ADDENDUM

Project: American Fork 21, 30, 32, 38 Project No.: 522-1242-21010101 Addendum No.: 02

Project Address: 270 North 900 East, American Fork, Utah Date: September 23, 2022

Owner: The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole

From (Architect): Evans & Associates Architecture

Instructions to Prospective Bidders:

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents and/or prior Addenda as noted below. All conditions, requirements, materials and workmanship are to be as described in the Contract Documents unless specifically stated otherwise. This Addendum consists of 8 page(s).

1. Changes to prior Addenda:
    a. None
2. Changes to Bidding Requirements:
    a. None
3. Changes to Conditions of the Contract:
    a. None
4. Changes to Specifications:
    a. 27 5117 Audio Systems
        i. The attached specification section shall be added to the contract documents.
5. Changes to Drawings:
    a. A101 Floor Plans and Details
        i. Keyed Note 10: The total number of cabinets in each hallway should be five.
        ii. Panel Door General Note: There is an existing Panel ‘S’ on the platform for the drive motor.
    b. A102 Ceiling Plan
        i. Keyed Note 3: The cabling to the salvaged speakers shall be new and shall be continuous from the existing mixer panel on the platform to the speakers.

End of Addendum

SECTION 27 5117

AUDIO SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install operational sound system as described in Contract Documents.

1.2 REFERENCES

A. Association Publications:
   1. Building Industry Consulting Service International (BISCI):
      a. *Information Transport Systems Installation Methods Manual* (ITSIMM) (5th Edition).
      b. *Telecommunications Distribution Methods Manual* (TDMM) (12th Edition).
   2. InfoComm International Association:
      a. *Audiovisual Best Practices: The Design & Integration Process for the AV and Construction Industries*.
      b. *AV Design Reference Manual* (1st Edition, 2006).
      c. *Basics of Audio and Visual Systems Design* (2003).
   3. Institute of Electrical and Electronics Engineers:
      a. IEEE 1100-2005, '*Recommended Practice for Powering and Grounding Electric Equipment*'.

B. Reference Standards:
   1. American National Standards Institute/InfoComm International Association:
      a. ANSI/INFOCOMM 1M:2009, ‘Audio Coverage Uniformity in Enclosed Listener Areas'.
      b. ANSI/INFOCOMM 2M:2010, ‘Standard Guide for Audiovisual Systems Design and Coordination Processes'.
      c. ANSI/INFOCOMM 4:2012, ‘Audiovisual Systems Energy Management'.
   2. National Fire Protection Association:
      a. NFPA 70, ‘National Electrical Code (NEC)' (2017 or most recent edition adopted by AHJ).
      b. NFPA 72, ‘National Fire Alarm and Signaling Code’ (2019 or most recent edition adopted by AHJ).
   3. Telecommunications Industry Association:
      a. TIA-568.2, 'Balanced Twisted-Pair Telecommunications Cabling and Components Standards' (Revision D, 2018).
      b. TIA-569, 'Telecommunications Pathways And Spaces' (Revision D, 2015).
      c. TIA-606, 'Administration Standard for Telecommunications Infrastructure' (Revision C, 2017).
      d. TIA-607, 'Telecommunications Bonding and Grounding (Earthling) for Customer Premises' (Revision C, 2015).
      e. TIA-758, ‘Customer-Owned Outside Plant Telecommunication Infrastructure Standard' (Revision B, 2012).
   4. Underwriters Laboratories (UL):
      a. UL 486A-486B, 'Wire Connectors' (3rd Edition April 2018).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate final inspection schedule of audio systems before final inspection.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. System shall be installed in accordance with applicable standards, requirements, and recommendations of International Building Code, National Electrical Code and all local authorities having jurisdiction.

B. Qualifications:
   1. Installer. Requirements of Section 01 4301 applies, but not limited to following:
      a. Approved Installers:
         1) Installers are to furnish and install components of audio system and meet qualification requirements.
         2) Approval subject to agreement process for Pre-Approval Installers.
      b. Alternate Installer(s):
         1) Firm specializing in performing work of this section:
            a) Minimum three (3) years of successful installation experience of AV system projects of comparable size, and complexity required for this project. Audio systems must have included complete installation and setup work and must have been completed by factory trained and certified technician.
            b) Firm successfully completed minimum of three (3) projects in past two (2) years before bidding.
            c) Firms must have certified technician that has successfully completed all relevant training courses recommended by manufacturers and proficient of all specified equipment of this section.
            d) Comply with specifications and Contract Documents.
         2) Submit documentation of compliance of qualifications before bid to Architect or Owner's Representative.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
   1. Provide secure location protected from weather in cool, dry location, out of direct sunlight in compliance with Manufacturer's instructions and recommendations.
   2. Keep materials free from dirt and foreign matter.

