PART 1 – GENERAL

1.01 GENERAL

A. It is the intent of this specification that the Contractor shall deliver in coordination with the District, complete and working systems, fully tested, that meet the requirements of this specification that shall integrate with the District’s Cisco VoIP equipment. All systems shall be completed and ready for immediate use.

B. The intent is for the raceways, conduits, rough-in boxes, and electrical power to be provided and installed by the Division 26 Contractor (Electrical) in new construction. The Contractor shall review specifications and prints sufficient to become familiar with interface requirements for this project. This Contractor shall provide any items not included but required to make this a complete and working system.

C. Cabling plant consists of a Central Equipment Room (CER) (which shall mean the same as Main Cross-Connect (MDF or MC or MXC)) and multiple Communication Closets (CCs) (which shall mean the same as Intermediate Cross-Connects (IDF or ICs or IXCs). All conduit and cable, which interconnects the CER to the CCs to the devices, shall be provided by Division 26 Contractor, if not existing.

D. District Personnel shall refer to Technology Information Systems (T.I.S.) Division for testing and coordination of Owner-provided equipment.

E. All Bid references can be found on the District’s website [www.pcsb.org](http://www.pcsb.org) under Departments & Divisions Directory, Purchasing, Bid Information.

1.02 RELATED SECTIONS

1. Section 26 05 05 Electrical Demolition for Remodeling
2. Section 26 05 05 Basic Electrical Requirements
3. Section 26 05 26 Grounding and Bonding
4. Section 26 05 33.13 Conduit and Raceways
5. Section 26 05 33.16 Boxes
6. Section 26 05 33 23 Surface Raceways
7. Section 26 05 53 Electrical Identification
8. Section 26 43 13 Surge Protectors for Data and Electronic Equipment
9. Section 27 05 10 Basic Specialty Systems Requirements
10. Section 27 10 00 Structured Cabling
11. Section 27 51 13 Appendix A Programing Information Template
12. Section 27 53 13.13 Wireless Master Clock Systems
13. Low Voltage Design Criteria

1.03 SCOPE OF WORK

A. Provide an IP integrated communications system to include the following sub-systems as required in Part 2, Products, of this specification:

1) Zone Paging System. This specification establishes a minimum level of quality, features, and performance for individual components as well as the integrated system with VOIP.

2) IP Telephone System—Owner Furnished Equipment, Contractor installed. The Contractor shall accept and install, as described herein.

B. The Contractor shall provide the above systems and interfaces (i.e., hardware and coordination) to meet the interactive requirements of each subsystem, as described herein. This Contractor shall provide coordination services with the Owner’s telephone installer (throughout the warranty period) in order to achieve a working system between the two systems.

C. The intent is to utilize the School’s LAN (and District’s WAN). The Contractor shall provide any cross connects or hardware requirements to provide a complete and working system. This Contractor shall be responsible for providing and installing the equipment and connections for an integrated and operational system and coordinate programming with the Contractor.

D. This Contractor shall assist and provide to the Owner Three (3) months prior to substantial completion or earlier a complete and typed “27 51 13 Appendix A Programming Information Template” using the following format.

1. Device F.I.S.H locations (BXX.YYY)
2. Room designation (Principal’s Office)
3. Device type (Phone, IP speaker, Zone Controller, Message Board, Etc.)
4. Phone Type (Wall or Desk)
5. MAC addresses (XX:XX:XX:XX:XX:XX)
6. Employee title (Principal, Bookkeeper, Secretary, Etc.)
7. User ID’s or Names (Last Name, First Name)

1.04 ZONE PAGING FUNCTIONAL DESCRIPTION

A. Provide fully-operational IP platform for zone paging communications system incorporating school safety notifications and general communications. The paging system shall consist of enterprise software and IP addressable hardware that shall reside in each school (provided by the Contractor, Configured by the District).

B. The platform shall provide communications employing state-of-the-art IP technology including the following minimum functions.

