, category, power over Ethernet, and the like.

1.3 RELATED SECTIONS AND DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions of Division 1, apply to the work of this section.

B. The Contractor shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification.

1.4 SCOPE

A. Provide all materials, items, engineering, labor, and work necessary for complete, safe, fully functional professionally installed system as specified, including:

1. Tools, scaffolding, equipment, labor, and supervision, even though they may not be specifically enumerated.

2. Verification of dimensions and conditions at the job site.

3. Coordination of the work with the work of any other trade Contractors who also may be working in the project space in a manner which will avoid conflict or interference and which will ensure proper sequence and avoid delay in the completion of any part or the entire Project.

4. Notification to the Architect/Engineer of any conditions, measurements, quantities, or other data, as required for proper execution, fit and completion of all work, and for safe and proper operating clearances.

5. Shipment of equipment to job site and the secured storage of all non-fixed equipment.

6. Installation and completion, in accordance with these specifications, related drawings, the equipment manufacturer’s recommendations, established trade criteria, and all applicable code requirements.

7. Inspection, demonstration, and necessary adjustment of the completed installation by the Contractor’s personnel.

8. Preparation and submission of complete submittal drawings, as-built drawings, and operational and maintenance manuals.

B. Work Included: The work of this section shall include, but not be limited to the following:

1. Demolition and removal of existing dimming panels, unused electrical boxes, conduit, and receptacles.

2. Provide new dimming panels, feeders, and conduits.

3. Provide new lighting controls.

4. Provide new lighting system receptacles and devices.

5. Provide custom input/output panels.

6. Provide all wiring necessary for a complete system.

7. Install new architectural lighting button stations as shown in drawings and provide all conduit, wiring, back boxes, and blank cover plates. All conduit for low-voltage wiring to have plastic bushings installed.

8. Provide all rack mount hardware, screws, blanks, cable management, rack rails, connectors, and interconnecting wiring for a complete professional system.

9. Temporary lighting until installed building lighting is complete and programmed.

10. Install new or relocate existing selected dimming circuits. See dimmer schedule on drawings. Refeed/extend existing wiring as necessary to terminate to lugs on new panels.

11. Provide all conduit, wiring, breakers, back boxes and junction boxes.

12. Provide Owner training, manuals, and as-built drawings as described herein.

13. Provide new equipment as listed in bill of materials and/or shown on drawings.

14. This Project requires all incidental or related items necessary to complete the Work as described herein, even though they may not be specifically enumerated. The extent of Work of this section is indicated by the drawings, sketches, specifications and schedules. Contractor shall provide all fixtures, devices, tools, materials, accessories, labor, and other items to deliver a complete job in all aspects.

C. Related Work: Related work, which is not included in this section:

1. All specifications and drawings in this contract are considered related work.

1.5 ERRORS AND OMISSIONS:

A. Any errors, omissions, or ambiguities found in these documents does not relieve the Contractor of the responsibility of providing all items necessary for a complete, safe, fully functional system. The Contractor shall provide complete working systems within the intent and meaning of the contract documents. All items of labor, material, and equipment not specifically described herein or detailed on the drawings but incidental to or necessary for the completion of the work shall be considered as included without extra cost. Any errors, omissions, or ambiguities shall be brought to the attention of the Owner and Consultant for clarification.

B. Where discrepancies occur between drawings, specification, and/or bill of materials, the Contractor shall seek clarification, otherwise, the greater quantity shall prevail.

1.6 GENERAL REQUIREMENTS

A. Field Conditions: This project consists of work in an existing venue. All bidders are strongly encouraged to survey and inform themselves of the areas where the work is to be performed prior to bid. No additional compensation or time extension will be given for conditions of which bidder could have been fully aware prior to bid.

B. Safety: The system shall conform to all applicable code requirements and shall be provided in conformance to the highest industry standards of operation and practices. All materials, arrangements, and procedures shall comply with applicable code requirements, allowing the end user to arrange and operate a safe assembly and working environment for audience and user's personnel.

C. Insurance: In the absence of more stringent requirements, the Contractor shall maintain sufficient injury and property liability insurance coverage throughout the project's scheduled timetable, including workmen's compensation coverage for their employees.

