Lauderdale County Board of Supervisors
410 Constitution Ave, 11th Floor
Meridian, Mississippi 39301
601-482-9746 Main
601-482-9744 Fax

BID NO. 3911: COMPLETE SOUND SYSTEM INTEGRATION LAUDERDALE COUNTY AGRICULTURAL CENTER

PACKET INCLUDES THE FOLLOWING:

- Legal Advertisement
- General Information
- Bid Specifications (Section 27 4116)
  - General (Pages 5 – 31)
  - Products (Pages 31 – 37)
  - Execution (Pages 37 – 61)
- Bid Submission Form
- Bid Bond
- Performance Bond
- Vendor Data Form
- Conflict of Interest Statement
- Non-Collusion Affidavit of Bidder
- Professional Reference Sheet
- Addenda Form

RESPONSE DUE BY TUESDAY, JULY 19, 2022, NOT LATER THAN 9:00 A.M.

BIDS WILL BE OPENED PUBLICLY AT 10:00 A.M.

11TH FLOOR CONFERENCE ROOM

NO LATE RESPONSES WILL BE ACCEPTED

_____
Firm Name

LEGAL NOTICE

ADVERTISEMENT FOR BIDS

NOTICE is hereby given that the Board of Supervisors of Lauderdale County, Mississippi, will receive sealed bids until **9:00 a.m. on Tuesday, July 19, 2022**, for the following:

BID NO. 3911: COMPLETE SOUND SYSTEM INTEGRATION - LAUDERDALE COUNTY AG CENTER

The above shall be bid per detailed specification on file in the Office of the Purchase Clerk, 410 Constitution Ave, 11th Floor, Meridian, MS 39301, (601) 482-9746, which may be obtained upon request or by visiting either the website of Lauderdale County Board of Supervisors at www.lauderdalecounty.org or Central Bidding at www.centralbidding.com.

Electronic Bids can be submitted via Central Bidding at www.centralbidding.com.

Sealed Bids can be submitted by mail via USPS, by courier service i.e., FedEx or by hand to the Lauderdale County Purchasing Department, 410 Constitution Ave, 11th Floor, Meridian, MS 39301, Monday thru Friday between the hours of 8:00 a.m. to 5:00 p.m. Envelopes must be received by the acceptance date and time listed above. No late bids will be accepted.

Each bid must be received in a sealed envelope which is marked in the lower left-hand corner with the words "COMPLETE SOUND SYSTEM INTEGRATION – LAUDERDALE COUNTY AG CENTER", the "DATE OF THE BID OPENING" and "C.O.R #". Adherence to the bid specifications is strongly recommended, as alternate bids will not be considered.

A Pre-Bid Conference will be held on Tuesday, June 28, 2022, at 10:00 a.m. at the following:
Lauderdale County Ag Center
1022 Hwy 19 South
Meridian, MS 39301

From the bids submitted, the Board of Supervisors shall select the most qualified based on price, and other relevant factors, negotiate and enter into a contract, all pursuant to Section 31-7-13, Mississippi Code of 1972, as amended. All bids offered will be read aloud. All bids will be accepted and evaluated by the Lauderdale County staff.

The board reserves the right to reject any, and all bids received and to waive informalities.

By: Jonathan Wells, Board President

SUBMITTED:

MERIDIAN STAR:
PUBLISHED THE ABOVE LEGAL
ADVERTISEMENT ON June 14th, 2022, and June 21st, 2022

PROOF OF PUBLICATION TO:
Stephanie Jackson
Lauderdale County Board of Supervisors
410 Constitution Ave, 11th Floor
Meridian, MS 39301
Phone: 601-482-9735

GENERAL INFORMATION

A. RECEIPT AND OPENING OF PROPOSAL:

Lauderdale County, Mississippi, (the "County") hereby invites and will receive bids on the forms attached hereto. Bids will be received at Raymond P. Davis Courthouse Annex Building at 410 Constitution Avenue, 11th Floor in Meridian, Mississippi, until **9:00 a.m. on Tuesday, July 19, 2022**. Each bid will be publicly opened, read aloud on the aforesaid date at 10:00 a.m. and taken under advisement for evaluation.

The envelopes containing the bids must be sealed and clearly marked with the Bidder's Company Name and Address on the outside, as well as "Bid #3911: Complete Sound System Integration - Lauderdale County AG Center" in addition to the Bid Opening Date, and "COR Number".

Any bids may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof.

Any bid received after the time and date specified shall not be considered.

B. INTENT:

The Lauderdale County Board of Supervisors is seeking bids to replace/update the Sound System at the Agricultural Center in accordance with the following bid specifications. It is the intent of these specifications, terms, and conditions to describe the components required for the completion of this project.

The County intends to award the contract to the bidder selected as the most responsible bidder whose response conforms to the specifications herein and meets the County's requirements.

Lauderdale County will not consider any bid not prepared and submitted in accordance with the provisions hereof and Lauderdale County reserves the right to reject any, and all bids.

C. PRE-BID CONFERENCE:

A pre-bid conference will be held at 10:00 on Tuesday, June 28, 2022, at:
Lauderdale County Ag Center
1022 Hwy 19 South
Meridian, MS 39301

While attendance is not mandatory by law, it is strongly recommended that interested bidders attend.

D. **BID PACKET INFORMATION:**

Bidders should adhere to the following:

- Bids are to be submitted per plans and specs described in Section 27 4116.
- No deviations or alternate plans are permitted.
- Bid amount should be inclusive of all cost in a single lump sum amount.
- Bid should include copy of the Certificate of Responsibility.
- Bid should include a copy of Bid Surety/Bid Bond.
- Drawings/Plans are not required in submittal.

The following pages contain the specifications for this bid.

(THIS SPACE HAS BEEN LEFT BLANK INTENTIONALLY)

LAUDERDALE COUNTY AG CENTER
SECTION 27 4116

NEW SOUND REINFORCEMENT SYSTEM

1. General

   A. Related Documents

      1. Existing Architectural, structural, mechanical, electrical drawings are considered a part of the A/V and/or Sound Reinforcement System (hereafter referred to as AV Systems or Systems) documents.

   B. Work In This Section

      1. Sound Reinforcement
      2. Digital Signal Processing
      3. Control Interface
      4. Software Configuration
      5. Coordination, termination and installation of Owner-Furnished services and equipment.
      6. Coordination of existing site facilities, including, but not limited to Announcer Booth, electrical service, conduits, rigging points.
      7. Cable, wiring, digital transport, connection and termination devices for wiring systems for all signal pathways for applicable systems.

   C. Products and materials supplied but not installed under this Section.

      1. Power Distribution (by owner at Announcer Booth).

   D. Related Sections

      1. Owner-provided electrical systems (at Announcer Booth).
         a. Electrical service entrance and related materials.
         b. Power distribution systems including, but not limited to, power conductors, distribution panels, conduits, breakers, etc., to be supplied by the owner.
         c. Contractor shall notify the owner of any conditions related to the existing power distribution system that may prevent, delay or constrain the implementation of new systems in any way.

E. Related Drawings

1. Obtain existing drawings from the owner.
2. Existing architectural drawings shall be considered part of the bid documents and contract documents.
3. Existing structural drawings shall be considered part of the bid documents and contract documents.
4. Verify site conditions in all cases.

F. Measurement and quantity convention

1. Product quantity is as required and/or as shown on the drawings.
2. When a specific quantity is noted, Contractor shall provide at least the given amount.
3. Cabling shall be installed with 20% redundancy in all cases permitted by conduit fill.
4. Some products listed under this section may not be required to fulfill the obligations of the work.
5. Contractor shall estimate the system in its entirety and provide quantities as required for a full, complete working system.
6. Contractor is responsible for providing material quantities required to complete the work, regardless if such items are not specifically shown or not.

G. Definitions

1. ASA: Acoustical Society of America.
2. NCAC: National Council of Acoustical Consultants.
3. AES: Audio Engineering Society.
4. ANSI: American National Standards Institute.
5. ICIA (InfoComm): International Communications Industries Association.
6. NAB: National Association of Broadcasters.

7. SMPTE: Society of Motion Picture and Television Engineers.

8. EMI: Electromagnetic interference.

9. Fabricator's Shop: The address listed on the Business License of the entity responsible for fabricating the Work specified in this Section, hereafter referred to as the "Contractor".

10. Fully Operational: A system that meets or exceeds all of the requirements set forth in the Contract Documents and is ready for the Final Inspection as described in Part 3 of this specification.

11. OFE: Owner Furnished Equipment. Unless otherwise noted herein or on the drawings, the Contractor shall integrate, terminate and test all OFE equipment shown on the drawings.

12. Owner: Lauderdale County.

13. AV/Sound Systems Contractor: Contractor.

H. Scope

1. Description of the Work.

   a. These specifications, the related drawings and General Conditions of the Contract comprise the requirements for the systems.

   b. Furnish, deliver, erect, install, program, develop, configure, interface and connect completely all material, equipment, appliances and devices described herein and shown on the Drawings, and supply all other incidental materials, appliances, tools, transportation, devices, connections, etc., required for a complete, working system.

   c. The systems shall be completed and commissioned for the owner in first class working order and operating condition, excluding those items listed as Related Work.

   d. All material, equipment, appliances, connections, cabling, devices, etc. required for a complete, working system shall be supplied and installed as part of this work, whether or not it is listed or described herein or shown on the drawings.

   e. It is the sole responsibility of the Contractor to provide a working system to the satisfaction of the Owner and the Consultant.

f. Perform assembly and fabrication of equipment, sub-assemblies, racks, interconnections, soldering, connection to user panels, terminals, devices or other equipment using industry-accepted standards and qualified technical personnel only. Such personnel shall be experienced in the installation of sound, communications, integrated AV systems, equipment and supporting devices, software and controls.

g. Coordinate service entrances, raceway and rough-in locations with actual equipment furnished, working as required with the owner.

h. Coordinate with owner for access to specific areas prior to performance of work.

i. Verify jobsite conditions, dimensions and environmental conditions prior to installation, fabrication, or supply of materials.

j. Perform all jobsite work, installation, and fabrication in accordance with these Specifications, manufacturer's recommendations, and all/any applicable code requirements.

k. This work is an integration of multiple components, coordination work, subsystems, software and supporting interface with other disciplines.

2. Infrastructure

   a. Coordination, verification and installed conditions for/of all cabling, terminations, junctions, splices, grounding, and power distribution.

   b. Detailed coordination with the owner is required prior to access to any area of facility.

   c. Testing and documentation of all existing and new conductors.

3. Field Equipment

   a. Mount, configure, test, and operate all field devices in accordance with the design drawings.

   b. Verify and coordinate final coordinates, locations, and configuration of all field devices with the Consultant or from the Submittal process.

c. Harness all cabling from field devices to plug plates, terminal boxes or pull boxes as necessary.

d. Integrate third-party and owner-furnished equipment as shown on the drawings.

e. Obtain approval for mounting systems and mounting configurations from the owner or procurement authority for all exposed device mounting configurations.