1) IP paging

2) Bell event announcement. Multiple, variable Bell Schedules

3) Emergency announcement that shall override any pre-programmed zones assuring that Emergency/Lockdown etc. are heard at every speaker location utilizing pre-recorded audio – tones, music and voice or live voice paging. Ensure compliance with NEMA Standard SB-40 for emergency communications in K-12 Schools

4) Capability of pre-recording emergency announcements.

5) Synchronization with Class Change Tones utilizing multiple, programmable schedules for each zone.

6) Utilization of computers and telephones throughout the school for zone paging function.

7) Digital message boards for displaying announcements (configurable).

8) System software to synchronize time with network timeserver or web-based time server.

9) Capability for paging configurability ranging from District-wide to individual end-point.

10) Requirement to page District-wide and by school.

11) The solution must be capable of sending synchronized pages to all Cisco Phone types listed in the schools’ Bid Number 15-725-068 “Cisco VoIP Hardware, Maintenance, & Software Licensing”. Cisco phones would be the only speaker device for pages in certain administrative offices.

12) The Contractor’s solution, as a “Life Safety” solution, must be recommended by and supported as integrated partner with the Cisco phone system products listed in Bid Number 15-725-068 “Cisco VoIP Hardware, Maintenance, & Software Licensing”.

1.05 SHOP DRAWING SUBMITTALS

A. Submit electronic copy of required information prior to proceeding with the work.

1) Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, location of each field connection, and a complete schedule of all equipment and materials with associated manufacturer’s product information n which are to be used.

2) Indicate that the rack space and power requirements for equipment are adequate.

3) Provide a Visio, or simpler diagram, describing IP addressing and proposed VLAN scheme and multicast containment.

4) Submit requirements/quantities of POE ports for analog speakers, proposed IP speakers, and zone controllers.

5) Provide UPS consumption power chart.

6) Indicate quantities of patch panels and port counts.

7) Indicate patch cords count.

8) Provide wiring diagrams. Each diagram shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project as well as System Installation Company’s name in the title block.

9) Provide details and descriptions of any other aspect of the system, which would differ from the contract documents due to field conditions or equipment furnished.

B. Review and approval of shop drawings by the Engineer does not supersede the requirement to provide a complete and functioning system in compliance with the Contract Documents.

1.06 CONTRACTOR QUALIFICATIONS

A. The Contractor shall have successfully completed installations of similar network equipment and project magnitude to that specified herein within the last three years of bid submittal in the State of Florida.

1) The Contractor (installing the IP paging system herein specified) shall be an experienced IP PAGING SYSTEM CONTRACTOR and bondable. "Experienced" shall mean that the Division 27 Contractor is an authorized representative of the equipment manufacturer and can demonstrate they have personnel that have experience in the design, installation, testing, and maintenance of IP paging systems.

2) The Contractor shall have experience as an IP TELEPHONE CONTRACTOR. If requested "Experienced" shall mean that the Division 27 Contractor has been certified in the installation of IP Phone systems to be deployed in conjunction with the IP paging system. This level of experience will not normally be requested. Experience will normally be to have extensive experience with physical layer terminating wiring and hanging physical phone equipment. Both wall mount and Desk mount phones are to be installed.

3) If requested, the Contractor shall submit to the Owner or PA/E, before work begins, certificates of successfully completed manufacturers’ training classes, specifically related to the equipment being installed.

PART 2 – PRODUCTS

2.01 ACCEPTABLE ZONED PAGING SYSTEM MANUFACTURERS

Only the pre-approved Division 27 Manufacturers/Contractors per “Bid No. 15-803-109-RN, “IP Integrated Zone Paging Communication Systems”, “Installed” shall be used for completion of this project.

2.02 PAGING ZONES

Provide configuration information for the zones, as directed by the Owner. System shall not limit the number of zones.

2.03 ACCEPTABLE SYSTEMS MUST MEET THE FOLLOWING MINIMUM FUNCTIONS

1. Paging system shall function with the District’s Cisco VOIP equipment and shall leverage multicast technology on the network to efficiently send messages to all devices without flooding the network. SIP communications are acceptable for devices initiating a page or for non-page device communication messages. Actual pages must be via multicast to ensure synchronization and eliminate echo effect as well as unneeded network traffic.

