

SECTION 27 00 00 - COMMUNICATIONS BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies the common administration basic requirements and common methods for all low voltage systems installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.

1.02 STANDARDS, REGULATIONS, AND CODES REFERENCES

- A. The following Standards, Regulations and Codes apply to work specified in the Contract Documents
1. Applicable State and Local Codes.
 2. California Building Code and California Electrical Code, Current Editions.
 3. BICSI TDMM (Telecommunications Distribution Methods Manual), 11th Edition 2006.
 4. ANSI/TIA/EIA-568-B.1. Commercial Building Telecommunications Cabling Standard,
 5. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 2, Grounding and Bonding Specifications for Screened Balanced Twisted-Pair Horizontal Cabling.
 6. ANSI/TIA/EIA-568-B.1-3. Commercial Building Telecommunications Cabling Standard.
 7. ANSI/TIA/EIA-568-B.1-4. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 4, Recognition of Category 6 and Category Cat 6A and 50 nm Laser-Optimized 50/125 um Multimode Optical Fiber Cabling.
 8. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.

- A. The following is a list of abbreviations generally used in Divisions 27 & 28:
1. ADA - Americans with Disabilities Act
 2. AHJ - Authority Having Jurisdiction
 3. ANSI - American National Standards Institute
 4. APWA - American Public Works Association
 5. ASTM - American Society for Testing and Materials
 6. CBC - California Building Code
 7. CEC - California Electrical Code
 8. CFC - California Fire Code
 9. FCC - Federal Communications Commission
 10. HVAC - Heating, Ventilating and Air Conditioning
 11. IEC - International Electro-technical Commission
 12. IEEE - Institute of Electrical and Electronics Engineers.
 13. IETA - International Electrical Testing Association
 14. FM - FM Global
 15. NEMA - National Electrical Manufacturers Association
 16. NFPA - National Fire Protection Association
 17. OSHA - Occupational Safety and Health Administration
 18. UL - Underwriters Laboratories Inc.
- B. Provide: To furnish and install, complete and ready for the intended use.
- C. Furnish: Supply and deliver to the project site, ready for unpacking, assembly, and installation.
- D. Install: Includes unloading, unpacking, assembling, erecting, installing, applying, finishing, protecting, cleaning and similar operations at the project site to complete items of work furnished by others.
- E. Following is a list of commonly used terms in Division 27:
1. Active Equipment: Electronic equipment used to develop various WAN and LAN services.
 2. Backbone: Collective term sometimes used to describe the campus and vertical distribution

8. Cross-Connect: Equipment used to terminate and tie together communications circuits.
9. Cross-Connect Jumper: A cluster of twisted-pair conductors without connectors used to establish a circuit by linking two cross-connect termination points.
10. Fiber Optic Distribution Unit (FDU): Cabinet with terminating equipment used to develop fiber optic cross-connect facilities. Also known as LIU.
11. Grounding: a conducting connection to earth, or to some conducting body that serves in place of earth.
12. Hinged Cover Enclosure: Wall-mounted box with a hinged cover that is used to house and protect electrical devices.
13. Horizontal: Pathway facilities and media connecting communications rooms to Telecommunications Outlets.
14. Intermediate Distribution Frame (IDF): Data networking equipment rack and/or location that serves individual buildings. Downstream from MDF.
15. Jack: Receptacle used in conjunction with a plug to make electrical contact between communications circuits, e.g., eight-position/eight-contact modular jacks.
16. Link: A transmission path between two points, not including terminal equipment, work area cables, and equipment cables; one continuous section of conductors or fiber, including the connecting hardware at each end.
17. Local Area Network (LAN): Data transmission facility connecting several communicating devices e.g., serial data, Ethernet, token ring, etc. Typically, the network is limited to a single site.
18. Main Distribution Frame (MDF): Initial (main) data network equipment rack and/or location. Only one MDF occurs per site and may serve many downstream IDFs.
19. Media: Twisted-pair, coaxial, and fiber optic cable or cables used to provide signal transmission paths.
20. Minimum Point of Entry (MPOE): The location where the service provider hands off connection and responsibility for service to on premise customer owned equipment.
21. Modular plug: For Cat6A an eight-position end-of-wire electrical connector.
22. Passive Equipment: Non-electronic hardware and apparatus, e.g., equipment racks, cable trays, electrical protection, wiring blocks, FDUs, etc.
23. Patch Cord: A length of wire or fiber cable with connectors on one or both ends used to join communications circuits at a cross-connect.
24. Patch Panel: System of terminal blocks or connectors used with patch cords that facilitate the administration of cross-connect fields.
25. Pathway: Facility for the placement of communications cable. A pathway facility can be composed of several components including conduit, wireway, cable tray, surface raceway, underfloor systems, raised floor, ceiling support wires, etc.
26. Protectors: Electrical protection devices used to limit foreign voltages on metallic communications circuits.
27. Raceway: An enclosed channel designed expressly for holding wires or cables; may either conductive metal or insulating plastic. The term includes conduit, tubing, wireway, underfloor raceway, and surface raceway; does not include cable tray.
28. Racks: An open or enclosed, freestanding, floor-mounted structure, typically made of aluminum or steel, used to mount equipment; usually referred to as an equipment rack.

