**SECTION 27 51 26**

**Note to Editor: This is a master specification and needs to be edited to become project specific. Please remove all highlights, comments and text boxes. make all text black once editing is complete.**

**coordinate with facilities design standards volume 4:**

[***https://www.lbschoolbonds.net/facilities-design-standards/facilities-design-standards-volume-4***](https://www.lbschoolbonds.net/facilities-design-standards/facilities-design-standards-volume-4)

**ASSISTIVE LISTENING SYSTEM**

1. **GENERAL**
   1. **SUMMARY**
      1. Section Includes:
         1. Assistive Listening System requirements for various room types including Typical classrooms, libraries, conference rooms, and auditoriums.
         2. Requirements for a complete system that can be moved easily from classroom to classroom (portable system) and a permanent system at other assembly areas such as auditorium, MPR (Multi-Purpose Room), or other designated assembly areas. All audiovisual sources should be able to be heard through the Assistive Listening System. Each classroom space will have features and integration with Audiovisual System to allow use of Assistive Listening System.
         3. One (1) complete set of Owner Furnished Assistive Listening System equipment will be provided per permanent classroom building and one (1) complete set for every ten (10) portable classrooms as required, unless otherwise specified.
      2. Related Sections
         1. Division 01
         2. 26 05 00: Common Work Results for Electrical
         3. 27 10 00: Structured Cabling
         4. 27 30 00: Voice Communications
         5. 27 41 16: Audiovisual Systems
         6. 27 41 33: Master Antenna & TV Systems
         7. 27 50 00: Digital Intercom Clock & Bell

**NOTE TO EDITOR: REVISE RELATED SPECIFICATION SECTION AS APPROPRIATE FOR SPECIFIC PROJECT REQUIREMENTS. REQUEST LATEST DIVISION 01 FROM DISTRICT REPRESENTATIVE.**