B. Paging system shall be able to reach all designated IP endpoints, IP phones, overhead speakers, email, SMS, and integrate with outbound dialers from one send event.

C. Phone handsets shall have the ability to whisper a page while users are on a phone call.

D. Paging software shall override the physical volume setting on the phones.

E. Paging software shall send site-based page to all phones, speakers, and/or zones synchronously to ensure audio clarity when multiple phones are near each other.

F. District-wide pages shall be delivered to all phones, speakers, and/or zones in less than 30 seconds from one distribution list. Local pages shall be delivered to site phones, speakers, and/or zones within five to ten seconds.

G. System shall be able to monitor all telephones and trigger a page to a distribution list when specified number, such as 911, is dialed. When 911 is dialed, the system shall automatically derive the origination point of the call from the Cisco Call Manager appliance and inform the recipients of the message and of that location. This functionality or call awareness must be seamless from the phone system to the paging system and correctly identify the source of the call.

H. The system shall have the ability to interface with Microsoft Skype for business to send instant messages to all users or have screen popups available that do not take excessive system resources.

I. System shall include the ability to pre-record and auto-trigger a notification (i.e., pre-recorded message, text alert, email, etc.). System shall provide hands free, two-way intercom between all phones.

J. System shall implement Panic Button that shall trigger a page/call from the classroom to a group of endpoints. Page end points shall be as determined by Owner. If a phone, a text notice shall appear on the phone display.

K. Bell Scheduling

1) System shall have a bell scheduler for creating and managing all bells within the District, building, or site (i.e., individual school).

2) System shall allow room level customization of schedules.

3) System shall allow District, site, building, or room level schedule exceptions to adjust schedules for events.

4) Bells shall be capable of ringing on all District end points including speakers, phones, message boards, and computers to enable better zoning granularity.

2.04 ZONE PAGING EQUIPMENT AND MATERIAL

A. Server Software/Hardware

1) Contractor shall accept server (provided by Owner). Contractor may be required to install in Owner’s rack and coordinate with the System Contractor to provide software programming, as needed, to complete the system. Server shall be installed in each school’s MDF or location, as designated by Owner.

2) Enterprise software, that will meet the project’s current IP endpoints, will be provided by Owner. This Contractor is to coordinate installation for a working system. Endpoints shall include all IP devices to receive pages and notifications such as IP speakers, zone controllers, computers, and IP Phones (includes softphones).

3) Each school shall have a locally-survivable solution for IP paging, bells, and local emergency notification, such as lockdowns.

4) System shall be configured to provide local live paging, standard bell schedule, and additional scheduling, as determined by Owner.

5) Additional configuration shall be provided by the owner, per school, to include system configuration to broadcast pre-recorded emergency notifications triggered by calling a specified extension on a local IP phone; sending an all clear broadcast to notifications triggered by calling a specified extension; and sending a pre-recorded all–clear page following a fire alarm drill.

6) Reports on feature usage, system activity, etc. shall be provided via web-based interface.

7) Configuration of system and initiation of system features shall be provided via web-based interface.

8) System shall sync the time to the school’s network time server or network-based time server.

9) Web-browser shall be provided to deliver school-wide emergency paging, pre-recorded messages and tones from any authorized user in the school or via the District. The software shall be capable of automatically notifying school personnel via pre-recorded page, text, and or email over available LAN/WAN network.

10) Per school, provide and install an IP speaker and RJ45 jack and install Owner-provided telephone, at the main server location, to be zoned and used for web-interface to test source material or microphone inputs.

11) Initially, Contractor shall set volume of zone controller AMPs at a 50% setting and provide documentation to the District staff for further adjustments. IP speakers shall not use manual or in-room volume attenuation. Any reference in the drawings for local volume control shall be disregarded.

12) Contractor shall test volume levels working with the District staff to verify a set volume level (dB level using a sound meter) when a predetermined test tone is sent. This shall be done for every room and zone. Speakers shall produce a sound level of 10 decibels above the space noise at full occupancy.

13) Any reference in the drawings designated as a single or double occupancy office, which depict a ceiling mounted speaker for paging, should be disregarded as the office phones are intended to receive pages.