1.7 CONTRACTOR QUALIFICATIONS

A. See front end specifications.

B. All equipment shall be the responsibility of a single Contractor who shall own and operate a full-time, staffed shop for the fabrication, assembly, and installation of lighting control and dimming system equipment. This Contractor shall assume complete responsibility for the fabrication, transportation, and installation of the work in this section and shall hold the Owner, Architect, and all their employees and Consultants harmless for any costs for errors or omissions associated with the work of this section and any action arising there from.

C. The Contractor shall have at least five (5) years' experience in the installation of similar equipment and systems for professional and educational theaters. The Contractor shall provide references of at least (3) installations of comparable scope performed by the Contractor, including location, description, name, address, and telephone numbers of the architects, consultants, and owners with contact persons for each. Comparable scope requires projects of including similar system topology and complexity of lighting control and dimming systems.

D. N/A

E. N/A

F. N/A

G. N/A

H. The Contractor or Subcontractor shall not be an officer, employee, or agent of or otherwise affiliated with the Owner, Architect, or Consultant.

1.8 SUBMITTALS:

A. See front end specifications. Additionally,

B. Drawings:

1. Drawings of the lighting control and dimming system shall be submitted to document the primary elements of the integrated system and to show all information necessary to fully explain the design features, appearance, function, fabrication and the integrated use of the system.

2. Drawings or screen shots of the proposed layouts of all graphical user interface (GUI) for all touch panels.

3. Detailed written narratives of the control system, integration and communication of equipment, typical operation, and control feedback methods for keeping the system synchronized.

4. Control system button/fader station labeling, color, functionality, indicator color, on status, off status, locked status, and feedback.

5. Riser/functional diagrams shall be provided to explain the power and control wiring, wire selection, wiring numbering, patch points, and termination requirements.

6. Proposed rack and desk layouts, panel layouts and locations, and labeling of panels.

7. Drawings of proposed mounting methods for all equipment, including mounting details, final locations with all focus information, section drawings with mounting heights and weights for all equipment.

8. Drawings shall be approved before any fabrication or installation may begin.

9. The drawings shall be no less detailed than as provided in the contract documents.

10. Reproductions of contract documents are not acceptable as shop drawings and will be rejected. The Contractor must submit his own original drawings. Architectural backgrounds will be provided.

11. System plans, elevations, and sections shall be submitted on minimum D-size (24” x 36”) sheets, and shall be drawn in no less than ¼” = 1’0” scale.

12. Submit in quantities as required by the front end documents.

C. Data Sheets: In addition to drawings, the Contractor shall submit Manufacturer Data Sheets for all standard equipment.

1. All data sheets shall contain full information on dimensions, construction, applications, load ratings, etc.

2. Data sheets shall be properly identified as to their intended use. Any options or variations shall be clearly noted.

3. Submit in quantities as required by the front end documents.

D. Other Documents

1. Submit Contractor Qualifications and proof of certifications as listed above in Section 1.7.

2. Submit color swatches and options to owner for selection.

3. Submit lighting console patch sheet (channel schedule), magic sheet screen shot, and show file.

4. Submit proposed IP addressing scheme with network settings.

E. Approvals: All submissions must be approved per the requirements of the project’s general conditions prior to the beginning of any fabrication, installation, or erection. Such approval does not relieve the

Contractor of the responsibility of providing equipment in accordance with the specifications or of providing full operational and safe systems.

1.9 WARRANTY & INSPECTIONS

A. Warranty: See front end specifications. Additionally, the Contractor shall provide a one (1) year written guarantee against defects in materials and workmanship. Within this period, the Contractor shall provide any required replacement within 30 days of written notification by the Owner, except for safety related items that shall be corrected within 24 hours of notification. Subsequent to the expiration of the guarantee period, the Contractor agrees to furnish repair and maintenance service, at the Owner's expense, within 30 days of request for such service.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Quality Statement: While the equipment specifications contained herein may be based upon the standard equipment of particular approved manufacturers, the individual component specifications are provided solely to set a minimum level of quality. Under no circumstances will equipment of lesser quality be accepted for this project.

B. Substitutions: May be permitted after contract award, but only with the written permission of the Architect/Consultant. The proposed substitutes must be equal or exceed the specified products in quality, performance, function, and apply to the system concept in the original manor.

1. Contractor substitution request shall include the item to be substituted, the unit price of each item, the advantages, and product data.

2. If any of the specified equipment is no longer available, the Contractor may make recommendations to the Consultant.

C. It is the responsibility of the Contractor, bidder, to ensure all equipment meets or exceeds specifications and will be reviewed by the Architect/Consultant.