29. Wiring Block: Punch down terminating equipment used to develop twisted pair cross-connect facilities.

1.04 PRODUCT AVAILABILITY

A. Products with long lead times are to be brought to the attention of the project manager.

1.05 PRODUCT SUBMITTALS

5. Holds and maintains a valid California C-7 or C-10 State Contractors License and can exhibit validity upon request.
6. A list of test equipment proposed for use in verifying the installed integrity of copper and fiber optic cable systems used.
7. A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who will be assigned to this project.
8. A list of technical product training attended by the contractor's personnel that will install the specified manufacturer system.
9. List of Sub-Contractor(s) who will assist the contractor in the performance of this work.

1.08 SEQUENCING AND SCHEDULING

2. Show exact routes of cable tray, surface raceway, conduits, and service entrance conduits.
 3. Show the exact location of racks, cabinets, mounting frames and the like.
- C. Operation and Maintenance Documentation: Provide copies of certificates of code authority acceptance, product data, guarantees, warranties, installation guides, maintenance guides and the like.
- D. Inspection and/or testing: Submit testing reports for testing that was performed.

^ PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide like items from one manufacturer, such as wire/cable, jacks, modular plugs, patch panels, equipment connection cords, wall plates, and the like. See individual sections for detailed information.

2.02 MATERIALS

- A. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established. Indicated brand names and catalog numbers are used to establish standards of performance and quality.
- B. Provide material and equipment that is acceptable to AHJ as suitable for the use indicated. For example, provide plenum rated cable in ceilings that are utilized as air return plenums.
- C. Include special features, finishes, accessories, and other requirements as described in the Contract Documents regardless of the item's listed catalog number.
- D. Provide incidentals not specifically mentioned herein or noted on Drawings, but needed to complete the system, in a safe and satisfactory working condition.

PART 3 - EXECUTION

3.01 EXAMINATION

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SECTION 27 05 00 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies the basic materials and methods for all low voltage pathways installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.
- B. This section adds refinements to Division 26 that apply to Communications and extra-low-voltage systems.

1.02 SCOPE

- A. Materials and/or methods for the following.
 - 1. Communication services
 - 2. Grounding
 - 3. Fasteners
 - 4. Hangers and supports
 - 5. Conduits/Backboxes/Raceways
 - 6. Underground
 - 7. Sleeves and penetrations

1.03 SUBMITTALS

- A. Submittals shall be done in accordance with District submittal procedures, see Division 01 Submittals for requirements.

1.04 RELATED REQUIREMENTS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. 26 00 00 – Electrical
- C. 27 00 00 – Communications Basic Requirements

1.05 REFERENCES

- A. ANSI American Nation Standards Institute
- B. NFPA 70 – National Electrical Code

- C. UL Underwriters Laboratory
- D. California Building Code (CBC)
- E. California Electrical Code (CEC)

1.06 WARRANTY

- A. Refer to Division 01 -- Warranties

PART 2 – PRODUCTS

2.01 All products used on this project shall bear the label and be approved by Underwriters Laboratories unless otherwise approved in writing by District.