1.6 WARRANTY

A. Special Warranty:
   1. Provide complete warranty repair or replacement for one (1) year at no cost to Owner, except in case of obvious abuse.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers Contact List:
   1. Category Four components as shown on Drawings from following Manufacturers. See Section 01 6200 for definition of Categories.
      a. Atlas Sound, Phoenix, AZ www.atlassound.com.
      b. Audio-Technica US Inc, Stow, OH www.audio-technica.com.
      c. Belden Wire & Cable Co, Richmond, IN www.belden.com.
      d. BSS Audio, Sandy, UT www.bssaudio.com.
      e. Chatsworth, Westlake Village, CA www.chatsworth.com.

f. Community Professional Loudspeakers, Chester, PA www.communitypro.com.
g. COMTEK Inc, Salt Lake City, UT www.comtek.com.
h. Conquest Sound Co, Tinley Park, IL www.conquestsound.com.
i. Crown Audio Inc, Elkhart, IN www.crownaudio.com.
j. Countryman, Menlo Park, CA www.countryman.com.
k. EIKI International, Laguna Nigel, CA www.eiki.com.
l. Electro-Voice Inc, Burnsville, MN www.electro-voice.com.
m. Emtech Electronics Inc, Orem, UT www.emtechelectronics.com.
n. Extron, Anaheim, CA www.extron.com.
o. HellermannTyton, Milwaukee, WI www.hellermann.tyton.com.
p. Hubbell Inc, Orange, CT www.hubbell-wiring.com.
q. IVIE Technologies Inc, Lehi, UT www.ivie.com.
r. JBL Professional, Northridge, CA www.jblpro.com.
s. König & Meyer, Wertheim, Germany www.k-m.de/en.
t. Leviton Manufacturing Co, Little Neck, NY www.leviton.com.
u. Liberty AV Solutions, Colorado Springs, CO www.libertycable.com.
v. Lowell Manufacturing Co, Pacific, MO www.lowellmfg.com.
w. Middle Atlantic Products, Fairfield, NJ www.middleatlantic.com.
x. Neutrik USA Inc, Lakewood, NJ (732) 901-9488. www.neutrikusa.com.
y. Newark Electronics, Sola and Triad, Chicago, IL www.newark.com.
z. QSC Audio Products, Costa Mesa, CA www.qscaudio.com.
aa. Radio Design Labs, Carpenteria, CA www.rdlnet.com.
bb. Rane Corp, Mukilteo, WA www.rane.com.
cc. Shure Brothers, Evanston, IL www.shure.com.
dd. SoundTech, Mundelein, IL www.soundtech.com.
ee. Soundtube Entertainment, Park City, UT www.soundtube.com.
ff. Surgex, Knightdale, NC www.surgex.com.
gg. Switchcraft, Chicago, IL www.switchcraft.com.
hh. TOA Electronics, South San Francisco, CA www.toaelectronics.com.
ii. TV One, Erlanger, KY www.tvone.com.
jj. Whirlwind Music Distributors, Inc., Rochester, NY www.whirlwindusa.com.
kk. Wireworks Corp, Hillside, NJ www.wireworks.com.

B. Performance:
1. Capabilities:
a. Installations with audio DSP shall meet following performance parameters:
1) From 100 Hz to 2 kHz, flat within plus or minus 2 dB.
2) Above 2 kHz, slope down along an approximate 3 dB per octave slope to 8 kHz.
b. No noise, hum, RFI pickup or distortion shall be audible under normal operating conditions.
c. Audio systems shall reproduce program material at level of 80 to 85 dBA without audible distortion.
d. All input levels shall be pre-set so system may be operated without going into feedback under normal conditions.
e. Seat-to-seat variations in the 4kHz octave band shall not exceed plus or minus 2 dB in the Chapel or Cultural Center.

C. System Requirements:
1. General:
a. Provide complete and fully functional audio systems using materials and equipment of types, sizes, ratings, and performances as indicated in equipment list in accompanying drawings:
1) Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction in accordance with published product information.
2) Coordinate features of materials and equipment so they form integrated system with components and interconnections matched for optimum performance of specified functions.
2. Provide all wire, cable, and connectors as required to complete installation of all systems as designed and specified.

D. Equipment And Materials:

1. General:
    a. Provide equipment selected from equipment list on drawings, or as substituted following proscribed substitution process, using all solid state components fully rated for continuous duty at ratings indicated or specified.
    b. Select equipment for normal operation on input power supplied at 105 130 V, 60 Hz.