2.2 STANDARDS

A. Installation shall conform to the latest federal, state, and local regulations, codes and industry standards. Where conflicts exist, the most stringent code or regulation shall apply.

1. Standards Organizations include:

a. AES, ANSI, ASME, ASTM, ASTME, BICSI, EIA, ESTA, IEC, IEEE, INFOCOMM, NEC, NEMA, NFPA, OSHA, PLASA, SAE, SMPTE, TIA, UL, USITT

2.3 OTHER REQUIREMENTS

A. All materials used in this project shall be new, unused, and of the latest design. Refurbished and obsolete materials are not permitted.

B. Fabrication:

1. The mechanical fabrication and workmanship shall incorporate best practices for good fit and finish. There shall be no burrs or sharp edges.

2. All equipment shall be fabricated to facilitate future maintenance and replacement.

C. Finishes:

1. All finishes are to be black, unless specified otherwise. If the manufacturer offers a choice of color finish, samples/swatches are to be provided to the owner.

2. All turnbuckles, clips, tracks, chains, and other items of incidental hardware shall be furnished plated or painted. Wire rope is not to be painted.

3. All finishes shall be returned to their original finish and condition after any cutting, patching, or other work.

4. Exception 1: where hardware is visible to patrons/audience and/or the general public, it must be painted to blend in with surrounding aesthetics. This includes any rigging or conduit in the house.

5. Exception 2: conduit and boxes mounted to black stage walls, to be painted flat black.

2.4 EQUIPMENT SPECIFICATIONS

A. GENERAL

1. Equipment is specified on a basis of system design. It is specified by manufacturer and model number.

a. The current manufacturer's data sheet for each referenced piece of equipment in force at the date of issuance of this specification will be the basis for the specifications of the referenced equipment.

b. Any product accessories such as power supplies, rack mount kits, connectors, adapters, network cables, or other small items are the responsibility of Contractor whether or not they are called out in detail within these specifications.

2.5 PORTABLE CABLE LABELING

A. General

1. All portable cables shall have the following labeling via heat shrink, printed cable, or labels underneath of clear heat shrink:

a. Color code for length
   1) 5’ – Black
   2) 10’/15’ – Red
   3) 25’ – Blue
   4) 50’ – Yellow
   5) 75’ – Green
   6) 100’ – White

b. Owner/Project Name

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of this equipment shall only be performed by qualified licensed electrical Contractors. Installation shall be performed in a workmanlike manner and shall strictly adhere to the standards of these specifications and manufacturer's installation requirements. Where necessary, the Contractor may make adjustments to accommodate unforeseen impediments to installation. The completed work must achieve all functional, electrical, safety and appearance requirements as established in these specifications.

B. Work shall be performed in accordance with OSHA and local codes.

C. The Contractor shall each be responsible for storage of stage equipment, tools, and its equipment during the period of installation.

D. N/A

E. N/A

F. The Contractor shall be responsible for all clean up related to its work, including the removal of packing materials etc. and the protection of existing surfaces or equipment. Repairs to damage caused by the Contractor to any item or surface are the sole responsibility of the Contractor.

G. The equipment described in this section is considered to be finished equipment and is to be protected during and after installation from excessive dirt and damage caused by other work.

H. All equipment and the areas around the equipment shall be cleaned prior to final inspection and acceptance.

1. In the event that a site condition will not allow for visual inspection at final acceptance, Contractor shall thoroughly document by photograph and submit. For example, equipment installed above a gypsum ceiling or wood blocking inside of a wall.

I. All circuits, panels, boxes, plates, receptacles, and the like shall be properly labeled in a clear permanent professional manner. Provide engraved faceplates stating circuit number(s) and panel fed from. Alternately, engraved 2-ply plastic plates (lamacoid) may be attached to panels and faceplates. P-touch printed stickers are not acceptable.

1. Colonial Engraving Co., Inc. 17 Route 125, Unit 2, Kingston, NH 03848, 603.347.1749

J. Wiring Methods

1. Splicing of low/voltage cables is not permitted between terminations.

2. All signal wire and cable shall be combed straight and bundled with cable ties every six to twelve inches of laced and anchored as needed. Use proper tooling to insure cable ties or lacing is installed at the proper tension. Do not crush the cable.

3. All data cable shall be combed straight and bundled with hook and loop (Velcro) tie wraps every six to twelve inches and anchored as needed. Do not crush the cable. Do not use nylon tie wraps (Zip Ties).