4. Distribution Frames (Racks)

a. Prepare equipment rooms and rack locations for rack frames, related cabling, and service entrances.

b. Coordinate with the owner, service providers, IT, and other applicable trades to incorporate third-party service entrances.

c. Ensure that all cabling is harnessed from the raceway system into the racks as specified herein and/or as shown on the drawings.

d. Ensure that the power feeders are in place and coordinate with the owner for installation of power conductors into rack power distribution systems.

e. Coordinate, configure and install applicable AV-supplied, supplemental raceway systems, including, but not limited to, cable ladders, trough systems, wire hook systems and cable trays as necessary.

f. Verify that all raceway entrances are properly configured and reflect the raceway drawings.

5. DSP Configuration & Programming

a. Coordinate signal flow for all DSP processors with the Consultant. Include the following audio processing and control functions:

1 All microphone inputs shall include HPF 125Hz UON.

2 All loudspeaker outputs shall include compression dynamics, -3.0dBFS, >10:1 compression ratio UON.

3 Do not use summing circuits for outputs where a single audio signal is required.

4 Band pass loudspeaker outputs per loudspeaker manufacturer's recommendation.

5 Prepare external control access for all input and output levels and mutes.

b. Prepare and submit DSP configuration files to Consultant for comment and approval.

c. Integrate DSP configuration files in the field and prepare systems for testing as specified herein.

d. Configure, develop and coordinate end-user control UI's as specified herein.

e. Configure, develop and coordinate interface with master control system, if applicable.

f. Interface with third party systems, including, but not limited to, LAN, Fire Alarm, content sources and owner-furnished equipment.

6. Testing, Troubleshooting and Certification of Performance Requirements

a. Ensure that all systems are installed as required by the contract documents.

b. Ensure that all systems are installed as required by the manufacturer for applicable components, equipment and accessories.

c. Test as required herein.

d. Certify all cabling, termination and connections for the distance, bandwidth and performance requirements of the systems as shown on the drawings.

7. Systems Summary

a. The description as noted herein provides a summary of the systems as designed herein and as required by the owner.

b. The descriptions, in accordance with the specifications and the contract drawings constitute the basis of the work.

c. The design, as shown on the consultant's drawings, represent the required functionality, performance and integration with the

infrastructure, however, the Contractor is responsible for ensuring that the design is implemented as shown.

d. It is the sole responsibility of the Contractor to meet these requirements to the complete satisfaction of the owner and the Consultant regardless of whether specific components, programming, configuration, fabrication, etc. is specifically shown on the drawings or noted herein.

e. Any revision to the design, as determined by the Contractor, will be considered. The Contractor shall contact the consultant with recommendations.

8. Systems Descriptions

a. General

1 The systems are integrated into a manufactured building (modified metal building) architectural design.

2 Cabling for AV systems shall be completely provided and installed by the Contractor. Cabling requirements are shown on the drawings.

3 The Contractor shall install cabling into facility with cooperation and coordination with the owner.

4 The cabling infrastructure includes a combination of conduit, conduit stubs, accessible ceiling areas, crawl areas, direct cabling (no conduit), within stage framing and within equipment rooms/operational control rooms.

5 Field panels shall be integrated by the Contractor as shown on the drawings. Backboxes for field panels is provided by the Electrical Contractor. The Contractor shall field-verify site conditions and inspect rough-in conditions prior to fabrication of field panels (see part 3, herein).

6 There are cabling end point locations that are not supported by conduit or backbones. In such cases, the Contractor shall terminate cabling through a finished hole in the ceiling (see cutting and patching, herein), or, set an appropriate backbox to support a plug plate if such plug plate is specified on the single line drawings or noted on the plans.

7. The Contractor shall conceal all cabling, regardless of conduit condition. Coordinate with owner in all cases where fishing a wall may be required.

8. Components shown on the drawings as “OFE” (owner furnished equipment), shall be fully integrated into the systems, resulting in a fully integrated system. The Contractor shall coordinate directly with the owner for all OFE components.

9. The AV systems are designed with components selected by the consultant for baseline performance and cost effectiveness.

10. The Contractor shall rig AV components to the physical infrastructure in full cooperation with the owner. Structural supports points shall be provided by the owner for interface with the Contractors rigging systems.

b. Arena Sound Reinforcement

1. Sound reinforcement for the arena and adjacent zones is based on a design which is intended to provide sound pressure levels, bandwidth and uniformity of coverage, determined by the consultant, suitable for the application and in conjunction with the acoustical parameters.

2. The sound system is based on a disturbed loudspeaker design with point-source enclosures located as shown on the drawings.

3. The Contractor shall integrate loudspeaker systems based on the drawings, and in full cooperation with the consultant.

4. Ceiling loudspeaker components shall be integrated with suspended rigging to structural attachment points. The Contractor shall carefully coordinate all rigging and attachment with the owner.

5. Loudspeaker components on columns or walls shall be integrated with manufacturer’s bracket system unless otherwise noted.

6. The Contractor shall install new cabling for all systems.

c. RF Distribution

1 A new remote RF antenna shall be integrated as shown on the drawings.

2 Provide new RF cabling from the antenna location to MDF.

3 The Contractor shall verify field conditions and provide cabling suitable for the distance and conditions.

4 Mount antenna to ensure line of sight below structure. The entire antenna assembly shall be free from structural interference.

5 Configure RF distribution as shown on the drawings.

6 Verify and test antenna system as recommended by the distribution equipment manufacturer.

d. Announcer's Booth

1 The booth is located on the arena floor in a raised structure. The sound system rack (MDF) is located in the booth and all cabling home runs are terminated there.

2 The Contractor shall coordinate all access to cabling pathways from the booth with the owner.

3 The Contractor shall strike and dispose of all existing equipment, cabling, racks and related components. Coordinate with the owner. No existing equipment or cabling will be re-used.

4 A single, rack-mounted touch screen controller shall be integrated into the DSP system for end-user control and operation.

9. Quality Assurance

a. The intent of these specifications and the accompanying drawings (hereafter referred to as Contract Documents) is to describe and present the concept of the system design for the project.

b. The Contract Documents represent a complete system provided and installed with high quality, professional reliability and performance. Professional performance standards by the Contractor and the equipment will be required at all phases of the Work.

c. The Owner and Consultant (hereafter referred to as Consultant), shall have exclusive jurisdiction of the acceptability of the work. This acceptance shall include, but shall not be limited to, shop visits to Contractor's fabrication shop if applicable, site visits, general observations and written reports from the Consultant.

10. Regulatory Requirements

    a. Comply with the latest version of ANSI, OSHA, IEC, IEEE, FCC, NEC and NFPA requirements.

    b. Listed and labeled as defined in National Electrical Code by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

    c. All equipment and materials shall be UL listed unless otherwise noted herein or on the drawings.

    d. Comply with all local codes as they apply to the work as specified herein and as shown on the drawings.

11. Manufacturer Qualifications

    a. Major products shall be supplied by manufacturers involved in the design, manufacture and service of products specifically for systems integration.

    b. All manufacturers shall maintain a factory-based service center capable of providing training, parts, maintenance and repairs.

    c. Manufacturers of DSP based audio products shall provide factory, or factory-authorized programming and implementation services.

    d. Minimum of 10 years continuous experience in the design and manufacture of audiovisual equipment as specified herein.

12. Source Limitations

    a. Obtain each category of audiovisual systems through one source from a single manufacturer when possible or practical.

    b. Obtain each component or item of equipment as a complete unit, including necessary mounting hardware and accessories.

13. Electrical, electronic and optical equipment.

a. Products of firms regularly engaged in the manufacture of electrical, electronic or optical equipment.

b. Provide latest model or type offered which meets the requirements shown on the drawings at the time of the submittal.

14. Materials

a. Provide only new materials and products.

b. Discontinued products or products that are known to be discontinued within 6 months of the bid date are not acceptable.

c. Supply the latest variation, version or revision of all hardware and software products.

d. All materials and equipment shall be of first-run manufacture. Items classified as "B-Stock" shall not be acceptable without prior approval from the Consultant.

e. If an item specified in Part 2 of this section, or is shown on the drawings, and has been discontinued, or is soon to be discontinued, submit the manufacturer's direct replacement for review and approval by the Consultant. If a direct replacement is not available, submit a proposal for an alternate product that meets the requirements as specified herein and/or as shown on the drawings.

15. Delivery, Storage and Handling

a. Deliver portable components, equipment, materials, and accessories to project site in original, unopened packages and store them in a fully enclosed, air conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

b. Handle components, equipment, materials and accessories carefully to avoid damaging units in any way.

c. Do not deliver system assemblies, sub-assemblies, portable components, equipment, materials or accessories until the building is enclosed and other construction within spaces where the audiovisual system assemblies will be installed is complete and ready for installation.

d. Fabricated equipment racks shall not be delivered to the jobsite until the noted equipment rooms have been finished and are operating with permanent building power.

e. Do not operate electronic systems on “temp” power under any circumstances without prior approval from the owner.

f. The Contractor shall be liable for all fabricated equipment racks installed on the jobsite until accepted by the Consultant during acceptance testing. Racks installed on the jobsite are not subject to warranty coverage until Final Acceptance.

g. The spaces where audiovisual system assemblies are installed shall meet the following requirements:

1 Free from dust generated from construction.

2 The room temperature shall be within the specified operating temperature recommended by the manufacturer.

3 All power distribution systems shall be complete and operating under final acceptance by the owner.

16. Substitutions

a. Equipment, materials and other required products designated as “design-basis” shall be the preferred products.

b. Items listed herein, and/or shown on the drawings may not include detailed performance specifications; in this case, the manufacturer’s specifications indicate the performance requirements.

c. The Contractor should provide design-basis products whenever possible. In this case, no substitution shall be accepted without a written request from the Contractor and with written approval from the Consultant.

d. Equipment, materials and other required products designated with the designation “no known equal” shall be the required products.

e. Where the specified product is designated “or approved equal”, the product specified shall determine the standard of performance required, regardless of any additional language referring to features, performance or other specifications.

f. In all cases where a specific manufacturer's model number is specified or shown on the drawings, the manufacturer’s

published specifications for noted item shall establish the performance requirement.

g. When products are specified without specific manufacturer or model requirements, the performance requirements, connectivity, functionality or mechanical requirements listed herein, or as shown on the drawings, shall establish the requirements for the product or item.

h. Requests for substitution shall be received by the Consultant as a request by the Contractor upon award of contract, to provide an equal or superior product without change to the design, the design intent or to the "spirit" of the design. Such requests assume that the Contractor has verified by a level of experience, documentation or other data that the proposed substitute product is in fact, equal to, or superior to the specified product and that the Contractor shall coordinate the configuration, installation and orientation of such product, amending or modifying the system design and its associated documentation as required for the work to be complete in all respects.

i. Substitutions shall not be considered valid when such substitutions are included as part of submittal drawings, shop drawings or other construction documents without prior approval from a formal request as specified above.

j. Substitutions shall not be considered when such substitution requires a substantial revision of the Contract Documents in order accommodate the substitution.

k. Substitutions shall not be considered when the substitution fundamentally changes, modifies or otherwise compromises the system design, the intent of the design or the "spirit" of the design.

l. Project infrastructure including, but not limited to, space planning, mechanical infrastructure, raceway systems, outlet and control boxes, etc. has been designed with design-basis products. Any substitution or product implementation that requires changes to infrastructure, mechanical requirements, electrical requirements, etc. shall require detailed shop drawings showing the proposed change. Such request shall not be considered if a substantial impact to other trades or the project site is required to accommodate such request. The Contractor shall verify and coordinate all raceway or

rough-in locations with actual equipment installed, regardless of change status.

m. When approved substitute equipment or products require changes to other system components, configurations, connections or infrastructure or system design as indicated by the drawings, the equipment shall operate properly in harmony with the design intent as indicated by the Contract Documents. Incidental changes, equipment, items or devices required to implement the approved change shall be provided by the Contractor without change to the Contract amount. Contractor shall assume all costs associated or incurred by approved changes, including, but not limited to, changes incurred by adjoining or supporting trades.

n. Requests for substitutions shall be submitted no less than 15 business days prior to bid date. Substitution requests shall be requested and approved in writing only, based on the criteria specified herein, and/or the General Conditions.