14) This Contractor shall connect system to the District-provided IP telephone network. See integration and configuration steps below.

15) System shall support a flexible numbering plan allowing two, three, four, five, or six-digit extensions to activate various paging activities, according to school’s dial plan.

16) Server shall not need direct connection to any classroom via home run or distributed wiring. The intent is to communicate solely through the IP LAN network.

17) Server shall store all school specific messages as well as District common messages, bell schedules etc. The server shall have a backup and restore capability accessible via web interface.

18) System’s Voice Interface shall provide:

a) Live audio paging access from any in-school IP telephone to any in-school IP endpoint. This shall include all zone controllers or any combination of IP endpoints.

b) Triggering of pre-recorded notifications, emergency and non-emergency, from any IP telephone to any in-school IP endpoint. This shall include all zone controllers or any combination of IP endpoints registered to the server.

19) System shall utilize a web-browser and audio input device (like a USB microphone) to deliver school-wide, live emergency paging, pre-recorded messages, and tones from any authorized computer in the facility. The system shall be capable of automatically notifying District personnel via the WAN of an alarm condition via email or text.

20) System shall be capable of automatically broadcasting page emergency instructions throughout the entire school when an alarm (i.e., lockdown, lockout, security, fire, etc.) is tripped or manually activated. The emergency instructions shall be pre-programmed and shall require no user intervention. The system shall provide redundant, alarm annunciation over the paging speakers and shall not be meant to replace primary fire alarm or security systems.

B. IP Addressable Endpoints

1) IP Speakers shall interface to each school’s data network.

a) Provide the ability to belong to one or more independent zones for zone paging, program/music distribution zones, and class-change tone reception. This assignment shall be a programmable function. Each IP speaker location or common zone shall be programmed in software and shall be able to belong to any combination of software defined zones.

b) Provide an analog output set of contacts such that an additional analog speaker may be paired with the IP speaker in larger classrooms. Additionally, the analog output shall be fitted with a pigtail to permit classrooms with auxiliary sound systems to detect sound and automatically disable in-classroom auxiliary sound system (i.e., voice reinforcement).

c) Basis for speakers shall be non-plenum rated. However, Contractor shall supply plenum-rated, where required. Contractor may propose an all plenum-rated solution.

d) Provide with a contact that shall detect a closed/open switch activity that may be programed to trigger a function such as strobe, panic, or other urgent message.

e) Provide cabling and message board in cafeterias, gymnasiums, auditoriums, media centers, etc. (gathering areas). See drawings for locations and quantities.

f) IP enabling of analog speakers using standalone POE devices either ceiling installed, in ceilings, or centralized rack shall not be acceptable as an IP speaker. The District does not want to deal with two separate devices in each class. The IP speaker must be a combined package with the speaker. The combined unit may have outputs for extension or other relay functions but the Ethernet POE and speaker per classroom must be a packaged unit. This District is aware of a number of IP enabling POE products that could be placed in ceilings. These would be unmanageable from a service perspective and unreasonable to identify.

2) IP-Addressable Zone Paging Module/Speaker

a) Shall connect multiple analog speakers in exterior or common areas in the school and support all page, zone paging, bells, audio events, and emergency notifications. Utilize zone paging amplifier.

b) Shall be rack mountable or Contractor shall supply a shelf.

c) Shall be able to belong to one or more zones for live paging, bells, pre-recorded audio, and emergency notifications.

d) Shall be mounted in the communications closet in existing rack.

e) Shall be end user configurable (with respect to accepting a Dynamic or Static IP address) must provide support for variable length subnet masks according to the School District’s IP addressing scheme and allow an interface to manually set the zone controller to a static IP.

f) Zone controllers may be used for common areas such as hallways, lobby, and outdoor spaces etc.; however, classrooms or other individual rooms must be able to be paged by unique IP address that may be combined into a zone.

g) Zone controllers and amps shall be install at the MDF or IDF punch block locations or termination cabinets unless otherwise specified by the owner.