4. Wire and cable shall be formed in either a vertical or a horizontal relationship to equipment or termination point with proper bending radii, service loop, and support. Provide ampler service loops at each termination so that plates, panels, patch bays, and equipment can be removed for service and inspection.

5. All wires and cables are to be permanently identified at each wire and cable end. This applies to interconnecting cables inside the racks.

6. All low voltage wire/cable ends are to be covered with heat shrink tubing.

7. Wire nuts are not permitted on low/voltage wiring.

K. Conduits and Cable Separation

1. All conduit to be EMT style unless noted otherwise. See painting/finish requirements in 2.3.C.

2. No conduit to be filled greater than 40%.

3. All conduits to have a pull string installed after pulling all wiring with the intention for future use.

4. All conduits must be continuous and installed per NEC requirements.

5. All conduits for low-voltage wiring must have plastic bushings installed.

6. Conduits shall have the following minimum separation by type:

   a. DATA/DIMMED POWER: 24”

   b. If other signal types are specified, please inquire on requirements.

7. Close proximity conduit/cable crossing is to be done perpendicularly at 90°.

8. It may not be possible to fulfill these requirements at the entry/exit of enclosures, boxes, and related devices. However, the intent of these guidelines is for the Contractor to provide the stated separation wherever physically possible and specifically where the path of adjacent conduit will be parallel for distances greater than 10’.

9. Maintain a minimum of 12” separation between fluorescent lighting fixtures and all ballasts.

10. Maintain a minimum of 96” separation between 15kVA transformers.

3.2 COMPLETION INSPECTION AND TESTING (FINAL ACCEPTANCE)

A. See front end specifications. Additionally,

B. Upon completing the installation of all equipment specified under this section, the Contractor shall notify the Owner/Architect within 10 business days, who will schedule an inspection from the Consultant.

C. At the time of inspection, the Contractor shall furnish sufficient workers to operate all equipment and to perform such adjustments and tests as may be required by the Architect and/or Owner.

1. All racks must be open and accessible. Tools must be available to remove any plates, panels, for inspection.

2. Documentation must be available for reference.

3. The system must be completely installed, tested, and all equipment fully operational.

4. Testing shall be in accordance to ANSI 10:2013 and shall include, but not be limited to:

   a. All circuits are operational and match dimmer/panel schedules. Test with a circuit tester.

   b. All circuits, panels, boxes, plates, receptacles, and the like are properly labeled in a clear permanent professional manner.

   c. Equalize all systems to conform to the specified initial performance criteria.

3.3 OWNER TRAINING AND MANUALS

A. See front end specifications. Additionally,

B. The Contractor will provide a training program at the project location for eight (8) hours of training in four (4) hour increments. This training may be spread out over a six-month period. This includes proper use, operation, trouble shooting, and instruction of all equipment and features of the system. Training may be split up into different parts/rooms of the lighting control and dimming systems, for example, Black Box, TV Studio, Concert Hall, or Main Stage Theaters. Coordinate with the Owner and his Staff on scheduling training and topics to be covered.

C. Upon completion of the work, the Contractor shall submit detailed Operation & Maintenance Manuals including as-built shop drawings, equipment descriptions, any required certificates or warranties, MSDS sheets, serial numbers, un-complied code and software for all programmable equipment, and parts lists. Submit in quantities as required by the Owner.

D. Provide physical hard copies and electronic copies of Operation & Maintenance Manuals for the Owner and Consultant.

END OF SECTION 265561

SECTION 265561 – LIGHTING CONTROL AND DIMMING SYSTEMS

PART 1 - GENERAL

1.1 INTENT

A. The specification section covers the fabrication, furnishing, delivery, installation, coordination, and operation of the Lighting Control and Dimming Systems and related equipment.

B. The project drawings are to be considered part of these specifications. Drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment. Exact locations are subject to the approval of the Architect/Owner's Representative.

C. Typical details are shown for the installation of various devices. The details do not apply to all situations.

1.2 DEFINITIONS:

A. For this project, the following entities are referenced:

1. Owner: The College of New Jersey, Ewing, NJ

2. Consultant: Starlite, Moorestown, NJ

3. Contractor: Prime Contractor

4. Subcontractor: Subcontractor to the Prime Contractor

B. For this project, the following terms are defined as:

1. Furnish, shall mean that the Contractor is responsible for acquisition and delivery of equipment and the installation shall be by others.