17. Contractor Qualifications

a. The work performed under this Section shall be performed by an experienced Systems Integration Contractor specializing in the design, installation and service of high-performance AV and control systems.

b. The Contractor shall be normally engaged in the business of integrating advanced AV and control systems in construction projects and shall provide evidence with the bid that such business operation has continued as such, continuously for no less than five (5) consecutive, prior years.

c. The work specified in this Section shall be performed by a single Contractor experienced in the design, fabrication, installation, testing and warranty contract management of systems such as those specified herein.

d. The Contractor shall provide evidence with the bid of no less than three (3) prior projects of similar scope, completed within the previous 12 months from the bid date. In this context, "scope" shall be defined as work that includes similar design, installation, operational requirements and cost.

e. The Contractor shall be authorized in good standing for all major product lines specified herein. If factory training or certification is required for specific product lines, the

Contractor shall provide evidence that such training has been completed by current staff members and that such training is directly applicable to the products specified herein.

f. The Owner reserves the right to reject any bids from firms without sufficient experience of projects of similar size, scope and cost.

g. The Contractor shall employ a qualified project engineer, as full-time employee and shall conform to at least four of the following requirements:

1 Be a university graduate engineer in electrical or electronic engineering.

2 The engineer shall have at least 5 years experience in design, implementation, troubleshooting and management of large scale, integrated electronic systems at the component and device level.

3 The engineer shall have an active CTS-D or CTS-I certification in good standing as issued by the International Communications Industries Association (InfoComm).

4 The engineer shall have direct experience in the implementation of at least 5 systems of similar scope within the last 7 years.

5 The engineer shall have factory training or certification for all products that integrate hardware and software configuration tools.

h. The Owner reserves the right to reject any bids from firms that cannot demonstrate compliance with staffing requirements as specified herein.

18. Coordination

a. Cooperate and coordinate as required with the owner and other contractors, tradesmen and supporting disciplines responsible for work not included in this Section.

b. Provide any and all information, documentation, samples, etc. as required or requested by the Owner or Consultant to ensure this work is completed to the satisfaction of the Owner, and in best interests of the Project, and for the efficiency of the construction process. Such assistance or information shall be transmitted in writing to the applicable party in all cases. All

correspondence of any type shall be written and shall be copied directly to the Consultant.

c. The Contractor shall participate in meetings and conferences as required.

d. The Contractor's project engineer shall be responsible for supervision of all technical work that is part of this Section, including, but not limited to, the following:

    1 Supervise preparation of shop drawings and submittals. Such engineer shall sign all submittals and shop drawings.

    2 Supervise shop fabrication and field installation work to assure conformance with the Contract Drawings, the Specifications, and the reviewed Shop Drawings to assure workmanship of the specified quality.

    3 Supervise the testing of all assemblies and sub-assemblies prior to delivery to the Project Site.

    4 Lead in the specified testing of the completed installation to assure the Owner that all Contract Requirements are met. Work with and assist the Consultant in the final testing for approval and acceptance of the system for the Owner.

e. The Contractor's project engineer, as defined herein, shall be present at the Project site for Substantial Completion Inspection, Final Inspection, approve the operating and maintenance manuals, and provide any additional instruction as needed to designated members of the Owner's staff.

f. Coordinate arrangement of the audiovisual system assemblies with adjacent construction, and with components occupying ceiling space, including structural members, pipes, air-distribution components, raceways, cable trays, recessed lighting fixtures, ceiling framing, light fixtures, HVAC equipment, fire-suppression system, and partitions.

g. Refer to existing electrical drawings and site conditions for service voltage and power distribution systems. Coordinate the installation of system power distribution and grounding systems with the owner.

h. Refer to Category AV Drawings for control and interface cabling to third party systems for equipment specified under this Section.

i. Coordinate layout and installation of system components with adjacent construction, including ceiling framing, light fixtures, ceiling fans, HVAC equipment, fire-suppression system, and partitions.

j. Provide assistance to the Owner as required to ensure that all equipment is implemented for maximum performance.

k. Coordinate installation of power distribution to A/V racks with the owner.

l. Termination of ground conductor inside A/V racks. Coordinate with the owner.

19. Warranty & Guarantee

a. The warranty specified in this Section shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

b. Warranty to the Owner shall be an inclusive warranty for the complete, integrated system without regard to specific products, materials or components.

c. Manufacturer's Warranties shall be executed by each manufacturer agreeing to repair or replace components of audiovisual system that fail in materials or workmanship within specified warranty period.

d. The Contractor shall coordinate all manufacturers' warranty during the system warranty period. This includes, but is not limited to travel, technical service time, installation, replacement, loaner equipment, etc.

e. Warranty Period shall start at the date of Final Acceptance as defined herein, regardless of the status of manufacturer warranties on individual equipment or components and shall be in force for a period of one calendar year.

f. Completion of the Warranty Period shall be one year from date of Final Acceptance and constitutes 100% Progress as it related to project invoicing.

g. Contractor shall provide verbal response within four (4) hours via landline telephone during the warranty period.

h. Contractor shall provide physical on-site response within forty eight (48) hours of notification by the end user within the warranty period.

i. Contractor shall maintain technical staff for any inquiry during normal business hours within the time zone of the project site.

j. Contractor shall provide alternate access to technical assistance from 7 a.m. to 9 p.m., 7 days a week during the warranty period. Such access may be provided via cellular telephone access, SMS/text messaging, video chat or web conference, provided that all requests are responded to within 30 minutes of the inquiry.

k. Guarantee all parts, materials, equipment, devices, labor and workmanship furnished under this Contract for the warranty period.

l. During the warranty period the Contractor shall visit the project site at least once during the mid-term of the warranty period (between the fourth and eighth month of the warranty period) and perform a detailed survey to ensure that the system is operating as designed and installed. Any defective materials or workmanship shall be repaired or replaced on-site without cost to the Owner.

m. The Contractor shall provide temporary equivalent, advanced replacement equipment when immediate on-site repairs cannot be performed, or it is impractical to do so.

n. The system shall be completely operational, as designed and installed, without delay or "down time" during the warranty period.

o. If specific components within the system are provided with manufacturer's warranty exceeding 12 months, the Contractor shall extend the total system warranty for such parts of the completed, integrated system as designed and installed to meet the warranty of such components.

p. The Contractor shall provide a complete and working system and shall provide maximum, cooperative assistance to the Owner during the warranty period to ensure continued, maximum Owner satisfaction.

q. Upon completion of the work, the Contractor shall submit a Certificate of Warranty. Such Certificate shall include

language that specifically indicates the warranty period, conditions of the warranty and signatures of authorized representatives of the Contractor and Owner.

r. At the discretion of the Owner, partial or incremental warranties may be negotiated for completed portions, sub-systems or assemblies of the system if jobsite conditions prevent the Contractor from completing the work, performing the final commissioning and training, thereby initiating the warranty period.

s. The warranty period shall not begin until the final testing and all post-test requirements have been satisfied and accepted by the Consultant and Owner.

20. Maintenance Service

a. Contractor shall offer an optional, post-warranty maintenance plan directly to the Owner. Such proposals shall include provisions for the following:

1 Site visits for routine maintenance.

2 Annual or semi-annual site visits for confirming and adjusting system controls for proper operation.

3 The offer for a Maintenance Service Plan shall be included in the close-out documents.

21. Shop Drawings & Submittals

a. General

1 Submittals shall be prepared, submitted, and approved by the Consultant prior to the procurement or fabrication of equipment and materials and prior to the commencement of any work.

2 Submittals shall include detailed, complete and thorough shop drawings and product data as specified herein.

3 Ensure that all electronic Submittals are configured for cross-platform PDF viewers. Do not embed proprietary, or Adobe-specific functionality that would prevent generic PDF viewers from operating properly with the files.

4 All PDFs shall be viewable, with full functionality on MacOS, Windows, iOS and Android operating systems.

5 Submit two (2) hard copy of all submittals.

b. Installer qualifications submittal:

1 Provide documentation indicating compliance with the Contractor Qualification requirements specified herein.

c. Product Data:

1 For each item specified herein, or shown on the drawings, submit a Manufacturer's Equipment Specification Sheet listing the product features, specification, and physical characteristics.

2 If more than one product or model option is listed, clarify which product is being submitted by identification.

3 Provide data sheets and supporting documents in a bound specification manual or indexed PDF document per the requirements noted herein.

4 Include equipment lists, data sheets, specification or "cut" sheets for all products, components and conductors for the complete system as specified herein.

5 Use only 8.5" x 11" sheets.

6 Use indexes, URL (hyperlinks) or other means to separate sections into clear, logical sections. Use multiple volumes as necessary.

7 If manuals are printed, use dividers and a master index or Table of Contents to organize sections.

8 Provide a Bill of Quantity for each item specified herein, or shown on the drawings, and all incidental material supplied necessary to complete the Work as specified herein and shown on the Drawings.

9 All schedules and bill of quantities shall include the manufacturer, model, description, quantity supplied and estimated replacement cost.

d. Shop Drawings

1 Shop Drawings shall be clear and legible.

2 Drawings shall be prepared and submitted on drawing sheets in the same size and format as the project drawings.

3 Title blocks for all shop drawings shall be the Contractor's with references to the project information.

4 Character height shall be 1/8-inch high when plotted at full scale.

5 Title character height shall be ¼-inch when plotted at fill scale.

6 Drawings shall be 1/4-inch, 3/4-inch, 1-inch, 1-1/2-inch, 3-inch and 1-inch = 1-inch scale.

7 Do not rely on Consultant's CAD drawings as a basis for this requirement. Consultant's drawings constitute proprietary copyrighted intellectual property and such, all or some of the original electronic drawing files may not be available. Contractor is free, however, to use plotted versions, either paper plots or portable documents (PDF) of the Consultant's drawings as a reference in preparing shop drawings.

8 Contractor shall not "cut and paste" Consultants drawings in any part as part of any submittal, shop drawing or as-built drawings.

e. Single Line Drawings

1 All signal flow, cabling and termination drawings shall be in Single Line format as specified herein.

2 Single Line Diagrams shall be separated by systems, location, signal transport (audio, control, etc.) as applicable for the project scope.