C. IP Paging Administrative Computer (PC)

1. Provide audio paging access from any PC to any zone (i.e., group) of paging speakers or all speakers/paging horns throughout the entire school. Access controlled by User ID and/or password.

D. Audio Paging/Program Amplifiers/Speakers

1) Power amplifier(s) shall be provided to provide a minimum of 1 watt of power to each analog paging speaker and 2 watts of power to each paging horn. Outside horns should be set to half its rated power typically 4-8 watts to achieve proper coverage.

2) Maximum load on the paging/program amplifiers shall be 50% of the rated, continuous output of the amplifiers.

3) Exterior Speakers shall be Atlas Sound VT-152UCN with SEN/Surface Mounted or VTF-152UCN/Flush Mounted or pre-approved equal. No more than two exterior horns per wire run. 18 AWG, 2-conductor, shielded cable provided under Division 27, Structured Cabling in new construction or by this contractor in existing facilities. Analog audio cables and speakers shall be new, existing wire and devices shall not be used.

4) Category cable, from IP Endpoints to the Owner-provided POE network switches, provided under Division 27, Structured Cabling.

5) Contractors shall accept Owner-pre-configured POE network switches. District will install in rack, power and cable the switches with Contractor-supplied cables, as specified in 27 10 00 “Structured Cabling” and described herein.

6) Contractor shall coordinate testing switches’ connectivity with District network staff.

7) Interior Recess-Mounted Ceiling IP Speakers: Provide 2' x 2' drop-in ceiling speaker unit or pre-approved equal. Contractor shall add a color matching ceiling tile cross tee when installing a 2' x 2' speaker in a 2´x 4´ opening. Speaker shall be independently supported, speaker shall not be supported from suspended ceiling grid system. All speakers to be pre-approved prior to receipt of bids. For existing schools, Contractor may use existing network cable to ceiling speaker, provided Contractor tests and certifies cable as new. Otherwise, Contractor shall provide new Category cable from closest closet to ceiling speaker. Contractor shall support all cable as new with respect to warranty as required herein.

a) Protocol: SIP and Multicast (must use both).

b) Ethernet I/F: 10/100/1000 Mbps.

c) Power Input: PoE 802.3af.

d) Payload Types: G711 μ-Law and synchronized multicast.

e) Output: 1.0 Watt Continuous.

f) Sensitivity: 96 dB / 1W / 1M S.P. Level.

g) Functional LED indicator.

h) Speaker design, all portions visible below the ceiling must be guaranteed not to fade or yellow over time. If polymer-based speaker enclosure, the bidder must include the OEM’s specifications on resilience to fading of the original color. All metal designs should have baked enamel paint finish or include a statement of finish resilience from the OEM.

i) Contractor will label all interior IP speakers so that the MAC address is visible from the floor.

8) Interior Analog Speakers (for common areas with a zone controller) are intended to be one-way speakers and output wattage shall be sized to ensure proper coverage of all areas.

a) Provide a new 2' x 2' drop-in ceiling speaker enclosure/baffle/back-box or pre-approved equal. All speakers to be pre-approved prior to receipt of bids and must be guaranteed not to fade or yellow over time. If polymer based speaker enclosure, the bidder must include the OEM’s specifications on resilience to fading of the original color. All metal designs should have baked enamel paint finish or include a statement of finish resilience from the OEM.

b) All speakers shall be 25-volt and compatible with the amplifier system. Speakers shall be selected according to application and spaced to provide appropriate audible levels. Attenuation devices with jumper select levels above ceiling (volume knobs are not approved) shall be provided and installed for fine-tuning and balancing the system. Sound levels throughout the campus shall not be less than 85 dB SPL.

c) Coordinate speaker enclosure color selections with Owner.

d) Analog speaker cabling plant and termination boxes provided under Division 27, Structured Cabling in new construction or by this Contractor on existing facilities. Analog audio cables shall be new, existing wire shall not be used.

e) Unless otherwise approved, all interior speakers shall be mounted a minimum of nine feet AFF or at ceiling height.

f) All speaker types should be selected with vandalism in mind. For example, ceiling mount speakers should be flush with the ceiling with no lips or other protrusions, which would allow for them to be pulled loose.

g) For ceiling mount, no excessive weight shall be borne by the ceiling tiles - provide straps or otherwise approved hardware for bar joist suspension, as needed. Speakers to be independently supported to Building structure, grid shall not be used as a supporting member.

h) Provide all final speaker terminations at ends, testing, and individual surge suppression.