2. Install, shall mean that the Contractor shall install items or equipment furnished by others.

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4. By Others, shall mean work that is not part of this contract.

5. By Owner, shall mean work that will be performed by the Owner or Owner's agents at Owner's cost.

6. As Required, shall mean as required by regulatory bodies, by referenced standard, by existing conditions, by generally accepted construction practice, or by the contract documents.

7. Equal, Accepted Equal, Approved Equal, shall mean as accepted in writing, by Architect/Consultant as being of equivalent quality, utility, function, efficiency, and appearance.

8. Low-voltage, Cabling, Wiring, shall mean low-voltage power or signal cabling and/or wiring to include single or multiple conductor, twisted pair, coaxial, fiber optic, category, power over Ethernet, and the like.

1.3 RELATED SECTIONS AND DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions of Division 1, apply to the work of this section.

B. The Contractor shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification.

1.4 SCOPE

A. Provide all materials, items, engineering, labor, and work necessary for complete, safe, fully functional professionally installed system as specified, including:

1. Tools, scaffolding, equipment, labor, and supervision, even though they may not be specifically enumerated.

2. Verification of dimensions and conditions at the job site.

3. Coordination of the work with the work of any other trade Contractors who also may be working in the project space in a manner which will avoid conflict or interference and which will ensure proper sequence and avoid delay in the completion of any part or the entire Project.

4. Notification to the Architect/Engineer of any conditions, measurements, quantities, or other data, as required for proper execution, fit and completion of all work, and for safe and proper operating clearances.

5. Shipment of equipment to job site and the secured storage of all non-fixed equipment.

6. Installation and completion, in accordance with these specifications, related drawings, the equipment manufacturer’s recommendations, established trade criteria, and all applicable code requirements.

7. Inspection, demonstration, and necessary adjustment of the completed installation by the Contractor’s personnel.

8. Preparation and submission of complete submittal drawings, as-built drawings, and operational and maintenance manuals.

B. Work Included: The work of this section shall include, but not be limited to the following:

1. Demolition and removal of existing dimming panels, unused electrical boxes, conduit, and receptacles.

2. Provide new dimming panels, feeders, and conduits.

3. Provide new lighting controls.

4. Provide new lighting system receptacles and devices.

5. Provide custom input/output panels.

6. Provide all wiring necessary for a complete system.

7. Install new architectural lighting button stations as shown in drawings and provide all conduit, wiring, back boxes, and blank cover plates. All conduit for low-voltage wiring to have plastic bushings installed.

8. Provide all rack mount hardware, screws, blanks, cable management, rack rails, connectors, and interconnecting wiring for a complete professional system.

9. Temporary lighting until installed building lighting is complete and programmed.

10. Install new or relocate existing selected dimming circuits. See dimmer schedule on drawings. Refeed/extend existing wiring as necessary to terminate to lugs on new panels.

11. Provide all conduit, wiring, breakers, back boxes and junction boxes.

12. Provide Owner training, manuals, and as-built drawings as described herein.

13. Provide new equipment as listed in bill of materials and/or shown on drawings.

14. This Project requires all incidental or related items necessary to complete the Work as described herein, even though they may not be specifically enumerated. The extent of Work of this section is indicated by the drawings, sketches, specifications and schedules. Contractor shall provide all fixtures, devices, tools, materials, accessories, labor, and other items to deliver a complete job in all aspects.

C. Related Work: Related work, which is not included in this section:

1. All specifications and drawings in this contract are considered related work.

1.5 ERRORS AND OMISSIONS:

A. Any errors, omissions, or ambiguities found in these documents does not relieve the Contractor of the responsibility of providing all items necessary for a complete, safe, fully functional system. The Contractor shall provide complete working systems within the intent and meaning of the contract documents. All items of labor, material, and equipment not specifically described herein or detailed on the drawings but incidental to or necessary for the completion of the work shall be considered as included without extra cost. Any errors, omissions, or ambiguities shall be brought to the attention of the Owner and Consultant for clarification.

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B. All equipment shall be the responsibility of a single Contractor who shall own and operate a full-time, staffed shop for the fabrication, assembly, and installation of lighting control and dimming system equipment. This Contractor shall assume complete responsibility for the fabrication, transportation, and installation of the work in this section and shall hold the Owner, Architect, and all their employees and Consultants harmless for any costs for errors or omissions associated with the work of this section and any action arising there from.