3 Single Line Drawings shall indicate final terminations and interconnection of all devices in the signal path for each system.

4 Single Line Drawings shall clearly indicate manufacturer, model, applicable SKU number, physical connections and related circuit type, physical location by rack and/or room number.

5 Use only clear English designators, drawing codes shall not be permitted.

6 Drawings shall be consistent with the submitted bill of materials. Use clear, constant designators throughout.

7 Include a schedule or master legend indicating all cable types. Include cable manufacturer, wire model or SKU number, cable designator/wire number, termination type, source and destination devices and any notes applicable to the termination.

8 Cleary note applicable terminal cabinets, pull boxes or backbones by physical location, panel designator or number, reconciled with architectural plans and/or AV Raceway plans.

f. Plans

1 Plans shall show physical locations of all devices with proper scale and notes to indicate mounting type, termination, etc.

2 If plans reference sections or elevations, use architectural section markers with references to sheet and detail.

3 Include room numbers, dimensions and relevant annotations for all AV-specific devices, coordination items, etc.

4 Where applicable, show physical equipment configurations in section and/or elevation view.

5 Section views are mandatory for suspended loudspeaker components.

g. Risers

1 Riser diagrams are optional, except in cases where comprehensive raceway plans, reflected ceiling plans and related details are not in use.

2 Provide riser drawings for the system infrastructure. Indicate box type, location, conduit types, location, termination and locations.

3 Indicate where cable trays, thoughts and multi-barrier raceway systems are used by location, size, type, function and cable fill.

4 Indicate applicable intermediate pull box location, size, type, quantity and number.

5 Indicate terminal back box locations, size, type, quantity and number.

h. Equipment Rooms

1 Provide details for each AV Equipment enclosure location, size, type, quantity and number.

2 Show racks in plan, section and elevation views. Contact the AV Consultant for architectural and rack backgrounds, if applicable or permitted.

3 Plans shall show physical locations of all racks, related raceway systems with proper scale and notes to indicate mounting type, termination, etc.

4 If plans reference sections or elevations, use architectural section markers with references to sheet and detail.

5 Include room numbers, dimensions and relevant annotations for all rack areas.

6 Indicate points of demarcation for related trades, power feeders, content sources, etc.

7 Where applicable, show physical equipment configurations in section and/or elevation view.

8 Section views are mandatory for rack rooms with cable ladder systems and rack configurations with more than 2 rack bays.

9 Rack or frame details shall include callouts for rack type, manufacturer, model, frame type, function and designator.

10 Equipment elevations shall not be used for termination or wiring details. Do not show connections as part of rear-panel rack elevations.

11 Provide elevations for all jack fields, patch bays and terminal panels. All elevations shall include panel type, manufacturer, model, configuration, connector type and quantity and designator, reconciled with the single line drawings.

i. Panel Elevations

1 All patch bay designators shall match a corresponding designator on the single line drawings.

2 Single line drawings are the basis for all panel designs. Panel elevations, if provided, are for reference only.

3 For each contractor-fabricated item, indicate all components and devices, including manufacturer and models, dimensions, connector types and manufacture and mounting locations.

4 Panel elevations shall reflect the metal fabrication process.

j. Rigging & Mounting

1 For all devices attached to the building indicate loads, location of attachment point, method of load calculation, hardware details, rigging parts schedule by manufacturer and model, design calculations.

2 Ensure that drawings include architectural and structural elements and demarcations to indicate related trades.

3 Callout, annotate and dimension all elements, fastening devices, hand/pick points, mounting hardware, supporting hardware, cabling and terminations.

k. Samples

1 Submit a sample for each device installed in visible public space.

2 Samples shall include, but shall not be limited to, flush-mounted loudspeaker grilles, control finish plates, field I/O panels, J-Box cover plates and rigging attachment plates.

l. Qualification Data:

1 Submit documentation supporting compliance for engineers and project managers as specified herein.

2 Indicate methods of compliance, if applicable for the demonstration of qualification of any additional personnel, and to demonstrate their capabilities and experience.

3 Include reference documents, lists or promotional materials for completed projects as specified in the

requirements herein. Include project names and addresses, contact names and addresses of architects and owners, and other information specified.

m. Test Reports

1 Shop Test Reports: Prior to requesting Shop Testing, document that each system has been tested, is complete and fully operational.

2 Submit indexed test results for each device and cable run.

3 Audio system tests shall include electronic frequency response, acoustic frequency response, total harmonic distortion, phase, signal I/O, polarity and gain structure.

4 Data transport systems shall be certified for the applicable bandwidth in accordance with the requirements of the manufacturer of the connected devices. Submit reports from test equipment where applicable.

5 The resultant performance of each physical media shall be documented in comparison with the performance requirements.

6 Submit via flash media a copy of the final software configuration file for all audio processing systems.

n. Closeout Submittal

1 Provide a comprehensive Service Manual with individual, manufacturer's operations and instruction manuals for all equipment, components and accessories.

2 Contractor shall prepare a system-level operation manual that reflects the end-user training.

3 The systems manuals shall be composed using a single, consistent visual format and writing style.

4 Text shall be derived from component equipment manufacturer's instruction manuals and may include reproductions of artwork and other materials.

5 Manuals, drawings, charts and graphs shall be submitted in PDF format on flash media or accessible on a internet address. Any web site or FTP location shall not expire during the warranty period.

6 A detailed index at the front of each manual shall indicate the project name, specification section reference, manufacturer, model, part number, description and operations and service information.

7 Provide complete, comprehensive instructions for the operations of all contractor-fabricated devices and equipment items provided as part of the Work of this Section.

8 Provide comprehensive specifications for all material, devices, components and equipment selected for use in this Section, whether modified or not.

9 Provide complete bills of quantities of all material as delivered, including a separate schedule of portable equipment.

10 Provide a final schedule of equipment and devices provided in each room, by room number and name.

11 Include serial numbers for all unique components, equipment or other items where applicable.

12 Provide a comprehensive tabulation of equipment, devices, miscellaneous parts and maintenance items, including manufacturer's name, address, model number, systems use and miscellaneous information.

13 Provide comprehensive documentation of all performance verification tests and procedures described herein.

14 Provide copies of all software-based programs, including, but not limited to, Control System code, DSP programming configurations on flash media.

15 The Record Drawings shall be developed from the final "as-built" condition of the systems.

16 Provide the “as-built” condition of the Shop Drawings.

17 Provide all training materials for review prior to scheduling training sessions.

18 Provide copies of all manufacturer warranties.

19 Provide a statement of system warranty as specified herein.

22. Sequencing

    a. Coordinate schedules with owner for all work.

    b. Ensure that work is closely coordinated with related trades to maintain project schedule.

    c. Notify Consultant at least 30 days prior to any site inspection or field request.

    d. Notify the owner of any site condition that impact work progress, constraints caused by related trades or any other condition.

    e. Submit all testing documentation to the Consultant, via the owner or procurement authority, for review prior to requesting any Inspection.

    a. Allow adequate time for corrections to be made after inspections to maintain the Project Schedule.

2. Products

A. General

1. Equipment, components and materials shall be new, factory-supplied, factory-sealed and unused condition.

2. All items shall be provided under full factory warranty.

3. Acceptable equipment, components and related items are shown on the drawings.

4. The drawings take precedence over any conflicts, unless otherwise noted.

5. Quantities shall be taken-off from the drawings, unless specifically noted herein.

6. When quantities conflict, the greater quantity shall be furnished unless specifically clarified in a written response from the Consultant to a Contractor RFI.

7. All equipment, components, materials or other devices required for a complete working system shall be included, even if such equipment, components, materials or devices are not specifically noted herein, or indicated on the drawings. Any such item shall be specifically noted in the bid submittal.

8. Provide all required components shown on the drawings.

9. The manufacturers' data, specifications and installation requirements, including, but not limited to, supplementary components, accessories, required software, maintenance plans or other additional items required to fully implement the systems as documented on the project drawings shall constitute the requirements for all system components.

10. Manufacturer's product data shall supersede any specific performance specifications provided herein, or shown on the drawings.

11. Specific product specifications, features, operational or functional requirements noted herein shall be considered performance requirements for all system components unless they conflict with the manufacturer's published data for the specific product.

B. Basis of Design

1. Design basis products constitute the preferred products for the integration of all systems.

2. Alternate products may be considered, see Substitutions, herein.

3. The design basis products are indicated on the drawings and represent minimum performance requirements.

4. If a specific product requires additional accessories, optional components or other items, provide the complete product configuration to meet the requirements of the system drawings or system description provided herein.

5. All products shall include all required components as recommended by the manufacturer for the application shown on the drawings and as summarized herein.

C. Wire & Cable

1. Wire, cable and signal conductors shall be new and unused.

2. All wiring shall be plenum rated except for wire installed in equipment racks, portable cables and wire installed in conduit or raceway systems.

3. All plenum wire shall meet applicable local codes.

4. Other equipment and/or component cables and conductors shall be constructed with stranded wire, shielded as required with the number of conductors and gauge required by the manufacturer for proper operation of the item supplied.

5. Wire and cable for any device, whether specifically listed herein, shown on the drawings or not, shall be supplied in accordance with the requirements of the device manufacturer and the National Electrical Code.

6. Specific wire and cable types, products and functions are indicated on the drawings.

7. Portable cable assemblies shall be provided as shown on the drawings, or as recommended by the intended device of use.

8. Provide all and any proprietary cables and interconnects if required by the specified equipment.

D. Field Panels & Plates

1. Panel or plate mounted connectors shall be mechanically and electrically isolated or insulated from the signal/shield terminal.

2. Floor mounted connectors shall be installed in secure floor pockets or protected enclosures, unless clearly noted otherwise on the drawings.

3. Interior plates shall be painted or anodized with a black finish.

4. Connector labels shall be engraved with .125" engraved lettering with white paint fill.

5. Custom panels and connectors shall be installed on .125" anodized brushed aluminum or CRS.

6. Panel elevation drawings are shown for layout and conceptual design. Provide connector complement as shown on the single line drawings.

7. Submit details and samples of all custom finish plates prior to fabrication.

8. Standard finish plates shall be constructed of brushed 302 stainless steel.

9. Logical, sequential and consecutive numbering shall be provided as shown on the drawings or as implied by the logical layout of the panel locations. Submit detail.

10. All panels and plates shall be supplied as shown on the drawings or as specified herein.

11. The single line drawings shall have precedence for all panel and plate requirements. Where a panel elevation is not shown, the Contractor shall configure the panel based on the single line drawing and the backbox or rack indicated on the plans.

12. The Contractor shall refer to the plans and AV raceway drawings to confirm panel sizes for all backbox locations.

13. The Contractor shall carefully configure plate construction based on the mounting configuration of the related backbox.

E. Cable & Wire Labels

1. Provide wire numbers for all cable assemblies, conductors, optical media and data cables.

2. Refer to single line drawings for suggested cable and wire numbering schemes.

3. The Contractor is free to use their preferred "shop standard" for wire and cable numbers. All numbers shall be included on the as-built drawings and reconciled with the cable schedule.