9) Provide a power calculation to be used for Owner-provided UPS adequate to operate system for a minimum period of 30 minutes during a power outage.

10) Contractor shall supply and install IP panic buttons. Basis: brushed aluminum or stainless steel faceplate and large red colored button (1" x 1", with momentary, de-bounced contact closure), in quantities and locations indicated on drawings. Panic Button shall function with the paging system to provide the following: identify the location utilizing the location’s FISH number of the panic button pushed and notify recipients (on a site-by-site basis, as determined by the Owner) via text, email, page, and/or live call. Areas primarily used by students shall have an emergency IP panic button, this includes but not limited to dinning, cafeteria, multipurpose, media center, gym, auditorium, etc. Emergency Panic call buttons in classrooms shall be located in the opposite corner of room from the telephone and entry door. Location of the emergency button shall comply with ADA.

E. Digital Message Boards: Provide boards compatible with system provided and in quantities/designated locations (reference drawings).

2.05 IP PHONE INTEGRATION

A. Contractor shall coordinate with the District to integrate with District’s IP Phone hardware supplier and software supplier.

B. Telco Interface and Cutover – Contractor shall work with District-supplied Telco contact to coordinate testing and eventual cutover of pre-determined numbers to new SIP service. Configure and support testing of new SIP service with Telco.

2.06 DISTRICT ZONE PAGING SYSTEM CONFIGURATION

A. Cooperate in configuration of District-wide paging servers.

B. Contractor expects to have all equipment (when necessary) for the locations at a single predetermined District location for configuration and staging.

1) District Personnel to assist Contractor in unpacking and staging power, temporary cables, etc.

2) District Personnel will repackage and ship to all remote locations following configuration.

C. Contractor to install Paging System using District-provided resources (i.e., hardware, racks, power).

D. Owner is to configure paging system per District requirements.

1. Emergency Notification
2. Live Paging
3. Pre-Recorded notifications
4. Bell Schedule
5. Weather Alerts
6. Lock Down Alerts
7. All Clear Alerts

E. Tactical Training

1) District Personnel will identify individual(s) to work with Contractor Consultants for knowledge transfer.

2) Contractor to provide knowledge transfer on key operational functions.

3) District Personnel will perform functions under Contractor supervision and direction to promote practical learning.

2.07 SYSTEM TESTING AND DOCUMENTATION

A. Owner shall provide Test Plans for each piece of the integration.

1) Paging and Alerts System

1. Emergency Alerts
2. Lock Down / All Clear
3. Live Paging
4. Recorded Broadcasts
5. Bell Schedule
6. Etc.
7. Contractor shall perform initial volume tests that will establish a level of 85 dB or greater throughout the area during a test tone.

C. Contractor shall provide electronic as-built documentation (i.e., AutoCAD and pdf) for all systems when finished

1. AutoCAD/pdf
2. How to Documents
3. System Configuration Documents
4. Etc.

2.08 MISCELLANEOUS

Contractor shall cooperate in the integration and programming of telephone and paging system to create the functions specified in this bid. Paging system and telephone system shall be individually tested but acceptance of the service shall only occur when a fully integrated system is delivered. This shall include testing of all emergency notification features and calls that are to be configured.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine conditions, with the Installer and/or Owner present, for compliance with requirements and other conditions affecting the performance of the School Communications and School Safety Network.

B. Contractor shall not proceed until unsatisfactory conditions have been corrected.

3.02 GENERAL

A. Installation shall be performed only by experienced installers who are familiar with the project requirements.

B. All equipment and materials are to be installed in accordance with all applicable standards of the National Electric Code and any other applicable codes including local municipality codes, safety codes, and ordinances.