* 1. **REFERENCES** 
     1. National Electrical Manufacturer's Association (NEMA)
     2. American National Standards Institute (ANSI)
     3. National Electric Code (NEC)
     4. Relevant State Electric and Fire Codes
     5. Institute of Electrical and Electronic Engineers (IEEE)
     6. Underwriters Laboratories, Inc. (UL)
     7. ANSI/TIA 568-C.0 Generic Telecommunications Cabling for Customer Premises
     8. ANSI/TIA 568-C.1, Commercial Building Telecommunications Cabling Standard
     9. ANSI/TIA 568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standard
     10. ANSI/TIA 568-C.2-1, Transmission Performance Specifications for 4-pair 100 Ω Category 6 Cabling, provided the accuracy requirements for Level III Field Testers; Category 6
     11. ANSI/TIA 568-C.3, Optical Fiber Cabling Components, Standard
     12. ANSI/TIA 569A, Commercial Building Standard for Telecommunications Pathways and Spaces
     13. ANSI/TIA 598, Color Coding of Optical Fiber Cables
     14. ANSI/TIA 606, The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
     15. ANSI/TIA 607, Commercial Building Grounding and Bonding Requirements for Telecommunications
     16. TIA TSB 67 Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling System
     17. BICSI – Building Industry Consulting Service International publications:
         1. Telecommunications Distribution Methods Manual
         2. LAN and Internetworking Design Manual
         3. Telecommunications Cabling Installation Manual
         4. Customer Owned Outside Plant Design Manual
     18. Manufacturer’s recommendations and installation guidelines.
     19. All cabling shall comply with all appropriate requirements of NEC Articles 770 and 800 and shall comply with the State Fire Codes as interpreted by the State Fire Marshall’s Dept.
     20. All publications referred to in this document shall be the latest publicized edition thereof together.
  2. **DEFINITIONS**
     1. Assistive Listening System – The combination of technologies that create a system that provides enhanced audio for the hearing impaired and student with auditory processing disorder. Any technology that enhances the understanding of speech by people with hearing impairments in acoustic environments in which speech is distorted, muffled, or obscured by background noise.
     2. Classroom – A teaching room that has fixed instructional media video projection capabilities, internet connectivity at the teacher's desk, student networking, a document camera (not in contract “NIC”), DVD/Blu-ray (NIC), and other multimedia input devices, standard laptop interface, multimedia control system that are connected to the network and have capabilities for additional add-on modular features.
     3. Contractor – The entity responsible for performing or overseeing the installation and configuration of the system.
     4. DHH – Deaf and Hard of Hearing, part of District Special Education Program <https://www.lbschools.net/departments/special-education/contact-us>
     5. District – Long Beach Unified School District
     6. District Approved Equivalent – A product that the Contractor submitted as equal to or greater than the product specified. Refer to Division 01 for additional information.
     7. District Standard – a design or brand that has been selected by the District as the acceptable product.
     8. District Technology Representative – An individual from the District’s Facilities Technology Group. They should possess an official @lbschools.net email address.
     9. District Representative – An authorized individual representing the District, for example a project manager.
     10. Integrator – The entity performing the physical installation and configuration of the system, who may be a sub-contractor of the Contractor.
     11. Large Auditorium – Auditorium that seats 700 or more.
     12. MPR – Multi-Purpose Room
     13. Owner – The District’s Technology Information Services Branch (TISB) who will oversee the system after turnover.
     14. Small Auditorium – Auditorium that seats less than 700.
     15. Switcher – the central unit of the Extron System that connects all associated devices.
     16. For any general definitions that do not appear here, such as RFI, refer to Division 1s. Should any contradictions occur between the definitions in this section and the ones in Division 1, the definitions above will take priority only in regard to Division 27 51 26.
  3. **SUBMITTALS**
     1. Certificates
        1. Contractor shall hold and maintain, through the completion, commissioning, closeout and warranty period of the project, manufacturer’s certification for the Assistive Listening System.
        2. The Contractor must be certified with the manufacturer for the Assistive Listening system for at least twelve (12) months prior to bid.
        3. The Contractor shall submit proof of certification to the District during bid time.
     2. Qualification Statements
        1. Submit Contractor’s experience and qualifications, include three (3) years of projects of similar complexity. Include names and locations of two projects successfully completed using an assistive listening instructional classroom technology.
        2. Submit documentation indicating Contractor has been in the contracting business for a minimum of five (5) years under the same name and is located within two hundred (200) miles of the District.
     3. Equipment Schedule
        1. Submit a complete bill of materials, including all quantities of components, devices, equipment, and wiring required to complete this scope of work prior to ordering any materials or commencing any construction activities. Provide all quantities needed, including OFOI components.
     4. Product Data and Shop Drawings
        1. Submit product data, including manufacturer’s data sheets, for all proposed system components.
        2. Submit manufacturer’s installation instructions.
        3. Integrator to submit shop drawings with device locations, power locations, and cable routes prior to installation.
        4. Submit a list of complete part numbers to the District for approval during submittal phase.
        5. Contractor and Integrator shall verify all equipment models, correct components, and correct number of components prior to submission of bill of materials.
        6. If additional equipment is required to meet system performance specifications, the Contractor shall provide the equipment with written District approval before installation.
     5. Refer to Section 01 33 00 Submittals for additional requirements.
  4. **CLOSEOUT SUBMITTALS**
     1. Documentation to be submitted by Contractor upon completion of system is:
        1. Provide a list of commissioning steps undertaken per system installed. This document may be a checklist. Commission per manufacturer requirements.
     2. Prepare and submit “As-Built” drawings of fixed systems such as Auditoriums, MPRs (Multi-Purpose Room), or other designated Assembly Areas. As-Builts to include indicating exact device locations, power source, network connection, associated panels, cable routes and wire numbers as tagged. Refer to Section 01 77 00 Contract Closeout and Final Cleaning for additional requirements.
  5. **DELIVERY, STORAGE, AND HANDLING**
     1. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
     2. Repair or replace damaged components before Completion of the project.
     3. ALL excess material that comes with the system shall be turned over to the District Representative at the conclusion of work.
  6. **WARRANTY**
     1. The Contractor shall provide the manufacturer's warranty that any equipment under this specification shall be free from defect for one (1) year from the date of final acceptance. Any receiver shall have a two (2) year manufacturer’s product warranty, and one (1) year loss and damage warranty. The loss and damage warranty shall replace a piece of equipment that is damaged beyond repair. With an option to purchase an extended warranty for up to five (5) years.
     2. Refer to Section 01 78 36 Warranties for additional requirements including Contractor warranty requirements.

