pch architects, l.l.p.

ADDENDUM NUMBER 8

To the Contract Documents
For the Construction of

Bid No. F13-04 COMMUNITY DAY SCHOOL
For
SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT

April 4, 2014

NOTICE TO BIDDERS

It is intended that all work affected by the following provisions shall conform to the original plans and specifications. Delete or modify each of the following items wherever appearing on Drawings, and/or Specifications. Acknowledge receipt of Addendum No.8 in the space provided on the Contractor's Proposal. Failure to do so may subject bidder to disqualification.

GENERAL:

Item Number 1; At all of the relocatable buildings on this project, coat the underside of all plywood roof sheathing with intumescent paint. Paint shall be FireGuard E-84 as manufactured by Shield Industries or approved equal, applied in accordance with manufacturers' instructions to achieve 1 hr. rating.

SPECIFICATIONS:

Item Number 2; Reference Notice Inviting Bids, Submittal of Bids; Revise the last sentence to read

"The Bids are due at 10:00 a.m. on Monday, March 10, 2014."

Item Number 3; Add attached Section **16760 Integrated Communications System.**

30 South Center Street
Redlands, California 92373
Telephone: 909/792-7397
Fax: 909/793-7873
www.pcharchitects.com

DRAWINGS:

Item Number 4; Reference Sheet T – Title Sheet, Scope of Work; The following work shall be included at the Del Vallejo Site:

> **The Contractor is responsible for disconnecting the EMS systems from the relocatables being moved and reconnecting the system as necessary to maintain its operation at the Del Vallejo Site.**

End of Addendum 8

Ralph Pacini,
PCH ARCHITECTS, LLP

PART 1- GENERAL

1.1 SCOPE OF WORK:

1.1.1 All applicable portions of Section 16000 shall apply to this section as though written herein completely.

1.1.2 The work under this section includes all labor, materials, equipment, and accessories required to furnish and install a complete Integrated Communication System as indicated on the drawings and as specified herein. The System shall contain the following Subsystems: Telephone Interface, Intercommunication, Master Clock, Emergency and Zone Paging, Sound Reinforcement, Intrusion Alarm, Network Media Management and Television Signal Distribution Systems.

1.2 RELATED WORK:

Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and sixteen (16) of these specifications.

1.2.1 The work described by this part includes the furnishing of all materials, equipment, supplies, labor and the performing of all operations necessary for the installation of complete and operating systems.

1.2.2 All conduits, outlet boxes, back boxes, junction boxes, terminal cabinets, backboards, wiring, cables, equipment, devices, etc., shall be furnished and installed complete under this section. Conduit and junction box sizes shall be determined by the Installing Communications Contractor for the particular wire and cable fills required for the systems installed (conduit sizes shall comply with the National Electrical Code). The entire responsibility of the system, including the installation, operation, function, testing and maintenance for 1-year after final acceptance under this section shall be the responsibility of the communications contractor.

1.2.3 The Installing Communications Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.

1.3 GENERAL REQUIREMENTS

1.3.1 The Installing Communications Contractor shall hold a valid State of California C-10 License, shall have completed at least twenty (20) projects of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

1.3.2 The Installing Communications Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work. Such as Alarm Company and Agent licenses.

1.3.3 The Installing Communications Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment specified and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Installing Communication Contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.

1.4 QUALITY ASSURANCE:

1.4.1 In order to match the District's Standard, establish quality and standards of performance the specified equipment for the communication systems is that of Rauland Borg Corporation. All mechanical, electrical and general information set forth on the respective data sheets for each specified item shall be considered to be part of these specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality. A list of at least six jobs of the identical equipment that has been in service for at least three years must be submitted with telephone numbers and addresses. The Architect reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing laboratory to prove equality. The decision of the Architect regarding equality of proposed equal items will be final.

1.4.2 It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified without exception. For any proposed substitution, complete descriptive, technical and cost comparison data and test reports shall be submitted for review during the bidding period. The Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from substitutions. Proposed substitutions shall be listed on the bid form, stating the reasons for substitution and the amount to be deducted from the bid if the substitution is allowed. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system and installation of the specified system at the contractor's expense.

1.4.3 If a substitution item is given final acceptance by the Owner, the contractor shall pay all costs (including travel, lodging, meals, computers, etc.) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected Owners representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected Owners representatives to provide any and all Factory/Manufacturer approved repairs, services, software upgrades, etc. without affecting any available or applicable Manufacturer Warranties.