C. The Contractor shall provide and coordinate with an Electrical Contractor for the connection of power and ground wiring to the system and all wiring installed by the Electrical Contractor. In addition, the Owner shall furnish the Contractor with a power surge protector to coordinate installation at the panel on the circuit into which the system shall be plugged.

D. The Contractor shall coordinate all work with other trades to avoid conflicts and delays in construction schedule. The Contractor shall take whatever steps necessary to meet the construction schedule, including but not limited to, expediting the delivery of materials and/or providing additional labor at no charge to the Owner.

3.03 INSTALLATION

A. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

B. Furnish and install all material, devices, components and equipment for a complete operational system.

C. Impedance and Level Matching: Carefully match input and output impedance’s and signal levels at signal interfaces. Provide matching networks, where required.

D. Control Circuit Wiring: Install control circuits in accordance with NFPA 70 and as indicated. Provide number of conductors, as recommended by system manufacturer, to provide control functions indicated or specified.

E. The Contractor shall provide necessary transient protection as recommended by the equipment supplier and referenced to earth ground.

F. Provide physical isolation from speaker, telephone, line‑level wiring, and power wiring. Provide 12-inch minimum separation between conductors to speaker‑microphones, telephone wiring and adjacent parallel power. Provide physical separation, as recommended by equipment manufacturer for other system conductors.

G. Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams and under Division 27, Structured Cabling.

H. Weatherproofing: Provide weatherproof and/or UV protective enclosures for items to be mounted outdoors or exposed to weather.

1. This Contractor shall remove any accessible portion of abandoned analog or otherwise distribution cables in ceilings, underground and walls. Abandoned 66-Punch blocks shall be removed.
2. When installing new IP Paging system, the original existing call buttons, speakers and conduits used for the intercom-paging must be remove at cutover. As part of the cutover this contractor must disconnect and remove original classroom analog speakers when new IP Paging system becomes active. Patch and paint to match existing, after removal of conduits and old devices.
3. All IP communications devices (Wireless access points, phones, IP paging speakers, zone controllers, etc.) installed by this Contractor must be patched over in the network closet using the correct color patch cables as per the 27 10 00 Structured Cabling specification.

Data- Blue

Wireless Access Points – Yellow

Voice and Phones– Orange

Speakers and Zone Controllers – Purple

1. When installing any speakers or other devices that require the replacement of ceiling tiles, this contractor must replace the ceiling tiles with those furnished by the school district.
2. Cabling terminations above ceilings for devices such as wireless access points, projectors, IP paging speakers, etc. needs to be terminated in a RJ45 8P8C Female jack, Male RJ45 modular plugs will not be accepted. The male RJ45 Keystone jack shall be installed in a box with a keystone wall plate. Wall plate shall be labeled per specification.
3. Wall phones shall be installed at 4” A.F.F to bottom with wall mounting solid face plate for telephone. Box shall have 8” of clear wall space on each side. Coordinate location and avoid installing phones above water fountains, furniture and behind doors. Phones should be accessible with no obstruction which could hinder operation.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a duly factory-authorized service representative for this project location to review field assembly and connection of components and the, testing, and adjustment of the system.

B. Inspection: Make observations to verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

C. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify, by the system test, that the total system meets the Specifications and complies with applicable standards.

3.05 FINAL ACCEPTANCE TESTING

A. The Final Acceptance Testing shall be provided to the Owner or the Owner’s designated representative only. Final acceptance testing to any other trade or service provider for the project shall not comply with the requirements of this section.

B. The Contractor shall provide a Final Acceptance Test record document signed by both the Contractor and the Owner or designated Owner’s Representative establishing the “In Warranty” date. The warranty period shall not commence until the Final Acceptance Test is completed.

C. This Contractor shall be prepared to verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. This Contractor shall make additional adjustments within the scope of work and which are deemed necessary by the Owner because of the acceptance test.

3.06 PROJECT SUBMITTALS PRIOR TO ACCEPTANCE

A. Installer Certificates: Signed by Contractor certifying that installers complied with requirements.

B. Acceptance Documents (include record of final settings and measurements certified by Installer).

C. Maintenance Data: For equipment to be included in maintenance manuals.

1) Record of Owner’s equipment-programming option decisions.