1. **PRODUCTS**
   1. **ACCEPTABLE MANUFACTURERS – SYSTEMS**
      1. Assistive Listening Equipment
         1. Phonak, <https://www.phonak.com/en-us>
      2. Transmitter
         1. Phonak | Roger Multimedia Hub
            1. UL – 60950-1
      3. Receiver
         1. Phonak | Roger Neckloop
      4. Extend Network Operating Range
         1. Phonak | Roger Repeater
      5. Headphones
         1. Approved by a District Representative.
      6. Case
         1. Case to house portable Phonak Devices such as Pelican 1450 Case
            1. Confirm with District Representative (OFOI)
      7. Phonak Components to be OFOI for portable classroom settings, and for fixed systems, such as auditorium, MPR, or other designed assembly area(s). All other components, accessories, materials, or equipment needed are to be Contractor Furnished Contractor Installed (CFCI).
   2. **SYSTEMS DESCRIPTION**
      1. Provide one (1) complete Assistive Listening System per permanent building. See section 3 below for equipment needed for a complete system per room type.
      2. Provide one (1) complete Assistive Listening System for every ten (10) portable classroom buildings. If there are more than ten (10) portable classroom buildings on the site, consult with a District Representative if additional systems will be needed for the portables’ use. See section 2.4, Room Based Design, below for equipment needed for a complete system per room type.
      3. Can be used in typical Classroom settings and large auditoriums.
      4. The Audiovisual System shall provide at a minimum, one (1) 3.5 mm output jack for Assistive Listening System connection.
      5. Contractor to ensure capability when connecting to the District’s existing Audiovisual System and using the existing systems microphones and external speakers.
      6. The room shall include control systems that have American Disabilities Act, Section 508 compliant buttons that are discernible without activating the controls or buttons on the control panel, closed captioning, and hearing assistance capability.
   3. **GENERAL EQUIPMENT REQUIREMENTS**
      1. Capability of connecting to hearing instruments and cochlear implants.
      2. Alternate options shall be provided for persons without a hearing instrument, hearing aid, or cochlear implant.
      3. The system shall be user friendly, easy to use, and portable, as required.
      4. Audio bandwidth: 100 Hz – 7.3 kHz
      5. All products shall be new and under warranty at the time of completion. B-stock, previously installed, refurbished, or used equipment is not acceptable.

**NOTE TO EDITOR: COORDINATE DRAWINGS, SPECIFICATIONS, AND APPENDIX, UPDATE THIS SPECIFICATION AS NEEDED**

* 1. **ROOM BASED DESIGN**
     1. **TYPICAL CLASSROOM, PORTABLE CLASSROOM OR LIBRARY**
        1. One (1) Transmitter
           1. It has the capability of connecting to one (1) multimedia device used in the classroom.
           2. Has the capability of connecting as a standalone media transmitter by an individual student for listening to an audiobook, a tablet, or a lesson on a computer.
           3. It has the capability of connecting to compatible hearing instruments.
           4. 3.5mm output jack connection to one (1) multimedia device.
           5. Unlimited number of receivers in use in a network.
           6. Up to 35 microphones in use in a network.
           7. Operating range to receiver: 20 m (66 feet)
           8. Operating range for button connect feature: 10 cm (4 inches)
        2. One (1) Receiver
           1. It has the capability of connecting to any hearing instruments and cochlear implants that feature a T-Coil, including ITE and micro sized BTEs.
           2. If the hearing instrument does not feature a T-Coil an audio shoe/boot can be attached to the hearing instrument to provide a direct or wireless connection.
           3. It has the capability of connecting to any headphone.
        3. One (1) Headphone

**NOTE TO EDITOR: FOR AUDITORIUMS, REVIEW MAXIMUM SEATING OCCUPANCY, DISTANCES OF AUDITORIUM, TO CONFIRM NUMBER OF REPEATERS (BOOSTERS) NEEDED ALONG WITH POWER AND MOUNTING REQUIREMENTS. NECKLOOPS AND HEADSETS 3.5MM WILL BE BASED ON MAXIMUMOCCUPANCY LEVELS**