C. The Contractor shall have at least five (5) years' experience in the installation of similar equipment and systems for professional and educational theaters. The Contractor shall provide references of at least (3) installations of comparable scope performed by the Contractor, including location, description, name, address, and telephone numbers of the architects, consultants, and owners with contact persons for each. Comparable scope requires projects of including similar system topology and complexity of lighting control and dimming systems.

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3. Detailed written narratives of the control system, integration and communication of equipment, typical operation, and control feedback methods for keeping the system synchronized.

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5. Riser/functional diagrams shall be provided to explain the power and control wiring, wire selection, wiring numbering, patch points, and termination requirements.

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7. Drawings of proposed mounting methods for all equipment, including mounting details, final locations with all focus information, section drawings with mounting heights and weights for all equipment.

8. Drawings shall be approved before any fabrication or installation may begin.

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PART 2 - PRODUCTS

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C. It is the responsibility of the Contractor, bidder, to ensure all equipment meets or exceeds specifications and will be reviewed by the Architect/Consultant.

2.2 STANDARDS

A. Installation shall conform to the latest federal, state, and local regulations, codes and industry standards. Where conflicts exist, the most stringent code or regulation shall apply.

1. Standards Organizations include:

a. AES, ANSI, ASME, ASTM, ASTME, BICSI, EIA, ESTA, IEC, IEEE, INFOCOMM, NEC, NEMA, NFPA, OSHA, PLASA, SAE, SMPTE, TIA, UL, USITT

2.3 OTHER REQUIREMENTS

A. All materials used in this project shall be new, unused, and of the latest design. Refurbished and obsolete materials are not permitted.

B. Fabrication:

1. The mechanical fabrication and workmanship shall incorporate best practices for good fit and finish. There shall be no burrs or sharp edges.

2. All equipment shall be fabricated to facilitate future maintenance and replacement.

C. Finishes:

1. All finishes are to be black, unless specified otherwise. If the manufacturer offers a choice of color finish, samples/swatches are to be provided to the owner.

2. All turnbuckles, clips, tracks, chains, and other items of incidental hardware shall be furnished plated or painted. Wire rope is not to be painted.

3. All finishes shall be returned to their original finish and condition after any cutting, patching, or other work.

4. Exception 1: where hardware is visible to patrons/audience and/or the general public, it must be painted to blend in with surrounding aesthetics. This includes any rigging or conduit in the house.

5. Exception 2: conduit and boxes mounted to black stage walls, to be painted flat black.

2.4 EQUIPMENT SPECIFICATIONS

A. GENERAL

1. Equipment is specified on a basis of system design. It is specified by manufacturer and model number.

a. The current manufacturer's data sheet for each referenced piece of equipment in force at the date of issuance of this specification will be the basis for the specifications of the referenced equipment.

b. Any product accessories such as power supplies, rack mount kits, connectors, adapters, network cables, or other small items are the responsibility of Contractor whether or not they are called out in detail within these specifications.

2.5 PORTABLE CABLE LABELING

A. General

1. All portable cables shall have the following labeling via heat shrink, printed cable, or labels underneath of clear heat shrink:

a. Color code for length

1) 5’ – Black
2) 10’/15’ – Red
3) 25’ – Blue
4) 50’ – Yellow
5) 75’ – Green
6) 100’ – White

b. Owner/Project Name

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of this equipment shall only be performed by qualified licensed electrical Contractors. Installation shall be performed in a workmanlike manner and shall strictly adhere to the standards of these specifications and manufacturer's installation requirements. Where necessary, the Contractor may make adjustments to accommodate unforeseen impediments to installation. The completed work must achieve all functional, electrical, safety and appearance requirements as established in these specifications.

B. Work shall be performed in accordance with OSHA and local codes.

C. The Contractor shall each be responsible for storage of stage equipment, tools, and its equipment during the period of installation.

D. N/A

E. N/A

F. The Contractor shall be responsible for all clean up related to its work, including the removal of packing materials etc. and the protection of existing surfaces or equipment. Repairs to damage caused by the Contractor to any item or surface are the sole responsibility of the Contractor.

G. The equipment described in this section is considered to be finished equipment and is to be protected during and after installation from excessive dirt and damage caused by other work.

H. All equipment and the areas around the equipment shall be cleaned prior to final inspection and acceptance.

1. In the event that a site condition will not allow for visual inspection at final acceptance, Contractor shall thoroughly document by photograph and submit. For example, equipment installed above a gypsum ceiling or wood blocking inside of a wall.