2) All instructions necessary for proper operation and manufacturer’s instructions (three hard copies and one electronic copy).

3) “Proof of Performance and School District Safety Compliance” information.

4) Manufacturer’s maintenance information (document with updated and accurate web links).

5) Electronic copies of software programs and system information on all programmable features of the installed platform.

3.07 CLEANING AND PROTECTION

Prior to final acceptance, this Contractor shall vacuum and clean all system components and protect them from damage and deterioration. All blank spaces in equipment cabinets shall be covered with blank panels. Top and side panels and all cabinet doors shall be installed. All general areas within and around all equipment rack/cabinets in the facility shall be swept, vacuumed, and cleaned up. No cabinets shall be left unlocked and all cabinet keys shall be turned over to the Owner or Designated Owner’s Representative.

3.08 IN-SERVICE TRAINING

A. The School shall provide a space for the training. This Contractor shall provide everything else, including copies of instructional materials, trainer(s), etc.

B. Provide videotaped training: one for maintenance session and one for each school’s staff training. Submit to District’s Project Manager.

C. Maintenance Personnel: If required, at a representative site, this Contractor shall provide on-site training for the Owner's maintenance personnel in the procedures involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Over a 14 day period, the Contractor shall schedule, with District maintenance personnel, two complete sessions to accommodate personnel’s schedules. The two sessions are intended to accommodate District staff being trained prior to system being actively used in the schools.

1) In addition to the Training Materials provided, the Contractor shall furnish Operators Manuals and User’s Guides at the time of this training via electronic or online media.

2) Schedule training with Owner (through the Owner or the Owner’s Designated Representative) with at least seven days advance notice.

D. School Staff: District Staff shall provide and implement a complete and comprehensive, on-site, school staff training program for administrators, facility staff members, and teachers. This mandatory training program shall provide school staff a complete understanding of how to utilize and properly operate the system functions. The intent is to provide two sessions, per school. One session would be provided upon production activation of the phone and paging system. The second session, timing as requested by the school, shall be provided within six months of the first session. Additional training is outside the scope of this bid and would be procured separately.

1) The training program shall be implemented by a staff member/trainer employed by this Contractor. The trainer must be qualified to provide training on their product.

2) All staff development training is to be coordinated through the Owner’s Designated Representative with at least seven days advance notice. The trainer shall provide the School’s administrative staff and District’s staff, a document listing all of the staff and faculty members who attended, received, and completed the training program.

3.09 AS-BUILT/RECORD DRAWINGS

Prior to final acceptance, provide three sets of drawings and one AutoCAD disc (Release 2014 or later) and a pdf file indicating all cable numbers and construction details in accordance with the actual system installation before final payment shall be issued. Revise all shop drawings to represent actual installation conditions. These Record Drawings shall be used during “Final Acceptance Testing.”

3.10 WARRANTY

A. Provide a three-year warranty on all of the Contractor-supplied equipment against defects in material and workmanship. This warranty shall cover all electronic equipment, as well as speakers. If any defects are found within the warranty period, this Contractor shall replace the defective equipment at no cost to the Owner (i.e., to include equipment and labor).

B. If the equipment cannot be repaired within 24 hours of service visit, the Contractor shall provide “loaner” equipment to the school at no additional charge.

C. If requested, Contractor shall provide a quote for a service contract offering continuing factory authorized service of the system after the warranty period.

D. Any software updates, during the three-year warranty, shall be provided to the District as part of this contract (i.e., no additional charge). This effort shall include travel to the site or District (if not able to remotely download) for installation and configuration of the updates.

3.11 EMERGENCY SERVICE

The Contractor shall maintain sales and service presence in the area of adequate size and quality to assure the Owner of rapid response to emergency service requests. Rapid emergency service response shall mean arrival of service personnel at trouble site within four hours of notice during normal business hours (i.e., 8:00 AM to 6:00 PM) and within 24 hours of said notice during all other hours on a 7-day per week basis. Service personnel shall arrive on site within 48 hours of receiving a request for routine or non-emergency service.

**END OF SECTION**