4. All labels exposed to field conditions shall be laminate type, vinyl construction with protection for the printing.

5. Labels shall be laminated or sealed with clear shrink wrap or other method to protect the printing.

6. All labels shall be resistant to weather and corrosion.

7. All labels shall be white with black numbering.

8. Each physical cable or optical media shall be labeled at each end.

9. If a physical cable or optical media has been spliced or otherwise coupled, each end of the break shall be labeled.

10. All labels shall be configured with Thomas & Betts WES Series systems or equal. Dymo labels or similar office-grade labeling systems shall not be acceptable.

F. Equipment Mounting

1. Loudspeaker rigging, suspension and mounting shall be performed with ATM Flyware or similar assemblies.

2. Omnimount brackets are acceptable with approval where applicable.
3. AV drawings are for information only. The Audio-Visual Contractor shall supply Shop Drawings of mounting details stamped by a registered structural engineer prior to installation.

4. All flush-mounted assemblies shall be secured to the structure.

5. Loudspeakers assemblies mounted flush into LAT ceilings shall be secured to the structure.

6. In all cases, the Contractor shall secure the approval of a licensed structural engineer for all mounting configurations.

7. Submit details for all mounting assemblies.

8. Custom fabricated mounting systems are not acceptable without approval from a structural engineer.

G. Loudspeakers

1. Refer to the drawings for circuiting, power, impedance, dispersion and location.

2. For use with manufacturer-specific amplifier controller for optimum operation.

3. Transducers: LF 1 x 12" Ferrofluid-cooled; HF - 1 x 1" exit Ferrofluid-cooled.

4. Frequency Response: 85 Hz – 16 kHz, nominal.

5. Sensitivity (1W/1m): 103 dB.

6. Power Handling: 200 W continuous @ 8 ohms.

7. Continuous Max Output: 126 dB (132 dB Peak).

8. Provide rigging, bracket, cabling, termination and transformer as indicated on the drawings.

    a. Acceptable, subject to above by: Community (Basis of Design), or equal by One Systems, Peavey Commercial, Renkus Heinz or JBL.

H. Wireless Microphone Systems

1. The drawings indicate the performance requirements, audio and RF connectivity, microphone type and signal flow.

2. The Contractor shall complete the design by ensuring RF conditions are suitable for site conditions.

3. The systems shall be implemented as the result of a site survey.

4. The Contractor shall perform a comprehensive site survey, in accordance with the recommendations of the specified (Basis of Design) manufacturer.

5. The site survey shall support the channel quantity indicated on the drawings, plus a 20% contingency for expansion.

6. Ensure that all RF conditions are suitable for the systems specified.

7. Include the results or RF site survey in the Submittal, prior to

procurement of RF components, equipment or related equipment.

a. Acceptable, subject to above by: Sennheiser (Basis of Design), or equal by Shure, Audio or Audio Technica.

I. DSP

1. Provide the DSP configuration as shown on the drawings.
2. Integrated DSP shall be included to support signal processing, routing, distribution, summing, switching and control.
3. DSP shall support audio and video transport across standard Ethernet networks.
4. Analog audio I/O shall be included as shown on the drawings.
5. The DSP shall support integrated control via a system of control panels, touch screens and UI software.
6. All network audio shall support AES67 standards.

a. Acceptable, subject to above by: QSC Q-Sys (Basis of Design), or equal by Biamp, Peavey Commercial (MediaMatrix) or BSS.

J. Supplemental Components

1. The AV drawings may not indicate supplemental components or components that may be "implied" by the system design or by a specific component.
2. The Contractor shall provide all required supplemental components required to meet the intent of the design.
3. If prior notice is not provided via an RFI or other pre-bid request, the Contractor shall be liable to provide any supplemental component required to interface the documented systems.
4. Provide the following in all cases:

a. Low level audio balancing transformer to terminate unbalanced circuits. Provide, mount and terminate transformer, equal to Jensen ISO-MAX PC-2XR.

b. Audio isolation transformer (1:1). Provide as required to isolate audio circuits from noise, hum or other spurious noise. Provide, mount and terminate transformer, equal to Jensen ISO-MAX DM2-2XX.

c. Provide active buffer amplifier for all consumer audio circuits with amplifier, equal to Aphex 124 or equal.

d. All passive control, GPIO, relay, logic and other custom circuits

shall include a power supply with 100% current rating for applicable circuit. Supply, mount and terminate power supply equal to B&K, Condor or approved equal.

K. Equipment Enclosures & Racks (Distribution Frames)

1. Provide racks as shown on the drawings.
2. Single line drawings shall constitute the requirement for racks in all cases. If rack elevations are provided on the drawings, they should be considered conceptual.
3. All equipment with EIA mounting rails shall be mounted in an equipment rack.
4. All racks shall include a power sequencing system with a 2:1 ratio of sequenced circuits to power amplifiers.
5. Four non-switched circuits shall be provided. All circuits shall be rated for the loads and feeders noted on the plans.
6. All racks shall include fans and exhaust vents in accordance the the recommendation of the equipment manufacturers for racked equipment and/or the rack manufacturer.
7. All racks shall include a system of vents and blank panels to ensure that all racks are sealed.
8. The Contractor shall use a system of punch or terminal blocks for internal rack circuits where applicable. Use only rear-rack panel or DIN assemblies.
9. All equipment shall be labeled by function and drawing designator, front and rear.
10. A system of horizontal and vertical cable management shall be employed to secure cabling systems.
    a. Acceptable, subject to above by: Middle Atlantic (Basis of Design), or equal by Lowell.

3. Execution

A. Examination

1. Examine rough-in work and verify actual locations of terminations, connections and applicable junctions prior to installation.
2. Notify the owner of any discrepancy in field conditions.
3. Examine raceway systems, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

4. Examine walls, floors, roofs, equipment bases, and roof supports for suitable conditions where audiovisual systems are to be installed.

5. Proceed with installation only after unsatisfactory conditions have been corrected.

B. General Installation

1. Furnish and install components, equipment, devices, accessories, wire, cabinetry, materials, parts, incidental items and other items necessary for a full, complete working system, whether specified herein or on the drawings or not.

2. Installation of all items, whether specified herein or not, shall be installed in accordance with the manufacturer's recommendations.

3. Install all items, etc. in accordance with the system drawings unless otherwise directed by the Consultant in writing.

4. Installation shall be performed in accordance within accepted practices of the broadcast, communications and electronics industries, including, but not limited to, AES, NAB, IEC, ANSI and NEC. Wiring and termination work shall meet or exceed such standards in all phases of the work.

5. Equipment shall be held firmly in place with proper mounting hardware, suspension or rigging materials.

6. Equipment attached to any building structure, sub-structure or other load-bearing member shall be self-supporting.

7. All mounting or rigging hardware shall be installed with a safety factor of at least three times the required load.

8. Equipment shall be installed to provide reasonable and normal safety to the operator or end user.

9. Adequate ventilation shall be provided for any heat-producing component, group of components or integrated equipment enclosure.

10. Furnish all systems to accommodate future additions, expansion and service using modular, solid-state components when possible.

11. All equipment shall be designed and rated for continuous operations and shall bear the mark of any applicable agency for jurisdiction of such, including, but not limited to UL, CUL or CE.

12. The installation requirements specified herein and shown on the drawings shall govern the design, fabrication and installation of

the system.

13. In case of a discrepancy between the project documents and any individual manufacturer's equipment specifications, the most stringent shall govern.

14. Furnish all test equipment and the services of the project engineer and the project manager to assist the Consultant in the acceptance testing.

15. Make any adjustments to any part of the system, including any supplemental or additional physical alignment of transducers as required during the acceptance testing.

16. Maintain a logical installation schedule to maximize efficiency with other jobsite conditions and trades.

17. Store all materials as required to ensure quality and condition for integration into the work.

18. Store materials in physical locations that facilitate prompt inspection and/or testing as required by the Consultant.
19. Materials shall not be accepted into the work without prior inspection and approval by the Consultant.

20. All materials shall be new and shall be manufactured, handled, and installed in a professional manner.

21. Coordinate installation of different components, owner-furnished items and other items as necessary to ensure maximum service and maintenance access.

22. Coordinate the installation of applicable specialty sub-contracting for related work, including, but not limited to installation of telecommunications circuits, fire alarm connections, interface with third party or owner-supplied systems, centralized LAN circuits and other connections as required, and as shown on the Contract Documents.

23. Verify compatibility of all components, equipment and other items to ensure that all dependencies are provided for proper operation.

24. Incidental items, including, but not limited to, hardware components, software, wiring, termination or fabrication shall be provided and installed by the Contractor.

C. Installed Cable & Terminations

1. General

   a. Install cable without damage to the insulation, conductors, deformation or compromise to the cable.

b. Install all cable in raceway system as shown on the drawings.

2. Signal Isolation

   a. Maintain 3" minimum distance between low voltage circuit cabling.

   b. Maintain 3' minimum distance between any low voltage circuits running parallel to any circuit exceeding 100VAC.

   c. Maintain 6' minimum distance between any low voltage circuits running parallel to any circuit exceeding 200VAC.

   d. Low voltage circuits shall not pass any adjacent high level circuit exceeding 100VAC at less than 90 degrees (perpendicular).

3. Terminations

   a. Do not splice system cabling unless specifically directed by Consultant or the system drawings.

   b. All cable shall be pulled directly from the source connector to the equipment enclosure without any junctions.

   c. Pull all cable through J-boxes and pull-boxes with adequate service loops in accordance with industry-standard practices.

   d. All terminations shall be performed using terminal blocks and/ or punch blocks as indicated on the drawings and specified herein.

   e. Circuits terminating to terminal blocks shall be terminated using appropriate spade lugs. All spade lug terminations shall be crimped and soldered.

   f. In lieu of manufacturer's recommendation, tin-solder all bare wire connections prior to termination.

   g. Un-terminated signal shields or drain conductors shall be individually insulated with clear heat-shrink insulation tubing and attached to the cable with an additional section of heat-shrink tubing.

   h. Maintain 8" of service loop at all connectors.

4. Cable Labels

   a. All terminating circuits shall be labeled on both ends with a logical, consecutive, sequential numbering scheme.

   b. Document all wire labels on as-built drawings and within any/ all software based audio processing systems where such

circuits are terminated.

c. Use only specified labels.

d. Labels shall be installed no less than 4" from the connector, terminal block or punch point, and no more than 8" from connector, terminal or punch point.

5. Cable Management

a. Cables shall be bundled or grouped by circuit type.

b. All circuit types shall be routed from source to destination in a clear, logical and consistent manner throughout the project.

c. Protect all wire, cable, harnesses and conductors from edges of pull boxes, J-boxes, conduits, ducts, equipment enclosures or other boundaries using industry-standard edge-insulating devices, such as "cat track" or rubber grommets.

6. Documentation

a. Maintain a thorough, carefully planned log of all circuit runs. Such logs shall document cable route, source location and destination terminations, min.

b. As-built drawings and wiring logs shall be furnished with clear, concise cabling documentation.

c. All wire numbers and logical numbering schemes shall be consistent between cable logs, drawings and software circuits.