E. Operation
1. Summary: Set up and program the system so room combining and signal routing is automatically executed based on control commands issued by system switches and partition infra-red sensors.
    a. Room Combining:
        1) Set up and program system so audio system in adjacent rooms will combine upon opening folding partition between rooms.
        2) When rooms are combined, all microphone inputs, in all combined rooms, can be active and audible in all combined sections upon condition that power / microphone switch in that room is on.
        3) When any power / microphone switch is off in any combined room, deactivate (mute) microphone inputs in that room.
        4) Program audio originating from Chapel / Rostrum to be highest priority, audio originating from Multi-Purpose / Platform to be second priority, audio originating from Cultural Center 'A' to be third priority, and audio originating from Cultural Center 'B' to be fourth priority.
        5) Program system to disallow audio from any other section to overflow into Chapel / Rostrum.
        6) Provide room combining including but not limited to following combinations:
            a) Base Configuration: Four independently operating sound systems in Chapel / Rostrum, Cultural Center 'A', Cultural Center 'B', and Multi-Purpose / Platform.
            b) Chapel / Rostrum Overflow: Audio from Chapel / Rostrum into any adjacent room, up to and including Platform.
            c) Multi-Purpose / Platform Overflow: Audio from Multi-Purpose / Platform into any adjacent room up to and including Chapel Overflow.
            d) Cultural Center Overflow: Audio from either Cultural Center into any adjacent room up to and including Chapel Overflow and Platform.
    b. Room Combine And Preset Commands:
        1) Set up and program system to reconfigure upon reception of control commands issued from infra-red sensors which monitor position of folding partitions.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Approved Installers:
1. Category Four Approved Installers. See Section 01 6200 for definitions of Categories:
    a. Qualifications:
        1) Meet qualification requirements as specified in Quality Assurance in Part 1 of this specification.
    b. Custom Light & Sound: (919) 286-0011.
    c. General Communications: (801) 266-5731.
    d. Marshall Industries: (801) 266-2428.
    e. Poll Sound: (801) 261-2500.
    f. Professional Systems Technology: (801) 649-6696.

3.2 EXAMINATION

A. Verification Of Conditions:
1. Verify compliance with following items before beginning work of this Section:
    a. No cables spliced.
    b. Isolated ground run back to electrical panel from all equipment cabinets.

c. Specified conduit, cables, speaker enclosures and equipment cabinets are properly installed.
d. Location and angle of speaker cabinets.

2. Ensure that no solid structural or decorative member impedes sound propagation from speakers and that no member with cross section greater than 3/4 inch (19 mm) is placed in front of speakers.
3. Verify installation of fiberglass insulation in field-fabricated speaker enclosures.
4. Verify proper functionality for all system components being reused or remaining untouched.

3.3 INSTALLATION

A. General:
1. Install system in accordance with NFPA 70 'National Electrical Code', NFPA 72 'National Fire Alarm and Signaling', and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

B. Mounting And Securing Equipment:
1. Equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
2. Fastenings and supports shall be adequate to support their loads with safety factor of at least three (3) times weight of equipment being installed.
3. Any structural mounting that is not able to meet this requirement due to specific nature of equipment, manufacturer's requirements or limitations of facility, shall not be installed without prior approval of Engineer.
4. Install all boxes, equipment, hardware, and other materials plumb, level, and square.

C. Speakers:
1. Maintain uniform polarity in speakers and wiring.
2. Employ no positive stop in rotation of speaker volume controls. Controls shall be capable of continuous rotations in either direction.
3. Mount transformers with screws securely to speaker brackets or enclosures. Adjust torsion springs as necessary to securely support speaker assembly.
4. Neatly mount speaker grilles, panels, connector plates, control panels, etc., tight, plumb, and square unless indicated otherwise on drawings.
5. Provide brackets, screws, adapters, springs, rack mounting kits, etc, recommended by manufacturer for correct assembly and installation of speaker assemblies and electronic components.
6. Line factory-fabricated speaker back boxes with one inch (25 mm) minimum fiberglass if not done by Back box Manufacturer.
7. Speaker Back Boxes shall be secured to structure using 12 ga (2.7 mm) minimum seismic safety cables.

D. Cables, Wires, And Connectors:
1. Cables:
a. Cable and wire shall be new and unspliced.
b. Splicing:
1) Splicing of cables and conductors is expressly prohibited in any location other than equipment racks.
2) Splicing of control and speaker level conductors shall be accomplished via punch block or terminal strip connections only.
c. Additional cable length shall be provided at all connector locations. Duplex box, junction box, and floor box locations shall be installed with sufficient cable length behind cover plates to permit wiring maintenance and connector replacement in the future.
d. When cable runs utilize vertical cable raceways located within walls, acoustic integrity of walls shall be maintained:
1) Cables that pass-through cover plates of junction boxes and raceways, through slab-to-slab walls, and through conduit lines shall be properly gasketted and sealed. Acoustic material shall be restored or replaced.
e. Separation between system cables and other services shall be maximized to prevent and/or minimize potential for electro-magnetic interference (EMI):
1) Provide at least 12 inches (305 mm) separation from electrical lines whenever feasible.