2.02 FASTENERS

- A. Mounting hardware and anchors recommended by the manufacturer of any material that shall be mounted to the building or structure.
 - 1. Sheet rock / drywall / wall board: Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.
 - 2. Concrete / cinder block / solid masonry: Expanding compression type lag, expanding compression type bolt, expanding compression type, all-thread with nuts, or approved equal.
 - 3. Tile / Stucco / hollow masonry: Toggle bolts or approved equal.
 - 4. Wood: Lag screws, wood screws, or approved equal.
 - 5. Metal: Beam clamps, sheet metal screws, self-drilling screws or approved equal.

2.03 HANGERS AND SUPPORT

- A. D-RINGS

- E. Junction boxes used for Fire Alarm systems are to be red in color with red colored cover plates.

2.07 GROUND BOXES

- A. See Division 26 for requirements.
- B. Approved manufactures are Jensen, Christy or approved equal.
- C. All ground boxes shall have metal traffic-rated lids with permanent factory markings of COMM or COMMUNICATIONS.
- D. Minimum size is 17" x 30"

2.08 PENETRATION SEALING

- A. Firestopping: Provide UL Listed Firestopping materials for all penetrations through rated assemblies (walls / floors).
- B. Draft stopping: Foam sealant for use around conduit penetrations (in non-rated assemblies) to prevent passage of air, smoke, and/or toxic gas.
- C. Weatherproofing: Weatherproof sealant for use around conduit penetrations in exterior walls to prevent the intrusion of water.

2.09 GROUNDING BUS BAR

- A. Copper bus bar 2"x10"x1/4" minimum size with stand-off brackets and insulators, pre-drilled and threaded mounting holes (hole qty. 12 or greater) for equipment grounding lug attachment.

PART 3 - EXECUTION

3.01 COMMUNICATION SERVICES

- A. Install underground boxes, conduits, and terminal cabinets per service provider requirements.

3.02 GROUNDING

- A. Ground fittings shall be UL approved for each application and installed and/or connected to system in accordance with current CEC Code requirements.
- B. See Division 26 for additional requirements.
- C. Install grounding bus bar per manufacturer's instructions and to be in each MDF and IDF.

3.03 HANGERS AND SUPPORTS

- A. Install hangers and supports per manufacturer's written instructions.
- B. Hanger spacing shall be 48" or less and within 12" of sleeves and/or junction/back boxes.

3.04 LOW VOLTAGE PATHWAY/RACEWAYS

- A. EMT conduit may be used at following locations (see Division 26 for exact requirements):
 - 1. In dry locations in furred spaces.
 - 2. In partitions other than concrete or solid masonry.
 - 3. In protected exterior locations not exposed to direct weather.
- B. Rigid steel conduit and fittings shall be used for vertical risers and on top of all roofs, overhangs, walkways, canopies, or any other location exposed to direct weather. See Division 26 for exact requirements.
- C. Furnish and install pull lines in all unused (empty) conduits or raceways. All pull lines shall be permanently tagged with identification at both ends.
- D. Install exposed conduit neatly, parallel to or at right angles to structural members. Maintain a

- D. For sound control, separate outlets on opposite sides of walls 16" minimum. Where outlets are less than 16" or in sound rated walls, seal airtight with fire rated sheet putty pads. Fill gap between junction box and wall with acoustical sealant all around perimeter of junction box. Fill conduits larger than 1 1/4" with fire rated putty.
- E. Installation of conduit and outlet boxes in fire-resistive walls, floors, floor-ceiling or roof-ceiling assemblies shall comply with Title 24, Part 2, Section 713.

3.06 UNDERGROUND BOXES

- A. To be installed per Division 26 requirements.
- B. Provisions to be made for supporting cables from the box sides (i.e., j-hooks, d-rings)

3.07 SLEEVES AND CONDUIT PENETRATIONS

- A. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways mounted to the same wall as the penetration provide a threaded conduit and secured in place with locking rings on both sides. Bend radius requirements shall be maintained where penetrations are made through the back of raceways; junction boxes with adequate depth shall be installed to comply with this requirement.
- B. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways not mounted to the same wall as the penetration, provide EMT conduit and secured in place with strut channel. Box connectors shall always be used to connect EMT to junction boxes and raceways.
- C. FIRE STOPPING
 - 1. Seal all conduit penetrations through fire rated walls and floors fire and smoke tight in conformance with current CBC and current CEC.
- D. DRAFT STOPPING
 - 1. All non-fire rated walls must be draft stopped and sealed. Submit method to be used for approval by inspector and/or project manager. Mineral wool is one product that may be used.
- E. WEATHER SEALING
 - 1. All exterior penetrations shall be sealed watertight. The contractor shall use silicon rubber caulk or other approved methods and materials. Submit method and material with inspector and/or project manager.