D. Grounding

1. Maintain ground integrity throughout system. Follow the grounding and signal termination schematics shown on the drawings. Any deviation to these drawings shall require prior approval from the Consultant. Such approval shall be in response to a written request from the Contractor with specific details documenting the proposed request.

2. The system shall be free from hum, noise, oscillation and other artifacts throughout the facility and at all system racks. This performance requirement shall be maintained even if the earth ground is temporarily disconnected.

3. Earth ground shall be terminated at a single point in accordance with National Electric Code 1996 paragraphs 250-74 Exception No. 4, 250-75 Exception and 384-20 Exception.

4. All wireways, trays and cable ladder assemblies shall be grounded to the raceway and conduit system, unless otherwise noted herein, or

on the drawings.

5. The equipment racks and system enclosures shall be electrically and mechanically isolated from all grounded systems, including, but not limited to the following:

    a. Building ground.

    b. Raceway and conduit system.

    c. J-Boxes, pull boxes or outlet boxes.

    d. Building structural steel.

    e. Other electrical system grounds.

6. Equipment enclosures shall be electrically connected at a single point to the isolated grounding system as shown on the A/V drawings.

7. Avoid ground loops at all points in the system.

E. Equipment

1. Mounting

    a. Secure all hanging and/or free-standing equipment to building structure to resist seismic acceleration of 1G in any direction.

    b. Required equipment support and mounting conventions may not specifically be shown on the Contract Drawings. Contractor shall design all required support and mounting systems as required by the specification and local codes.

    c. Submit detailed shop drawings with proposed design and that reflect actual field conditions and support, mounting and restraint requirements.

    d. Comply with all local codes as they apply to the work.

    e. Comply with the U.B.C.

2. Equipment Enclosures & Racks

    a. Equipment racks and enclosures shall be installed at the locations shown on the drawings or as coordinated with jobsite conditions. Coordinate final locations with the Owner and Consultant as required.

    b. Install all racks as shown on the drawings when practical. Include detailed drawings for actual rack configuration as part of the shop drawing Submittals.

c. Maintain clear access to all free-standing MDF or IDF rack locations. Such clearance shall include a minimum of 36" of clear space in any direction between the walls and the racks, unless indicated otherwise on the drawings.

d. Cabling within racks shall closely follow the conventions shown on the drawings. Include detailed drawings for actual rack configuration as part of the shop drawing Submittals.

e. Isolate all signal cabling from high voltage power feeders and power distribution circuits (>100VAC) at all times.

f. Do not use multi-channel "snake" type cable unless specifically noted herein or on the drawings. When such cabling is approved, take care when dressing off cable. Avoid bend radius of more than 45 degrees at any point. Use metal spiral type strain relief at all corners. Use cable clamps with non-conducting soft couplers at entry points to all racks, boxes or other enclosures or sub enclosures.

g. All field circuits shall be terminated to terminal blocks or punch blocks as noted herein or as shown on the drawings, except for circuits specifically noted to land directly to equipment within racks, or other equipment mounted externally.

h. Patch bay terminals, specifically those with E Series (E3, E90, etc.) connectors may serve as terminal locations if applicable, unless specifically noted otherwise herein, or on the drawings.

3. Equipment Room

a. The preferred room layout and space configuration is shown on the drawings. Submit shop drawings of proposed layout for each equipment room, MDF or IDF. Drawings shall include, but shall not be limited to the proposed position of equipment racks, user control positions, consoles, monitoring locations, computer locations and access to the lighting control and fire suppression systems. Final layout shall be approved by the Consultant.

b. Maintain access to all equipment racks as noted herein and as shown on the drawings. In the event that circumstances prevent such orientation, the racks shall be mounted on bases with 3" casters to allow access to both front and rear rack panels or to allow full swing of rack doors. If casters are required, Contractor shall secure all cable harnessing to avoid reconfiguration of cable entry points, conduits or power distribution systems. Submit shop drawings where applicable.

c. Maintain egress in all equipment rooms.

d. Coordinate final layout with related disciplines including, but not limited to, electrical, mechanical, structural and finish trades.

F. Control System Function

1. The system specified herein requires the use of Master Control System or integrated with the audio DSP, if supported, to provide seamless function of integrated components.

2. The system shall be configured to provide simple, intuitive operation for the end user.

3. The Contractor shall closely coordinate required operational control with the owner and the Consultant prior to programming.

4. The system shall not be accepted until all functionality is operational and de-bugged.

5. Components under control are shown on the drawings, however, the Contractor should configure the integrated systems to support control of any additional component or sub-component as required to complete the system and to meet the owner's control requirements.

6. If the control system requires multiple master controllers operating in tandem, the Contractor shall configure the system to ensure that there is full duplex communications between control servers or between any device that includes a control server.

7. Provide power as required for interface devices under control at device end points.

8. The operational functions listed below provides the minimum control requirements, but is not inclusive of all required controls or operations and does not relieve the Contractor from providing comprehensive control code as required by the owner.

   a. System Power On/Off

   b. Loudspeaker Zone Toggle On/Off

   c. Loudspeaker Zone Volume Up/Down (Level Limited)

   d. Master Level Up/Down (Level Limited)

   e. Master Mute

9. The Contractor shall design additional UI elements for service access, advanced users and troubleshooting, minimum.

10. All control UI elements shall be coordinated with the end-user. The Contractor shall provide mockups for all UI elements as

required.

11. The Contractor shall provide two (2) additional site visits to modify the control system programming as part of this work. All visits and supplemental programming work shall be coordinated with the end-user. In addition, additional visits shall be scheduled after 90 continuous days of use by the end-user and a second visit after 6 months of continuous use by the end-user.

12. The Contractor shall instruct the end-user to document desired changes, use impact, notes and comments on daily operations.

13. The Contractor shall maintain open communications with the end user to assist in the final configuration of the control software. This information should be used to modify the control system as the end-user develops a workflow.

G. Microphones & Input Sources

1. Configure microphones for PTT (push to talk) operation.

2. Configure microphone summing for automatic (NOM=1) operation.

3. Configure line level auxiliary sources for simultaneous operation.

H. DSP Programming

1. The system specified herein requires the use of software products for audio signal flow configuration, control interface and remote client design.

2. Provide interface to the primary control system as required.

3. Functionality that is configured for baseline audio performance, as approved the Consultant during commissioning, shall not be accessible from the control system or primary DSP UI.

4. Provide limited zone levels, mute and source-select functionality via the DSP UI, if required.

5. Signal flow configuration shall be performed by the DSP audio processing system manufacturer, unless the Contractor is fully authorized by such manufacturer to develop, program and create UI elements necessary to implement the work document herein and as shown on the drawings.

6. If required, the Contractor shall procure such services directly from the manufacturer.

7. Primary user interface UI shall be designed and implemented by the DSP audio processing system manufacturer, unless the Contractor is fully authorized by such manufacturer to develop,

program and create UI elements necessary to implement the work document herein and as shown on the drawings.

8. Remote interface client design shall be performed by the DSP audio processing system manufacturer, unless the Contractor is fully authorized by such manufacturer to develop, program and create UI elements necessary to implement the work document herein and as shown on the drawings.

9. System adjustments shall be performed on site in the presence of the Consultant during commissioning.

10. An authorized manufacturer's Contractor, capable of providing on-site changes to the controls, configuration, signal flow and graphical functions of the software shall be present.

11. Provide copies of all software files to the owner and the Consultant upon final completion. Copies shall be provided on flash media suitable for use with the manufacturer's native software and compatible operating system.

I. Software

1. For all equipment that includes software-based configuration, controls or operation, ensure that all related UI's, configuration files and service tools are developed with the latest version of the manufacturer's software.

2. Ensure that all components have been updated with the latest firmware.

3. Do not install or configure any software-based component with beta software or firmware.

4. Ensure that all software is compatible with interconnected transport systems and device end points.

5. Ensure that all computers, mobile devices and appliances are operable with the latest software and firmware.

6. Ensure that subsequent software and firmware updates will not disable any component, transport system, UI or device from operating as required by the system drawings.

7. Inspect all software and firmware versions during post-contract site visits and upgrade as required and has summarized herein.

8. Provide one year licensing for all applicable software functionality required to meet the operation of the systems as documented.

9. Coordinate exact license requirements recommended by the manufacturer with the owner and end-user.

J. Quality Control

1. Engage the services of a factory-authorized Applications Engineer or Technical Specialist to assist in the programming, configuration and implementation of all systems where software and hardware are integrated.

    a. DSP based signal processing systems.

2. Schedule site visits for at least 7 days in advance.

3. Inspect components for physical damage, defects or freight damage and confirm certification marks for safety, nameplate compliance or agency approval as per the Contract Documents.

4. Confirm conditions of electrical connections throughout the system.

5. Use torque tools calibrated within the prior 6 months to use when required. Use manufacturer's recommended tolerance and/or torque values.

K. Shop Testing

1. General Electrical Performance Testing

    a. Use caution when testing devices containing solid state or digital circuits by ensuring a static-free, ESD compliant environment.

    b. Ring out all circuits in passive configuration by ensuring continuity and the absence of any short circuit between adjacent conductors.

    c. Ensure proper current draw from all components under normal operating conditions.

    d. Ensure that all circuits are in phase and will pass the required bandwidth.

2. Component Operational Testing

a. Configure and operate all system controls to ensure proper operation and functional requirements.

b. Simulate actual operating conditions for all control tests.

c. When configuration and testing work involving equipment provided and/or installed under other Sections is indicated, combine testing required by this Section with that required by Sections specifying other equipment.

3. Correct all deficiencies and make necessary adjustments for all tests. Re-test as required and verify that operation is compliant with the drawings, specifications, or manufacturer's recommendation.

4. Apply labels to all tested equipment indicating test result, date, and responsible agency.

5. Prepare written reports of all tests and observations.

6. Record any defects in materials and/or workmanship or unsatisfactory test results. Record repairs and subsequent performance certification.

7. Record operation control adjustments and final settings.

L. Inspection

1. All racks shall be inspected by the Consultant at the Contractor's shop prior to delivery to the jobsite, unless otherwise directed.

2. The Contractor shall demonstrate to the Consultant that the racks meet the operational and fabrication requirements as specified herein.

3. In lieu of shop testing, Contractor may request fabrication testing at an alternate site, bonded warehouse, or staging site. Such requests shall be made in writing at least 60 days prior to testing date and shall require approval from the Consultant.

4. Shop tests shall include, but shall not be limited to the following:

a. Verify that all equipment is operating per manufacturer's specifications within the context of the integrated system.

b. Signal flow testing of all output circuits including, but not limited to phase, noise, oscillation, and signal integrity.

c. Subjective listening tests.

d. Time alignment and operational latency.

e. Usability of configured controls and interfaces.

M. Substantial Completion

1. Substantial Completion shall constitute 90% Progress as it related to project invoicing.

2. The Contractor shall notify the owner, or procurement authority in writing of Substantial Completion.

3. Substantial Completion is determined by the Contractor at such time when the system implementation has been completed successfully, meeting all requirements specified herein and on the drawings.