* + 1. **SMALL TO LARGE AUDITORIUMS** 
       1. One (1) Transmitter
          1. Has the ability to be connected to one (1) multimedia device
          2. Has the ability to be connected as a standalone media transmitter by an individual student for listening to an audiobook, a tablet or a lesson on a computer.
          3. 3.5mm output jack connection to multimedia devices
          4. Unlimited number of Receivers in use in a network
          5. Up to 35 microphones in use in a network
          6. Operating range to Receiver: 20 m (66 feet)
          7. Operating range for connect feature: 10 cm (4 inches)
          8. Audio bandwidth: 100 Hz – 7.3 kHz
       2. One (1) Receiver
          1. It has the capability of connecting to any hearing instruments and cochlear implants that feature a T-Coil, including ITE and micro sized BTEs.
          2. If the hearing instrument does not feature a T-Coil an audio shoe/boot can be attached to the hearing instrument to provide a direct or wireless connection.
          3. It has the capability of connecting to any headphone.
          4. Total number of Receivers will be based on the seating capacity of the Auditorium.
          5. Total number of Receivers shall be 4% of total seating capacity.
       3. One (1) Headphone
          1. For each Receiver there should be a coordinating and compatible Headphone to create a complete set.
          2. Provide 4% of total seating capacity
       4. One (1) Repeater
          1. It has the capability of expanding the operating range of the network in larger spaces. One or more repeaters may be needed per space.
          2. Operating range to primary microphone, receiver, transmitter, or next repeater is 40-70 m (130 – 230 feet).
          3. Operating range to receiver: 20 m (66 feet)
          4. Operating range for connect feature: 10 cm (4 inches)
          5. Mounting

Wall mount support with clip.

3/8” hole for tripod mounting.

* + - * 1. Location shall be on wall designated by drawings. Locate on stage opposite the Transmitter and at the rear of the Auditorium adjacent/proximity to the projector, preferably on a flat surface.
        2. Electrical is required for each repeater.

Confirm existing power and requirements to provide power if power is not available where required.

Height of power to be installed between 8’ and 12’ AFF.

Size and height of Auditorium, including if there is balcony seating, may require additional Repeaters and power to ensure that all seating has potential use of Assistive Listening System.

* + - * 1. Electrical enclosure box, required at each Repeater to protect both Repeater and power source.

Two-Gang Wiremold enclosure. Base has rectangular KO to enable extension from existing flush wall box and 1/2'” and 1” concentric knock-outs (KOs).

Accepts industry standard faceplates for switch and communication devices.

* + - 1. Contractor to provide all materials, tools, equipment and labor to provide power, integrate systems, and provide enclosures to protect ALS (Assistive Listening System) components, such as but not limited to Repeaters.

1. **EXECUTION**
   1. **EXAMINATION**
      1. Verify that related conditions, including equipment that has been previously installed under other sections, are acceptable for product installation in accordance with manufacturer’s instructions.
      2. All devices connected to equipment specified in this section shall bear the UL label and comply with the applicable National Electrical Code (NEC) standards.
   2. **INSTALLATION**
      1. Equipment shall be configured and in ready to use condition.
      2. Energize and commission equipment in accordance with manufacturer’s instructions. Integrator shall perform tests to verify system functionality before attempting to turn system over to District. For final acceptance of completed systems Contractor shall coordinate with District Representative. Commissioning the system shall at minimum, consist of the following:
         1. Plug into the 3.5mm jack within the room and verify audio output.
         2. Verify that audio is sufficiently set on the switcher such that the volume on the Media Link Controller (MLC) does not need to be at maximum for a reasonable volume.
   3. **LABELING**
      1. Label fixed equipment including room number and series if more than one device located in room, such as the Repeater
   4. **CLOSEOUT ACTIVITIES**
      1. Training

**NOTE TO EDITOR: REVISE TRAINING SECTION BASED ON PROJECT REQUIREMENTS, TYPES OF SYSTEMS, INCLUDING PHASED TURNOVER OF BUILDINGS**

* + - 1. The Contractor shall provide training for school district end users on proper operating procedures for the system after completion per campus, or by building if phased construction. Provide a one-hour training.
         1. End user training will cover the use of the Extron Audiovisual System in conjunction with the Assistive Listening System.
         2. Training will cover start up, charging, connection, and volume control.
      2. In addition to site end user training, if the Contractor is installing the first Assistive Listening System at the campus the Contractor shall provide one (1) advanced training session for the District’s Deaf and Hard of Hearing (Special Education Program) and Technology and Information Services teams. This advanced training shall be no more than two (2) hours and must include maintenance schedules and common troubleshooting steps. The training shall show how to configure the switcher in the Extron enclosure if the 3.5mm audio jack is not working properly. The advanced training will conclude with instructions on how to engage in the warranty process, if needed.

**END OF SECTION 27 51 26**