3.08 CLEANING

- A. Clean all work prior to concealing, painting, and acceptance. Performed in stages if directed.
- B. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.
- C. Remove debris from inside and outside of equipment and enclosures.

3.09 FINAL DOCUMENT SUBMITTALS

- A. See 27 00 00 for more information.

END OF SECTION

SECTION 27 10 00 - STRUCTURED CABLING

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable Structured Cabling communications system. The system shall provide highly reliable and high-performance data communication from main distribution frame (MDF) through each intermediate distribution frame (IDF) to end points requiring fiber optics and/or copper cabling and associated equipment.
- B. This section condenses sections 27 11 00 – Communications Equipment Room Fittings, 27 13 00 – Communications Backbone Cabling, 27 15 00 – Communications Horizontal Cabling and 27 16 00 – Communications Connecting Cords into one comprehensive section.

1.02 SCOPE

- A. The work will include but not be limited to the following objectives:
 - 1. Contractor shall furnish and install all required components and accessories as outlined in the design documents for a complete and operable turn-key system.
 - 2. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the standards and requirements prior to beginning work
 - 3. The Contractor shall furnish and install all required fire-treated $\frac{3}{4}$ " (three quarter inch) plywood for the MDF and all IDF locations.
 - 4. The Contractor shall furnish and install a ground bus bar at the MDF and IDF rooms.
 - 5. The Contractor shall furnish and install all required racks and cabinets.
 - 6. The Contractor shall furnish, install, and configure uninterruptable power supply(ies) (UPS) for the MDF and/or IDF racks.
 - 7. The Contractor shall furnish and install all newly required conduit/raceway.
 - 8. The Contractor shall furnish and install all wire/cable (copper/fiber optic) as required.
 - 9. The Contractor shall terminate all strands of fiber at each fiber enclosure.
 - 10. The Contractor shall furnish and install termination all end-point equipment (patch panels, jacks, wallplates, enclosures, etc.).
 - 11. The Contractor shall furnish and install all patch cords (copper/fiber).
 - 12. The Contractor shall test and certify installed cable plant.

1.03 RELATED REQUIREMENTS

Leaf Engineers
Project No. 230235

Camellia E.S. Tele-Center Upgrade Project
Sacramento City Unified School District

STRUCTURED CABLING
27 10 00

1.08 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.09 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.
- C. 15-year manufacturer's warranty/certification required for all copper and fiber cable plant installations.

1.10 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.01 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Contractor shall confirm all equipment part numbers with the Project Manager or District prior to ordering equipment and updating submittals as required.
- D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.
- E. Install mounting hardware and anchors as recommended by the Manufacturer of the equipment that requires mounting to the building or structure and adhere to all code requirements. See section 27 05 00 for requirements.
- F. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.02 MANUFACTURERS AND PRODUCTS

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and approval by District and/or its representative.

2.03 COPPER/FIBER OPTIC CABLES AND COMPONENTS

- A. All copper cables and components shall be Cat6A rated.
 1. Cable to be reduced diameter.

- C. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to job bidding. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for accurate bidding and performance of the Work.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.
- B. The Contractor shall verify the availability of power where required.

3.04 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00 for this section.
- B. Submit drawings for review and approval by the Project Manager.