4. Within 14 business days following the receipt of the Notice of Substantial Completion the Owner and/or Consultant shall schedule time to witness operation of the systems. At this time, the system shall be demonstrated to the Owner and/or Consultant that the system meets all installation, performance and operational requirements specified herein and as shown on the drawings.

5. Substantial Completion includes, but is not limited to, the following progress milestones:

   a. All equipment, related components, accessories, and other physical goods are on site on operational.

   b. All loose items have been delivered to the end-user and accepted.

   c. The system operation is at a state that is operable by the end user without intervention.

   d. The end-user has been trained and is equipped to operate the systems under normal use, defined by the system drawings.

   e. Interface with the site LAN is complete and operational. The Contractor has coordinated network requirements with the owner's IT staff.

6. The Contractor shall be prepared to demonstrate the system performance and operational benefits including, but not limited to the following functional system components:

   a. Control usability.

b. Audio performance.

c. DSP audio processing operation and configuration.

d. Subjective listening tests.

7. In the event that the testing indicates that the system is not Substantially Complete, the Contractor shall bear all costs associated with the jobsite test. This includes the travel and lodging costs of the Consultant or other personnel required for attendance by the Owner.

8. Final testing shall be scheduled by the Contactor at least 30 days prior to the test period. Such notice shall be in writing to the Consultant and Owner.

N. Acceptance Testing

1. General

a. At the time of Acceptance Testing, the Consultant shall conduct a series of tests and adjustments to ensure that the system meets all requirements as specified herein and as shown on the drawings. These tests shall also confirm that the system is installed correctly and configured for proper operation.

b. The tests shall confirm that the installation meets the design intent as indicated within the Contract Documents.

c. The Contractor shall perform comprehensive testing prior to Consultant's visit to ensure that the system is ready for testing on any level.

d. Contractor shall document all tests as they are performed in the presence of the Consultant and submit the results to the owner, procurement authority, owner and Consultant as required. The approved document shall become part of the final system documentation as specified herein.

e. The Contractor shall assist the Consultant in performing final system tests, adjustments, and configuration modifications as necessary.

f. Contractor shall provide all labor, materials, and tools necessary for these tests and adjustments and all necessary test equipment to complete the tests.

g. Contractor shall contact the Consultant prior to the scheduled testing date to verify the test equipment, labor, and materials requirements for the testing procedure.

2. Verification

   a. Prior to energizing the system and prior to the Consultant's arrival, the Contractor shall ensure that the system is ready for inspection and in compliance with the Contract Documents.

   b. All products are installed in a proper and safe manner in accordance with the manufacturer's instructions.

   c. Insulation and shrink tubing are present where required.

   d. Dust, debris, solder splatter, etc. is removed.

   e. Cable is dressed, routed, and labeled.

   f. Connections are properly installed with correct polarity.

   g. All labeling has been installed.

   h. Temporary facilities and utilities have been properly disconnected and removed from the site.

   i. All products are neat, clean, without blemish and supplied with applicable accessories and parts securely attached.

   j. Jobsite debris including glass, flooring and supports, ceiling tiles and supports, walls, doors, etc. have been removed.

   k. Electronic devices are properly grounded.

3. General Performance

   a. All products are neat, clean, without blemish and supplied with applicable accessories and parts securely attached.

   b. Using a passive circuit test device, test each AC power receptacle for proper operation.

   c. Measure DC resistance between the technical ground at any equipment rack and the main building ground. Resistance shall be 0.15 Ohms or less.

   d. Temporarily lift the technical ground from the main electrical ground and measure DC resistance. Resistance should be 1000 Ohms or greater.

e. Measure impedance at 100 Hz and at 1 kHz for all full range loudspeaker output circuits at the rack distribution point. Results should be within manufacturer's published specification.

f. Measure impedance at a frequency appropriate for band limited output circuits at the rack distribution point.

g. When documenting the results of these tests, include the calculated impedances based on number of units on a line and the size and distance of the run.

h. Correct any field readings that differ more than 15% from the calculated impedances.

4. Loudspeaker Circuits

   a. Prior to energizing the system and the Consultant's arrival, perform tests in compliance with applicable EIA standards. Record the results of each test in the Project Acceptance & Test Manual.

   b. Ensure that the audio DSP system includes components, including, but not limited to, limiters, band-pass filters, leveling controls, as required to ensure that loudspeaker circuits are protected from excessive audio levels, distortion, transients and noise to the fullest extent possible.

   c. Provide a low level, band limited test signal at each amplifier input.

   d. Energize one channel of the first amplifier and verify that the correct loudspeaker or loudspeaker zone is operating. Correct any wiring, distribution, or other problems as necessary to ensure that zone allocations match the as-built and system drawings. Continue this test until all output circuits are verified in the same manner.

5. Constant Voltage Circuits

   a. Prior to energizing the system and the Consultant's arrival, perform tests in compliance with applicable EIA standards. Record the results of each test in the Project Acceptance & Test Manual.

   b. Use music, pink noise or other distinctive audio signal as a source for each constant voltage loudspeaker zone. Energize only one amplifier channel at a time.

c. Walk the loudspeaker zone to confirm audio is operational.

d. Verify that each loudspeaker in the zone is operational and that there are no significant changes in sound pressure level from one loudspeaker to the next.

e. Verify that loudspeaker coverage is consistent with the areas indicated on the drawings.

f. Repeat the test for each loudspeaker zone, one at a time as noted.

6. Loudspeaker Polarity

a. Prior to energizing the system and the Consultant's arrival, perform tests in compliance with applicable EIA standards. Record the results of each test in the Project Acceptance & Test Manual.

b. Use a stand-alone polarity tester or other audio test equipment to measure the polarity of all loudspeakers in the system.

c. Inject the test signal at the loudspeaker circuit termination point. Do not use active electronics for this test. Use a "known-good" test amplifier if necessary.

d. All loudspeakers shall maintain correct polarity throughout the system.

e. Follow manufacturer's recommendations in conducting the tests.

7. Gain Structure

a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Adjustment of each active device for proper gain.

d. Verification of unity gain through each active signal processing device using a calibrated signal source.

e. Adjustment of power amplifiers for required electro-acoustical level.

f. Contractor shall record the results of all tests and adjustments for each device in the Project Record Manual.

g. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

8. Dynamics

   a. Ensure that the audio DSP system includes components, including, but not limited to, limiters, band-pass filters, leveling controls, as required to ensure that loudspeaker circuits are protected from excessive audio levels, distortion, transients, and noise to the fullest extent possible.

   b. Assist the Consultant in determining the configuration of additional dynamics processing to facilitate specific input, output, and summing circuits.

9. Delay

   a. Assist the Consultant in the performance of this work.

   b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

   c. Adjustment of delay outputs to each subsystem to ensure proper synchronization between the loudspeaker zones.

   d. Verification of coherence to zero-time base to ensure maximum imaging and intelligibility.

   e. Measurement of time arrival for adjacent loudspeaker zones.

   f. Adjustment of delay circuits to synchronize adjacent loudspeaker circuits for proper operation as required for the space.

   g. Contractor shall document this process and provide printed reports of each delay adjustment. Indicate the delay time for each zone, or each loudspeaker before and after applying delay.

   h. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

10. Zone Level Adjustment

    a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Verification of zone level adjustments.

d. Adjustment of zone amplifiers to provide consistent and appropriate volume levels throughout the facility.

e. Verification that systems will provide nominal sound pressure levels at least 12 dB above the ambient noise level under normal operating conditions.

f. Ensure that adjacent zone levels with similar system components are operating within 1.5 dB from the average.

g. Contractor shall record the setting of each amplifier in the Project Record Manual and keep backup copies of applicable data files.

h. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

11. Headroom

a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Confirm that the digital signal processing system will perform at required levels with at least 12 dB of headroom.

d. All power amplifiers are driven correctly with full scale output from the signal processing system.

e. Adjust the gain structure as necessary to ensure proper headroom.

f. Contractor shall record the results of all adjustments and control sets in the Project Record Manual and keep backup copies.

g. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

12. Field I/O

a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Verify that each receptacle under test appears at the correct position on the patch bay and within the digital signal processing system.

d. Verify polarity and phase for each circuit.

e. Confirm that signal ground is properly grounded in accordance with the drawings.

f. Verify all circuits for correct wire numbers and labeling.

g. Contractor shall record the results of all adjustments and control sets in the Project Record Manual and keep backup copies.

h. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

13. Linear Response Equalization

a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Configure the digital signal processing system to provide the required filters for all adjustments.

d. Adjust filters in the digital domain for linear performance.

e. Adjust the digital signal processing gain structure in combination with filter attenuation adjustments to achieve linear response.

f. Ensure that no filter exceeds +3 dB amplitude, unless otherwise directed by the Consultant.

g. Contractor shall record the results of all adjustments and control sets in the Project Record Manual and keep backup copies.

h. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

i. Secure all settings in software, hardware, and backup media.

14. Tone Control Equalization

a. Assist the Consultant in the performance of this work.

b. Consultant shall perform tests and adjustments at the jobsite in cooperation with the Contractor.

c. Use additional filters to provide adjustment of subjective tonal response.

d. In cooperation with the Owner's staff, adjust the filters to achieve a pleasant, comfortable sound response.

e. Contractor shall provide follow-up refinements to the equalization based on requests from the Owner within 90 days of final adjustment.

f. Following the Consultant's adjustments, Contractor shall use a portable RTA, FFT or SPL meter to document the sound pressure level and frequency response of each zone using normal operating sources.

g. Contractor shall record the results of all adjustments and control sets in the Project Record Manual and keep backup copies.

h. Additional tests may be required. The Contractor should verify test equipment and materials requirements prior to the testing visit.

15. Field Audio Circuits

a. In the presence of the Consultant, demonstrate that the complete audio system has been tested and that all performance requirements have been satisfied.

b. Test all field audio circuits and record results of tests results.

c. Provide records of the test results, including conductivity, polarity, resistance to ground, noise, and bandwidth. Retain results in the project backup.

16. Test Equipment

a. Furnish the following equipment as requested. Verify exact requirements with Consultant at least 14 days prior to Consultant's visit.

b. All equipment shall be available for the entire test period through final system testing:

1 Sound Level Meter: ANSI S1.4-1971 Type SEA with digital or analog display. Meter to provide ranges of 40 to 120 dBA.

2 Impedance Meter - Capable of testing audio lines at three frequencies, minimum, between 250 Hz and 4k Hz. Measurement Range: 1 ohm to 100 k Ohms.

3 Oscilloscope, suitable for all system circuits, dual trace, 200Mhz bandwidth minimum for audio work.

4 Multimeter-Measurement range, DC to 20kHz, 100 mV to 300V, 10 ma to 10 A.

5 Audio Oscillator: bandwidth 20 Hz to 20k Hz ±1 dB at 0 dBm output. Output to be balanced. Oscillator to include adjustable output level.

6 Noise generator, pink type, ANSI filters.

7 Ladders and scaffolding necessary to inspect all speakers.

8 Temporary 100-foot microphone cables for testing purposes.

9 Provide three portable VHF or UHF business band radios for use during acceptance testing with transmission range sufficient to cover entire project. Include rechargeable batteries and charger along with holster for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance.