1.4.4 All of the Electronic Systems Equipment shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the Installing Communication Contractor is the Authorized Distributor and that the equipment has been installed according to factory intended

practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.

1.4.5 All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

1.4.6 The material in this section will be covered by the Rauland 5-year material warranty policy.

1.5 SUBMITTAL AND MANUALS

1.5.1 Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.

1.5.2 Additional requirements of this section are:

.1 Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight (8) copies of a complete submission.

.2 The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.

.3 The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.

.4 The second section shall include a copy of the Installing Communication Contractors valid C-10 California State Contractors License, letters of factory authorization and guaranteed service, list of twenty (20) projects of equal scope and list of proposed instrumentation to be used by the Contractor.

.5 The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.

.6 The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications.

.7 The fifth section shall contain a wiring designation schedule for each circuit leaving each piece of equipment and drawings showing system wiring plans.

1.5.3 The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

PART 2 - PRODUCTS

2.1 ICS SYSTEM REQUIREMENTS

2.1.1 The system shall provide the state of the art in technology for all paging and intercom communications, secondary clock corrections, and bell schedules. The system shall be easy to learn and operate. All standard system programming shall be user friendly to allow the system administrator the ability to easily program system features. The system shall be a Rauland Telecenter VI.

2.1.2 This system shall be interfaced with a telephone system furnished by others and some of the features and functions that are described here are done though the telephone system. The instruments in the classrooms and administrative areas are part of the telephone system and only interfaced to the ICS system.

2.1.3 Provide complete and satisfactorily operating Integrated Intercom/Communications System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturers standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.

2.1.4 Features offered by this system shall be implemented and controlled by software programs that can be changed and expanded as customer needs evolve.

2.1.5 The system shall allow system monitoring and administration from a local Windows 95/98 PC or remote Windows 95/98 PC via a modem.

2.1.6 The system shall be an electronic system consisting of one (1) or two (2) amplified intercom channels, (classroom) speakers, digital readout for display, and solid state logic and sensing.

2.1.7 Ability to provide multiple zone program distribution which is not interrupted by intercom communications.

2.1.8 The system shall lend itself to expansion by simple addition of modules.

2.1.9 The central switching system shall provide for switching of the intercom talk path to a telephone mode, during the course of a call.

2.1.10 The system shall be equipped with voice prompting to identify the calling station and respective call priority.

2.1.11 This system is to be interfaced with the site telephone system, which is specified elsewhere and furnished by the Owner as per the specifications.

2.1.12 Two-way communication between any telephone and any room speaker.

2.1.13 Room speakers and call switches shall be programmable and may be assigned any three, four or five digit number. Any room number may be reassigned at any time, and it shall not be dependent on wiring or circuit numbers.

2.1.14 Sixteen (16) separate paging zones shall be provided; each location shall be programmed in software to belong to any combination of software zones.

2.1.15 Each dialing administrative telephone in the system shall be programmable for the following options:

.1 Allow zone paging.

.2 Allow All-Page announcements.

.3 Allow Executive Override.

.4 Allow Emergency paging.

.5 Allow activation of Time Zone tones.

.6 Set the priority level and target display of "normal" calls.

.7 Set the priority level and target display of "emergency" calls.

.8 Assignment of architectural number.

.9 Class of Service.

.10 Assignment of associated speaker to paging zone.

.11 Automatic Call-Back-Busy.

.12 Call Forward-No Answer.

.13 Call Forward-Busy.

2.1.16 Amplified two-way voice communication shall be available from any dial phone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active.

2.2 EQUIPMENT AND MATERIALS

2.2.1 Central Controller Unit

The Integrated Electronic Communications Network shall have the following capabilities:

.1 Facilities for multiple operations simultaneously without interference with an established pattern of priorities for all administrator/classroom communication capabilities.

.2 Facilities for centralized attendant answering.

.3 The system shall provide Personal Identification Numbers for selected administrators. By dialing their PIN at any system telephone, the administrator shall have access to the same intercom/paging capabilities assigned to their office telephone, regardless of the restrictions on the phone they are currently using.

.4 Provide multiple attendant positions for answering intercom calls.

.5 Facilities for the central control unit to store information and give reports on features, system activity, etc. upon request either on site or remotely.

.6 Facilities for automatically sounding a warning tone signal over any loudspeaker selected for two-way communications to alert the station attendant (classroom teacher) to the call and prevent unauthorized monitoring.

.7 Facilities for access to any single loudspeaker unit, zone loudspeaker unit, or all loudspeaker units. The warning tone signal shall sound as soon as the station is selected and shall be automatically repeated at regular intervals for the duration of the call if the voice circuit is not activated.