3.05 INSTALLATION

A. ENTRANCE FACILITIES

1. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and housing when so directed by service provider.
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with a minimum No. 6 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

3. Bond metallic equipment (including ladder rack) to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.06 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District' Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.07 WIRE/CABLE (COPPER/FIBER OPTIC)

- A. Design, layout, size, and plan new cable runs as required.
- B. All wire and cable passing through metalwork shall be sleeved by an approved grommet or bushing.
- C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.
- D. Neatly dress and tie (Velcro) all cabling.
- E. UTP cabling shall conform to a 6-foot separation requirement from the main power panel, transformers, switchgear and/or starter motors adjacent to the MDF, IDF and termination locations.
- F. Fiber optic cable shall be installed from the MDF to each IDF.
- G. Orange corrugated HDPE (High Density Polyethylene) Innerduct shall be used for fiber optic cable protection in all interior locations.
- H. Spicing of fiber optic cable shall be done with fusion splices.
- I. When required copper feeders (minimum 4-pair) are to be installed from the MDF to each IDF

- J. Maintain proper bend radius for all cable installations.
- K. Do not exceed cable manufacturer's instructions for installation pull load. Any cable damaged by excessive pull force shall be replaced by the installing contractor.
- L. Modular plug terminated link (MPTLeers .h08n0

- C. During the formal Test & Inspection (Commissioning) of the system, the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.
- F. Provide 15-year manufacturer's warranty/certification documentation for all copper and fiber cable plant installations.

3.11 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

DESCRIPTION	MFG	PART NUMBER
Rack Cabinet 7'	DAMAC	CS84EDB1BSS3
Wall Mount Cabinet 48"	DAMAC	

(White)		
Cat6A Data Jacks (White)	Ortronics	KT2J6A-88
Cat6A Data Jacks (Green)	Ortronics	KT2J6A-45
Cat6A Data Jacks (Blue)	Ortronics	KT2J6A-36
Cat6A Data Jacks (Yellow)	Ortronics	KT2J6A-44
Cat6A Data Jacks (Black)	Ortronics	KT2J6A-00
Cat6A Data Cable, Reduced Diameter, Riser (White = default)	Berk-Tek	11143100
Cat6A Data Cable, Reduced Diameter, Plenum (White = default)	Berk-Tek	11141651
Cat6A Data Cable, Reduced Diameter, Riser (Blue = CCTV/Access Control)	Berk-Tek	11142398
Cat6A Data Cable, Reduced Diameter, Plenum (Blue = CCTV/Access Control)	Berk-Tek	11141650
Cat6A Data Cable, Reduced Diameter, Indoor/Outdoor (Black)		
Cat6A Patch Cord (Blue)	Quiktron	576-A10-0xx (xx = length)
Cat6A Patch Cord (Green)	Quiktron	576-A20-0xx (xx = length)
Cat6 Patch Cord Slim 1' (Blue)	C2G	01072
Cat6 Patch Cord Slim 1' (Green)	C2G	01160
Fiber Optic LIU 1-RU	Ortronics, Infinium	INFC01U-M4-E
Fiber Optic LIU 2-RU	Ortronics, Infinium	INFC02U-M4-E
Fiber Optic Adapter	Ortronics, Infinium	HDFP-LCD12AC
Fiber Optic LC Field Term Connector	Ortronics	205KAN9GASM
Fiber Optic Fanout Kit	Ortronics	61500858
Fiber Optic Cable Single-Mode OS2, Indoor/Outdoor	Superior Essex	W4012J101
Fiber Optic Cable Single-	Berk-Tek	PDP012AB0707-I/O-C4(YEL)

Mode OS2, Indoor/Outdoor		

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PART 3 - EXECUTION

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Equipment Appendix - Provide the following network and UPS equipment for Camellia Elementary as shown below:

230235 - Camellia E.S. Tele-Center Upgrade Project		DESCRIPTION
4	C9300L-24P-4Y-EBU	Cisco - C9300L-24P-4Y-5PU Catalyst Full Def. 4x10G/4G
4	C9300L-DNA-F-24-3Y	Cisco - C9300L-DNA Essentials, 24 Port, 3 year term
	ESPEP017-423-4800-module	Cisco - EPEP017-423-4800-Mod
	SMC15002URM	SMC - SMC15002URM

Leaf Engineers
Project No. 230235

Camellia E.S. Tele-Center Upgrade Project
Sacramento City Unified School District

EDUCATIONAL INTERCOM S m1J S m1TEMSt

- I. Existing systems shall remain operable until the new system is accepted and approved by the District or the District's representative.
- J. The Contractor is responsible for user/operator training (maximum 2 hours).
- K. The Contractor shall complete all required project closeout documentation in a timely fashion.