I. All circuits, panels, boxes, plates, receptacles, and the like shall be properly labeled in a clear permanent professional manner. Provide engraved faceplates stating circuit number(s) and panel fed from. Alternately, engraved 2-ply plastic plates (lamacoid) may be attached to panels and faceplates. P-touch printed stickers are not acceptable.

1. Colonial Engraving Co., Inc. 17 Route 125, Unit 2, Kingston, NH 03848, 603.347.1749

J. Wiring Methods

1. Splicing of low/voltage cables is not permitted between terminations.

2. All signal wire and cable shall be combed straight and bundled with cable ties every six to twelve inches of laced and anchored as needed. Use proper tooling to insure cable ties or lacing is installed at the proper tension. Do not crush the cable.

3. All data cable shall be combed straight and bundled with hook and loop (Velcro) tie wraps every six to twelve inches and anchored as needed. Do not crush the cable. Do not use nylon tie wraps (Zip Ties).

4. Wire and cable shall be formed in either a vertical or a horizontal relationship to equipment or termination point with proper bending radii, service loop, and support. Provide ampler service loops at each termination so that plates, panels, patch bays, and equipment can be removed for service and inspection.

5. All wires and cables are to be permanently identified at each wire and cable end. This applies to interconnecting cables inside the racks.

6. All low voltage wire/cable ends are to be covered with heat shrink tubing.

7. Wire nuts are not permitted on low/voltage wiring.

K. Conduits and Cable Separation

1. All conduit to be EMT style unless noted otherwise. See painting/finish requirements in 2.3.C.

2. No conduit to be filled greater than 40%.

3. All conduits to have a pull string installed after pulling all wiring with the intention for future use.

4. All conduits must be continuous and installed per NEC requirements.

5. All conduits for low-voltage wiring must have plastic bushings installed.

6. Conduits shall have the following minimum separation by type:

   a. DATA/DIMMED POWER: 24”

   b. If other signal types are specified, please inquire on requirements.

7. Close proximity conduit/cable crossing is to be done perpendicularly at 90°.

8. It may not be possible to fulfill these requirements at the entry/exit of enclosures, boxes, and related devices. However, the intent of these guidelines is for the Contractor to provide the stated separation wherever physically possible and specifically where the path of adjacent conduit will be parallel for distances greater than 10’.

9. Maintain a minimum of 12” separation between fluorescent lighting fixtures and all ballasts.

10. Maintain a minimum of 96” separation between 15kVA transformers.

3.2 COMPLETION INSPECTION AND TESTING (FINAL ACCEPTANCE)

A. See front end specifications. Additionally,

B. Upon completing the installation of all equipment specified under this section, the Contractor shall notify the Owner/Architect within 10 business days, who will schedule an inspection from the Consultant.

C. At the time of inspection, the Contractor shall furnish sufficient workers to operate all equipment and to perform such adjustments and tests as may be required by the Architect and/or Owner.

1. All racks must be open and accessible. Tools must be available to remove any plates, panels, for inspection.

2. Documentation must be available for reference.

3. The system must be completely installed, tested, and all equipment fully operational.

4. Testing shall be in accordance to ANSI 10:2013 and shall include, but not be limited to:

   a. All circuits are operational and match dimmer/panel schedules. Test with a circuit tester.

   b. All circuits, panels, boxes, plates, receptacles, and the like are properly labeled in a clear permanent professional manner.

   c. Equalize all systems to conform to the specified initial performance criteria.

3.3 OWNER TRAINING AND MANUALS

A. See front end specifications. Additionally,

B. The Contractor will provide a training program at the project location for eight (8) hours of training in four (4) hour increments. This training may be spread out over a six-month period. This includes proper use, operation, trouble shooting, and instruction of all equipment and features of the system. Training may be split up into different parts/rooms of the lighting control and dimming systems, for example, Black Box, TV Studio, Concert Hall, or Main Stage Theaters. Coordinate with the Owner and his Staff on scheduling training and topics to be covered.

C. Upon completion of the work, the Contractor shall submit detailed Operation & Maintenance Manuals including as-built shop drawings, equipment descriptions, any required certificates or warranties, MSDS sheets, serial numbers, un-complied code and software for all programmable equipment, and parts lists. Submit in quantities as required by the Owner.

D. Provide physical hard copies and electronic copies of Operation & Maintenance Manuals for the Owner and Consultant.

END OF SECTION 265561