.8 Direct Dialing, two-way amplified voice intercom between all locations equipped with administrative telephones and staff station speakers without the use of a press-to-talk or talk-listen switch.

.9 The Central Controller Unit shall provide an RS-232 port for the connection of on-site or off-site diagnostics by distributor or factory-trained personnel.

.10 This port shall be usable for the programming and saving of all programmed data for each system with the utilization of an on-site or off-site computer.

.11 This port shall provide the capability of logging of various activities within the system.

.12 Facilities for executive override permitting an assigned telephone to "override" on-going intercom conversation(s) in the system.

.13 Facilities for the instantaneous distribution of emergency announcements simultaneously, by a single button access, to all locations equipped with speakers.

.14 Emergency announcements originating from any assigned administrative telephone shall have priority over all regular system functions.

.15 Facilities for the distribution of alarm signals to all areas equipped with speakers by single button access.

.16. Up to nine (9) separate distinct alarm signals shall be provided. Each of the distinct alarm signals can be activated by a designated single button.

.17. Capability for assigning speaker locations to any one or more of the sixteen (16) zones for zone paging, up to sixteen (16) zones for program distribution, eight (8) zones for class change "bells", and up to eight (8) security zones. All of these zones may be configured to be independent of the other zones.

.18. Facilities for the origination of both "normal" and "emergency" calls from any staff location.

.19. It shall be possible to review all calls stored in memory in the order received.

.20. Facilities for answering calls registered in the digital read-out display merely by pressing a single response button. This capability shall not prevent other calls from being placed or answered by dialing their numbers.

.21. Facilities to cancel all staff station originated calls from any administrative telephone.

.22. Facilities for assigning or changing classroom numbers by architectural or any desired numbering system; either three-digit, four-digit, or five-digit numbers may be assigned.

.23. Facilities for multiple loudspeaker or telephone conversations to take place and not prevent announcements, educational, or music programs from being distributed to other areas of the building.

.24. Facilities to automatically send incoming calls to an alternate phone or if they remain unanswered for a predetermined amount of time.

.25. A facility to notify a user that the intercom path called earlier is now available. If a busy signal is obtained, user shall dial callback feature code and hang up. System shall automatically call back user when intercom path is available and complete an intercom call to speaker.

.26. Facilities for universal wiring for all data network, telephones, intercom speakers, and call switches using category five (5) cable. Systems requiring a custom cable plant dedicated to just the intercom system will not be acceptable.

.27. Facilities to provide automatic emergency instructions to be broadcast to the entire school when an alarm is tripped. The emergency instructions are preprogrammed and require no user intervention.

.28. Facilities for single button access to allow page announcements into speaker zones without interrupting others performing simultaneous functions.

.29 Facilities to page one or more area-wide pocket pagers when a call is placed of a specific call priority or all call priorities. The pocket pager will display the calling room number and a numeric call priority.

.30 Facilities to automatically alter a call switch's class of service by time of day and day of week as directed by the owner.

.31 It shall be possible to initiate Class of Service changes either manually or automatically on a per station basis using internal clock set.

32 A minimum of four independent program memory sets shall be provided. Choice of time of service change and active memory set selected shall be completely programmable.

.33 Class of Service Changes shall be programmable by time of day and day of week.

.34 A minimum of sixty-four (64) unique classes of service shall be available.

.35 Capability for assigning speaker locations to any one or more of the zones for zone paging or time signal reception; this assignment to be a programmable function.

.36 Time signal tones shall be generated on a manual or automatic basis.

.37 Emergency tones shall be distributed from designated Administrative Telephones.

.38 Power amplifiers shall meet all specifications exactly as specified herein, including power capacity and count.

2.2.2 Administrative Telephone

Administrative Telephones indicated on the drawings shall provide functions as scheduled below:

.1 One (1) button dialing of most commonly dialed number or numbers.

.2 Facilities for multiple operations simultaneously without interference with an established pattern of priorities for all administrator/classroom communication capabilities.

.3 Complete station software assignment including class of service, speed call numbers, and any other features assigned without any wiring changes being required.

.4 Facilities to permit the distribution throughout the facility of emergency announcements, all-page announcements, zone-page announcements, and emergency/evacuation alert if authorized through class of service.

.5 Facilities to enable use of features without the use of "hook switching".

.6 Facilities for two (2) line, forty-eight (48) characters LCD module to display room number dialed, room station call, program distribution, and paging zones.