1.03 RELATED REQUIREMENTS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 27 00 00 - Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.
- E. Section 27 10 00 – Structured Cabling

1.04 REFERENCES

- A. See section 27 00 00 for requirements.

- B. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five (5) years' experience installing Rauland Telecenter equipment.
- C. The contractor shall possess a California a C7 or C10 license.
- D. The Contractor or Subcontractor shall be Rauland Telecenter authorized to provide and install equipment with 5 years documented experience.

1.10 CERTIFICATIONS

- A. Installers shall be manufacturer certified..

1.11 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.
- F. Contractor shall be responsible for scheduling Subcontractors in a timely fashion.

1.12 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.13 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

- A. The equipment shall only be installed by Contractors who are qualified and certified by the manufacturer to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing educational intercom equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the District's Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the District's Project Manager.
- C. Submit and receive approval shop drawings prior to work commencement.

3.04 PATHWAY INSTALLATION

- A. See Division 26 and Section 27 05 00 for requirements and more information.
- B. Existing Construction:
 - 1. Refer to design documents.
 - 2. Surface raceway and components shall be Wiremold 2300.

3.05 EQUIPMENT INSTALLATION

- A. Equipment to be wired and installed per manufacturer's instructions.
- B. The Contractor shall coordinate with the District's IT Department if connecting to their network. The Contractor shall provide a spreadsheet of all device MAC addresses indexed by device location to the District IT department to facilitate programming of reserved IP addresses for each device.

- C. Installation shall be in accordance with applicable codes (i.e. NEC, NFPA 72) local and state codes shown on the drawings, and as recommended by the major equipment manufacturer.
- D. Perform all Work as indicated in the Drawings and Specifications.
- E. All low voltage cables shall be kept away from power circuits.
- F. Contractor shall provide programming and configuration of the Educational Intercom system for full functionality.
- G. Contractor shall maintain a complete, up-to-date backup of the system configuration. Backup shall be maintained throughout programming period until final Acceptance by District. Submit back-ups to District upon Final Acceptance.

3.06 LABELING/SCHEDULES

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Label all standard speaker cables with port ID.
- C. Label all speakers with speaker ID.
- D. Label all IP speakers with MDF/IDF, patch panel and jack numbers.

3.09 CONFIGURATION

- A. All equipment to be fully configured and tested for functionality prior to testing.

3.10 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.

Leaf Engineers
Project No. 230235

Camellia E.S. Tele-Center Upgrade Project
Sacramento City Unified School District

- Baffle ACC3011S
 - Message Board TCC3011S
- Add: IP Classroom module
Sp000cm BT /FAAADD c (for use withLSO:

Clock/Speaker surface combo
(for use with 12" Round clocks)

Rauland

Lowell
Lowell

1.04 REFERENCES

- A. See section 27 00 00 for requirements.

1.05 DEFINITIONS

- A. See section 27 00 00 for requirements.

1.06 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Clock system where applicable.

1.07 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.08 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

1.09 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five (5) years' experience installing communications equipment systems.

1.10 CERTIFICATIONS

- A. See section 27 00 00 for requirements.

1.11 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

D. Perform Work with persons experienced and qualified to produce workmanship specified.

E. Maintain quality control over suppliers and Subcontractors.

F. Contractor shall be responsible for scheduling Subcontractors in a timely fashion.

1.12 WARRANTY

A. Refer to Division 01 Warranty section.

B. See section 27 00 00 for additional requirements.

1.13 CLOSEOUT DOCUMENTS

A. See section 27 00 00 for requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers - See Appendix A at the end of this document for pre-approved materials.

B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing electronic clock equipment before the Bid Opening Date.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to sponss) wil0blITJ 1 0ITJ 1 0ITJ 1 0lon ph-1(diti)-o9e perforJ 01(ctlv4ain)-1(g2)-

- B. Data drops to be installed inside flush single-gang back box at clock location.
- C. Clocks to be installed over wiring connection outlet.

- D. Clocks to be installed flush against the mounting surface with no overhang.

3.11 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.