2) Where separation is unavoidable, distribution cables shall cross other services at right angles whenever practical to minimize EMI.

f. Do not install signal cables on top of light fixtures, ceiling speakers, projection screens, HVAC controls or sensing devices, fire safety and sprinkler system detection technology, or any other technology or mechanical equipment.

g. Install system cables shall not block access to other equipment or services, across removable service panels and/or in any other manner to prohibit routine maintenance of HVAC systems, fire safety equipment and building mechanical control systems.

h. Power cables, control cables, and high-level cables shall be run on left side of equipment racks as viewed from rear. All other cables shall be run on right side of all equipment racks as viewed from rear.

i. Cables, except video cables which must be cut to electrical length, shall be cut to length dictated by cable run.

j. Terminal blocks, boards, strips or connectors, shall be furnished by installer for all cables which interface with racks, cabinets, consoles, or equipment modules. Affix terminal blocks, boards, strips or connectors to equipment racks using screws only. Double sided tape will not be accepted.

k. Shields for audio cables shall be grounded at input end only of various equipment items on system to prevent potential for ground loops.

l. Shields for microphone cables shall be grounded at both ends to allow Phantom Power to pass.

2. Wiring and Cabling:

a. Comply with industry standard circuit polarity and loudspeaker wiring polarity. No cables shall be terminated with polarity reversal between connectors at either end.

b. System wire, after being cut and stripped, shall have wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No bare wire ends shall be accepted.

c. Do not place any wires and cables for this system in any conduit, raceway, wire way or cable tray that is used for mechanical systems of building.

d. Route all cable and wiring within equipment racks, cabinets and millwork according to function, separating wires of different signal levels (microphone, line level, amplifier output, AV, control, etc.) by as much distance as possible. Neatly arrange, harness and bundle all cable with velcro straps.

e. After completion of wiring and cable installation, all trough and box covers shall be notched out and grommetted for clearance of various cable bundles, (i.e., separate audio, video, and control). Panel covers shall be screwed back in place and all gaskets shall be restored or replaced.

3. Connectors:

a. Provide connectors of type and quality as detailed in Contract Drawings and/or as required to meet minimum bandwidth requirements of equipment to which connectors are terminated. Overall quantity of connectors shall not be limited by quantities indicated in Contract Drawings and shall be provided as required.

b. No connectors shall be installed in non-accessible locations or used for splicing cables. Connectors shall be new.

c. Connectors shall incorporate strain relief mechanisms which firmly grip the jacket of connected cables.

d. Connectors shall be properly polarized to prevent improper seating.

e. Connectors shall provide appropriate electrical characteristics for circuitry to which they are attached.

f. Exposed conductors inside of equipment racks shall be dressed with heavy duty neoprene heat-shrink tubing.

g. Heat-shrink type tubing shall be used to insulate and dress ends of all wire and cables including separate tube for ground or drain wire.

h. Solder connections shall be made with rosin-core solder. Temperature controlled soldering irons rated at least 60 watts shall be used for all soldering work. No soldering guns, gas or butane, or temperature unregulated irons shall be used on job site.

i. Mechanical connections shall be made with approved crimp lugs of correct size and type for connection. Wire nuts shall not be permitted except inside speaker enclosures. Each connector shall be attached with proper size controlled-duty-cycle ratcheting crimp tool approved by manufacturer.

j. Conventional non-ratcheting type crimping tools are unacceptable, and shall not be used on job site. Presence of such tools on job site shall constitute evidence of mechanical connections made with unauthorized tools and shall provide sufficient grounds for rejection of all mechanical connections in system, and will be considered non-conforming work.

E. Seismic Bracing:
1. Comply with IBC and local seismic requirements for all equipment and conduit pathways.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
1. Installer Testing:
a. After completion of installation but before inspection by Audiovisual Consultant, perform following:
1) Conduct system tests and make necessary corrections for proper system operation including, but not limited to, following:
a) Output level uniformity.
b) Polarity.
c) Shock, strain excited hum, and oscillation.
d) Clipping, hum, noise, and RFI in all system configurations.
e) Speaker line impedances.
f) Loose parts and poor workmanship or soldering.
2) Sweep speaker systems with high-level sine wave or 1/3 octave pink noise source. Correct causes of buzzes or rattles related to speakers or enclosures. Notify Contractor and Audiovisual Consultant of external causes of buzzes or rattles.
3) Rough Balance: Balance system well enough that it can be used for meetings before final inspection.

B. Non-Conforming Work:
1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

C. Manufacturer Services:
1. Provide services of factory authorized service representative to supervise field assembly and connection of components and pretesting, testing, and adjustment of system.

3.5 CLEANING

A. Waste Management:
1. All work areas are to be kept clean, clear and free of debris at all times.
2. Disposal of rubbish, debris, and packaging materials in proper manner.

END OF SECTION