.7 Facilities for receiving staff station and/or emergency calls with single button response.

.8 Provide saved number redial function.

2.2.3 Emergency/Normal Call Switch

Emergency/Normal Call Switches indicated on the drawings shall provide functions as scheduled below:

.1 Provide one (1) "Emergency" call switch that shall activate a distinctive "EMER" level call from a single button activation. Button shall be clearly marked "EMER" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. In accordance with the Americans with Disabilities Act (ADA), the "Emergency" call will provide a flashing call assurance LED confirming that the call has been placed in the system.

.2 Provide one (1) "Normal" call switch that shall activate a distinctive "NORM" level call from a single button activation. Button shall be clearly marked "NORM" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. In accordance with the Americans with Disabilities Act (ADA), the "Normal" call will provide a steady call assurance LED confirming that the call has been placed in the system.

2.2.4 Normal Call Switch (if shown)

Normal Call Switches indicated on the drawings shall provide functions as scheduled below:

.1 Provide one (1) "Normal" call switch that shall activate a distinctive "NORM" level call from a single button activation. Button shall be clearly marked "NORM" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. Ability to upgrade the "NORM" call to an "EMER" call by pressing the button a second time. In accordance with the Americans with Disabilities Act (ADA), the call will provide a steady call assurance LED (which will be upgraded to flashing for "emergency" calls) confirming that the call has been placed in the system.

2.2.5 Program Distribution System

.1 The system shall provide facilities to distribute program material (i.e. cassette tape, CD, radio broadcasts) in the following manner:

- The media operator shall cue remotely located music source or select radio station.

- The media operator shall then "direct select" room(s) or areas to send the program via a switchpanel OR The media operator shall dial from an Administrative Telephone to select the room(s) or areas to distribute program

- Both means of switch panel and dial-up program distribution shall be accessible from the system.

.2 Power amplifiers shall meet all specifications exactly as specified herein, including power capacity and count, provide a minimum of ½ watt power to all intercom speaker locations plus 15 watts power to all horn type speaker locations.

2.2.5 Time Programming

The master time controller shall provide the following functions:

.1 Non-volatile memory capacity for storing 550 events and up to 100 Calendar dates for schedule changes.

.2 Ability to review, edit and delete events via a Windows 95/98 PC running the configuration program.

.3 Review events from any entered time of day.

.4 Events shall be programmable to any or all of eight (8) zone circuits. Selection of any of eight (8) schedules to allow flexibility due to seasonal changes or special events.

.5 Fully automatic Calendar execution.

.6 User programmable Automatic Daylight Savings Time Change.

.7 Programmable Music-on-Class-Change. This feature shall be programmable from 1 to 3600 seconds (60 minutes).

.8 Separate bell-tone selection and separate bell duration for each event.

.9 Latched operation of zones to control lighting or other devices.

.10 Interface with most types of secondary slave clocks whether synchronous wired or electronic.

.11 User-programmable custom slave clock correction. Output relays rated at 5 amperes shall be provided on all zone circuits as necessary.

.12 Lithium battery will provide not less than 5 years battery back up for timekeeping function.

2.2.6 Classroom Security and Supervision Interface

.1 The classroom controller shall offer easy interface to a security transducer-like motion detector or door switches.

.2 All field wiring shall be individually supervised for opens or shorts to each call station and security devices.

.3 No other wiring or equipment shall be needed to secure a classroom.

.4 Arming and disarming functions shall be performed by dial-up via the Administrative Telephone(s).

.5 Easy interface shall be provided to the main security system.

.6 Any systems not providing inherent security functions in the classrooms shall not be acceptable.

2.2.7 Data Logging

.1 System wide events. The System Log shall contain all events that occurred in the system for which event logging has been enabled to diagnose or document system usage.

.2 Schedule parameters. Shows for each day-of-the-week the times-of-day when system configuration modes change.

.3 System logging. The System Log Dump report shall list all events that occurred in the system for which event logging has been enabled to diagnose or document system usage.

.4 System shall be self-monitoring. System shall include a background process dedicated to self-monitoring.

2.2.8 Telecenter System Rack Equipment

To fulfill the above requirements, the following control equipment shall be provided:

.1 Rauland Microprocessor based central switching assembly with auto modem. Equip system for number of stations required plus one station line group card but no less than 20%.

.2 Power amplifiers - Power and number of amplifiers shall be as required by load plus 50% reserve.

.3 All equipment shall be mounted in a Rauland equipment racks.

.4 Furnish a Sola or equal 1.3kVA UPS system.