O. Final Acceptance

1. Final Acceptance shall constitute 100% Progress as it related to project invoicing.

2. Final acceptance of the system shall be granted by the Owner when it is clear to the Owner and Consultant that the system has be integrated in accordance with the contract documents.

3. All equipment has been provided and installed per the Contract Documents.

4. Portable items or equipment not installed has been delivered and accepted by the Owner.

5. All testing has been completed and accepted by the Consultant.

6. Punch list items, resulting from Substantial Completion Inspection, have been performed to the satisfaction of the Consultant.

7. All signage or mounted system documentation has been installed per the specifications.

8. Final system documentation, including manuals, as-built drawings, software configuration and control files has been assembled as per the specifications and has been delivered and accepted by the Owner.

P. Cleaning

1. Clean all provided equipment, components and devices internally and externally using methods and materials recommended by manufacturers.

2. Repair damaged finishes.

Q. Training

1. The Contractor shall provide training to the end-user all facets of system operation, control, configuration and maintenance.

2. For specialty sub-systems, including, but not limited to, audio control consoles, lighting control consoles, loudspeaker processing systems, control systems, projection systems, signage systems, content sources, switchers, etc., the Contractor shall engage a factory-authorized service representative to train Owner's operations, end-users, technical and/or maintenance personnel as required to perform training on system level components.

    a. Subject matter shall include fundamental troubleshooting, servicing, adjusting, and equipment maintenance.

    b. Provide a minimum of eight hours' training.

    c. Use the final version of the Project manuals as part of the training session. Refer to drawings and operations manuals as training aids.

3. Schedule training with Owner at least fourteen (14) days' advance notice.

4. Submit all training materials to the Consultant, via the owner or procurement authority, for review prior to scheduling training sessions, if applicable.

5. Provide 24 hours of hands-on training in the practical operation of the systems to the Owner's operations staff. Training topics shall include at a minimum:

    a. General sound and control system operation and theory.

    b. The signal topology for each system provided.

    c. DSP equipment software configuration and operation.

    d. Control system operation.

    e. Basic functionality.

    f. Correct operation procedures.

    g. Basic troubleshooting techniques.

6. Provide 4 hours of follow-up training within 3 months of the initial training to review aspects of the original training and provide instruction on specific troubleshooting issues.

7. Record video and audio of all training sessions. Provide three (3) copies to the Owner's Representative on flash media, suitable for playback on MacOS, iOS, Windows, or Android devices.

R. Protection

1. After installation, protect the audiovisual systems from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

2. Provide temporary covering for all components until time of Final Acceptance.

3. Use covering materials that will effectively protect the audiovisual system components from spills, scratches, abrasion, breakage, or other damage.

S. Post Completion

1. Within one year of date of Substantial Completion, provide two site visits, one at 90 days, the second as directed by the owner, to adjust audiovisual system, make program changes, and adjust controls to suit post-construction/normal operating conditions.
2. Coordinate all site visits with Owner.
3. Document all adjustments, software configuration changes and any change to system hardware, cabling, mounting, terminations, or operations.

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BID SUBMISSION FORM

LAUDERDALE COUNTY BOARD OF SUPERVISORS

BID NO. 3911 - COMPLETE SOUND SYSTEM INTERGARTION – LAUDERDALE COUNTY AG CENTER

Proposal of_____, an

(individual) (partnership) (corporation) organized under the laws of the State of_____.

Having examined the Place of The Work and all matters referred to in the Bid Specifications and the Drawings prepared by Roland, Woolworth & Associates, LLC. for the above-mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

BASE BID: _____

_____ dollars
(Amount Written in Words)

$_____
(Dollar Value)

All bids should follow the format above for submitting pricing. Price should be inclusive of the contractor's cost for the completing the entire project. **No alternative bids will be accepted.**

SIGNATURE: _____

NAME & TITLE: _____

TELEPHONE: _____

ADDRESS: _____

EMAIL: _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned. _____

_____ As Principal, and

_____ as Surety, are hereby held and firmly bound

unto _____ as OWNER in the penal sum of _____

__5%_____ of BID for the payment of which, well and truly to be made, we hereby jointly and severally

bind successors, assigns and ourselves.

Signed, this _____ day of _____, 20_____.

The Condition of the above obligation is such that whereas the Principal has submitted to a certain BID attached hereto and hereby made a part hereof to enter into a contract in writing, for the

Complete Sound System Integration - Lauderdale County Agricultural Center

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall be execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

BIDDER	SURETY
_____ (Seal)	_____ (Seal)
Bidder's Printed Name and Corporate Seal	Surety's Printed Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title
Attest: _____	Attest: _____
Signature and Title	Signature and Title

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR BID

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
(Name of Contractor)

_____
(Address of Contractor)

a _____ hereinafter called "Principal", and
(Corporation, Partnership or Individual)

_____ hereinafter called "Surety", are held and firmly
(Name of Surety)

bound unto the **Lauderdale County Board of Supervisors**, hereinafter called "Owner" in the penal sum of

_____ Dollars ($_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the OWNER, dated the _____ day of _____, 2022, a copy of which is hereto attached and made a part hereof for the installation of:

Complete Sound System Integration
Lauderdale County Agricultural Center

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the Original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER of all of outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and sees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed hereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the loans of this Contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.

WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each of which shall be deemed an original, this the_____day of_____, 2022.

ATTEST:

_____ _____

(Principal)

(SEAL)

_____

(Witness as to Principal)

_____

(Address)

_____

ATTEST:

(SEAL)

_____

(Witness as to Surety)

_____

(Address)

_____

NOTE: Date of BOND **must not be** prior to date of CONTRACT. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR BID

LAUDERDALE COUNTY BOARD OF SUPERVISORS

410 CONSTITUTION AVE, 11TH FLOOR, MERIDIAN, MS 39301

VENDOR DATA FORM

I, the undersigned, do hereby acknowledge I have read all the requests listed herein and have submitted my bid and all documentation required accordingly.

NAME OF COMPANY: _____

LEGAL ADDRESS: _____

_____

_____

PHONE: (____) _____ FAX: (____) _____

FEDERAL ID #: _____ (Attach Form W-9)

I hereby certify that I am authorized to sign this proposal for/or on behalf of the company.

SIGNATURE: _____ DATE: _____
(***Authorized Principal***)

DIRECT PHONE: (____) _____ EMAIL ADDRESS: _____

PRINTED NAME & OFFICIAL TITLE: _____

**********PLEASE PROVIDE ADDITIONAL INFORMATION BELOW IF APPLICABLE********

AUTHORIZED PERSON IN CHARGE OF PROJECT AT THIS LOCATION:

NAME: _____ TITLE: _____

DIRECT PHONE: (____) _____ FAX: (____) _____

CELL: (____) _____ EMAIL: _____

LOCATION ADDRESS ***(if different from above)***: _____

_____

SIGNATURE: _____ DATE: _____
(***Authorized Person in Charge of Project***)

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR BID

BIDDER CONFLICT OF INTEREST STATEMENT

STATE OF MISSISSIPPI, _____
Before me, the undersigned authority, personally appeared_____, who was duly sworn deposes and states:

1. I am the _____of _____, with a local office in _____and principal office in _____.
(City & State) (City & State)

2. The above-named entity is submitting a Bid for Lauderdale County described as Complete Sound System Integration – Lauderdale County Ag Center.

3. The Affiant has made diligent inquiry and provides the information contained in the Affidavit based upon his/her own knowledge.

4. The Affiant states that only one submittal for the above proposal is being submitted and that the above-named entity has no financial interest in other entities submitting proposals for the same project.

5. Neither the Affiant nor the above-named entity has directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraints of free competitive pricing in connection with the entity's submittal for the above proposal. This statement restricts the discussion of pricing data until the completion of negotiations if necessary and execution of the Contract for this project.

6. Neither the entity not its affiliates, nor anyone associated with them, is presently suspended or otherwise ineligible from participation in contract letting by any local, State, or Federal Agency.

7. Neither the entity nor its affiliates, nor anyone associated with them have any potential conflict of interest due to any other clients, contracts, or property interests for this project.

8. I certify that no member of the entity's ownership or management is presently applying for an employee position or actively seeking an elected position with Lauderdale County.

9. I certify that no member of the entity's ownership or management, or staff has a vested interest in any aspect of Lauderdale County.

10. In the event a conflict of interest is identified in the provision of services, I, on behalf of the above-named entity, will immediately notify Lauderdale County.

DATED this _____day of _____, 20_____.

_____
(Affiant)

_____
Typed Name and Title

Sworn to and subscribed before me this _____day of _____, 20___.
Personally Known_____ Or produced identification_____
Identification type:_____
Notary Public-State of _____
Printed, typed, or stamped commissioned name of notary public.
My commission expires:_____

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NON-COLLUSION AFFIDAVIT OF BIDDER

STATE OF _____

COUNTY OF _____

_____, being duly sworn, deposes and says that:

1. He/or She is _____ of _____ the bidder
Title Company Name
that has submitted the attached proposal.

2. He/or She is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such bid.

3. Such Bid is genuine and is not a collusive or sham bid.

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, connived, or agreed, directly or indirectly, with any other bidder, firm or person to submit a collusive or sham Bid in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm, or person to fix the price or prices in the attached bid or any other bidder, or to fix any overhead, profit or cost element of the bid price or the bid price of any other bidder, or to secure through any collusion, connivance, or unlawful agreement any advantage against Lauderdale County or any person interested in the proposed Contract; and

5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

SIGNED _____

TITLE _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ DAY OF _____, 20____.

_____

Notary Public, State of Mississippi. My Commission Expires: _____

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LAUDERDALE COUNTY BOARD OF SUPERVISORS
410 CONSTITUTION AVE, 11TH FLOOR, MERIDIAN, MS 39301

VENDOR PROFESSIONAL REFERENCE SHEET

QUALIFICATIONS: Firms shall have the capability and capacity in all respects to fulfill the contractual requirements to the satisfaction of the Lauderdale County Board of Supervisors.

Indicate the length of time you have been in business as a company providing the type of service(s) required for this agreement. Year(s) _____ Month(s) _____

Please provide a minimum of three (3) references, which may substantiate past work performance and experience in the type/or scope of work/service, or equipment/product required for this contract. This should include the following: Business Name, Address, Contact Person, Length of Time of Service, Phone Number, and their email address.

1. Business Name: _____

Address: _____

Contact Person/Title: _____ Length of Time of Service: _____

Phone Number: _____ Email: _____

2. Business Name: _____

Address: _____

Contact Person/Title: _____ Length of Time of Service: _____

Phone Number: _____ Email: _____

3. Business Name: _____

Address: _____

Contact Person/Title: _____ Length of Time of Service: _____

Phone Number: _____ Email: _____

_____
Company Name of Bidder/Vendor

_____
Signature of Person Completing

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ADDENDA FORM

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
(If no addenda, please indicate with N/A in space provided.)

1. Addendum #_____ Date: _____
2. Addendum #_____ Date: _____
3. Addendum #_____ Date: _____
4. Addendum #_____ Date: _____

Addendum Acknowledgement:

_____ _____
Signature of Bidder or Authorized Agent Date

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR BID