.5 Provide switchbank to control pushbutton changes of master clock schedules four (4) and emergency tone transmission eight (8).

2.2.9 Accessory Equipment:

.1 Classroom loudspeakers - Interior flush mounted wall or ceiling shall be Rauland USO188 mounted in Rauland ACC1004 baffle and ACC1100 back box. Use ACC1102 back box for surface installations.

.2 Exterior flush ceiling or wall loudspeaker shall be Quam C10PAOT10 weatherproof mounted on Rauland ACC1012 baffle and ACC1105 back box. Use vandal-proof hardware.

.3 Exterior long throw surface mounted horn loudspeaker shall be Rauland 3703. Provide Vandal-proof cage to protect horn. Submit drawing for approval prior to installation.

.4 Classroom telephones shall be wall mounted with dial pad and connected to head equipment.

2.2.10 Cable:

.1 Loudspeaker cable shall be West Penn 290/425.

.2 Microphone cable shall be West Penn 291.

.3 All cable installed in underground conduit shall be West Penn AQC type.

PART - EXECUTION

3.1 INSTALLATION

3.1.1 The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the Architect before making any changes. It shall be the responsibility of the factory authorized distributor of the specified equipment to install the equipment and guarantee the system to operate as per plans and specifications.

3.1.2 Furnish all conductors, equipment plugs, terminal strips, etc., And labor to install a complete and operable system.

3.1.3 The cables within the rack or cabinets shall be carefully cabled and laced with No. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.

3.1.4 Splices of conductors in underground pull boxes is not permitted.

3.1.5 The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

3.1.6 The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish

occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

3.1.7 The contractor shall provide not less than eight (8) hours for instruction of personnel in the operation and maintenance of the systems. This instruction time shall be divided as directed by the District.

3.1.8 The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory authorized distributor of the specified equipment to install the equipment and guarantee the system to operate as per plans and specifications.

3.1.9 Furnish all conductors, equipment plugs, terminal strips, etc., And labor to install a complete and operable system.

3.1.10 The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system. The systems shall be installed in accordance with NFPA 70 and other applicable codes.

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

3.1.12 Control Circuit Wiring:

.1 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.

.2 The contractor shall mount a main distribution frame as shown on the plans. All wires shall be laid down on terminal punch blocks and identified by the actual room location it serves. All the communications points shall be wired into this main distribution frame, laid down in sequence, and identified by which line it is on and the point position it serves. Provide separate termination blocks for field and equipment. Cross connect circuits for proper operation.

.3 The contractor shall provide necessary transient protection on the AC power feed, all station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.

3.1.13 Wiring Within Enclosures:

.1 Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.

.2 Provide physical isolation from each other for speaker-microphone, line-level, speaker-level, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12 inch minimum separation between conductors to speaker-microphones and adjacent parallel power and telephone wiring. Provide physical separation as recommended by equipment manufacturer for other Integrated Electronic Communications Network system conductors.

.3 Splices, Taps, and Terminations: Make splices, taps and terminations on numbered terminal punch blocks in junction, pull, and outlet boxes, terminal cabinets and equipment enclosures. Splices of conductors in underground pull boxes is not permitted.

.4 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.

3.1.14 Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

3.1.15 Grounding:

.1 Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.

.2 Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

.3 The contractor shall provide all necessary transient protection on the AC power feed and on all station lines leaving or entering the building.

.4 The contractor shall note in his system drawings, the type and location of these protection devices as well as all wiring information.

.5 The contractor shall furnish and install a dedicated, isolated earth ground from the central equipment rack and bond to the incoming electrical service ground buss bar.

3.2 FIELD QUALITY CONTROL

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

3.2.2 Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.

3.2.3 Testing:

.1 Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the system is operating as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds. Perform all tests stated in each separate system specification.

.2 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 The Owner reserves the right to make independent tests of all equipment furnished to determine whether or not the equipment complies with the requirements specified herein and to accept or reject any or all of the equipment on the basis of the results thereby obtained.

3.3 CLEANING AND PROTECTION

3.3.1 The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., the Contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.

3.4 COMMISSIONING

3.4.1 Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Provide a minimum of 8 hours training. Operators Manuals and Users Guides shall be provided at the time of this training.

3.4.2 Schedule training with Owner through the Architect, with at least seven days advance notice. This instruction time shall be divided as directed by the Owner.

3.5 WARRANTY

3.5.1 The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the purchaser.

3.5.2 The Contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

3.5.3 A typewritten notice shall be posted at the equipment rack which shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

END OF SECTION